Mental Health and Illness Worldwide
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Norman Sartorius · Ee Heok Kua

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Editors

Mental Health and Illness of Children and Adolescents

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Mental Health and Illness Worldwide

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Mental Health and Illness of Children and Adolescents

With 39 Figures and 42 Tables

Springer

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Anula Damayanthi Nikapota *In Memoriam*
The current editors would like to make a special acknowledgement to Dr. Anula Nikapota, who sadly died during the preparation of this volume. We want this handbook to be a tribute to her memory and a recognition of the inspiration she has given to international mental health. After graduation, in Sri Lanka, she worked with distinction as consultant in charge of a Maudsley community service in a highly multicultural part of London. There, she showed herself to be a superb clinician – wise and knowledgeable, with an unerring ability to engage children and families from diverse backgrounds. She pioneered strategies to improve the working relationships between child and adolescent mental health services and the wider community. Dr. Nikapota developed and ran an excellent Diploma/M.Sc. course in Child and Adolescent Mental Health at the Institute of Psychiatry, Psychology and Neuroscience, King's College London, with an emphasis on multidisciplinary and multicultural approaches. The graduates of the course now

include distinguished clinicians from over 50 countries, and for its 30th anniversary in 2018, many of her previous students returned to London for the celebration.

At the UK's Association for Child and Adolescent Mental Health (ACAMH) she was the international development officer and was responsible for its granting free memberships in the lowest income countries and extending its training systems. Internationally, she was very active in training, consulting, and promoting connections in countries developing their services, including Sri Lanka, Japan, Cambodia, and Bangladesh. She will be remembered with affection by many, not only for her fine professional contributions, but also for her sparkling personality and deep cultural interests and attainments.

Foreword

I am delighted to pen the foreword to *Mental Health and Illness Worldwide – Mental Health and Illness of Children and Adolescents*. We recognized early on the need for a comprehensive reference and resource for mental health in children and adolescents. Prof. Eric Taylor and his editors have met that need, and all having contributed significantly to the evolution of child mental health services across many countries.

In addition to providing a practical resource containing the core science of mental health principles for children and adolescents, it is part of a series of seven volumes titled Mental Health and Illness Worldwide.

This work takes its place as one of the most comprehensive yet readable books on the subject and I am pleased to see that the volume editors have succeeded in inviting outstandingly knowledgeable and recognized authors for the chapters of this book. This volume will cover various major issues in the field of mental health in children and adolescents and is organized into parts such as Diagnostic Classification, Assessment and Cultural Diversity, Epidemiology, Childhood Adversities, Maternal Health and the Infant, Physical Conditions and Child and Adolescent Mental Health, Neurological Conditions, Prevention, Treatment and Services, Mental Public Health Strategy and Policy, Health Economics, Education and Training of Child Mental Health Professionals. Each chapter in the sections contains evidence-based background information emphasizing core science, intended for the students and professionals to have a guide to the current state of knowledge and will provide a single resource that reveals important recent developments in research and service delivery.

It is my hope and expectation that this book will provide an effective learning experience and referenced resource for all mental health professionals caring for children and adolescents, leading to improved patient care. The volume editors, Prof Eric Taylor, Prof Frank Verhulst, the late Dr. Anula Nikapota, Prof John Chee Meng Wong, and Prof Keiko Yoshida, deserve rich praise for shepherding this effort to collect so much wisdom within a single cover.

Lien Ying Chow Professor in Medicine
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Chong Yap Seng

Series Preface

Psychiatry lives exciting and challenging times. Advances of knowledge stemming from basic sciences and epidemiological and clinical research have provided a better understanding of the etiopathogenesis, psychopathology, and natural history of mental disorders. Improved methods of treatment have changed clinical practice and prolonged the life of people with mental illness. Economic consideration and the emphasis on human rights of people with mental illness made a profound impact on the way in which psychiatry is to be practiced.

Regrettably, however, psychiatry is not practiced in the same manner around the world. Undergraduate and postgraduate education in psychiatry varies in content and duration from country to country. Psychiatrists use different doses of medication for the same disorders. The systems of care for people with mental illnesses differ in the organization and content of their interventions. Support to scientific investigations of matters related to psychiatry fluctuates and in many countries amounts to very little.

Information about the function of psychiatric services varies in quantity and quality. The series of seven books on Mental Health and Illness Worldwide aims to help in reducing these differences and facilitate international collaboration in psychiatry. We have invited top experts from different countries to edit the volumes, and they have in turn selected authors from different parts of the world. We have also decided to approach the body of psychiatry from a public health and epidemiological perspective rather than have books dealing with different groups of diseases. The series includes books examining and presenting knowledge assembled according to social and public health variables – gender, urbanity, migratory status, age, and education. Each of the volumes has adopted a wide perspective and included chapters based on knowledge stemming from epidemiology, on results of the investigation of cultural issues, on the best of psychopathology, on the results of the investigation of biological factors, mental health care and its innovations, health economics, and experience gained in preventive programs. The volume editors have agreed to aim at producing volumes marked by the balance of information and knowledge from basic social and behavioral sciences and from clinical practice.

The seven volumes of this opus are:

1. Mental Health and Illness of the Elderly
   Editors: Helen Chiu (Hong Kong) and Ken Shulman (Canada)

2. Mental Health and Illness in the City
   Editors (Denmark): Povl Munk-Jorgensen, Niels Okkels, and Christina Kristiansen
3. Mental Health and Illness of Women
   Editors: Prabha S. Chandra (India), Helen Herrman (Australia), Jane Fisher (Australia) and Anita Riecher-Rössler (Switzerland)
4. Mental Health and Illness in the Rural World
   Editor: S. K. Chaturvedi (India)
5. Mental Health, Mental Illness and Migration
   Editors: Driss Moussaoui (Africa), Dinesh Bhugra (United Kingdom), and Antonio Ventriglio (Italy)
6. Mental Health and Illness of Children and Adolescents
   Editors: Eric Taylor (United Kingdom), Frank Verhulst (Netherlands), John Chee Meng Wong (Singapore), and Keiko Yoshida (Japan)
7. Education About Mental Health and Illness
   Editors: Marc H.M. Hermans (Belgium), Tan Chay-Hoon (Singapore), and Edmond Pi (USA)

We were delighted to see that the volume editors have succeeded in recruiting outstandingly knowledgeable authors for the chapters of their books. Most of them have received worldwide recognition for their contributions in their fields of specialization, and all of them have written their texts with authority and excellent judgment concerning the materials to be included.

We believe that these series of books demonstrate the importance and value of interdisciplinary and international collaboration and that it will provide readers a global perspective of mental health and mental illness. We also hope that it will help to make our discipline more homogenous and bring its practitioners worldwide closer together in the pursuit of helping people with mental illness worldwide.

We wish to express our profound gratitude to Professors Eric Taylor, Frank Verhulst, John Chee Meng Wong and Keiko Yoshida, the editors of this volume on *Mental Health and Illness of Children and Adolescents* for their dedication and commitment to this excellent work.

August 2020

Norman Sartorius
Ee Heok Kua

Volume Preface

This volume gives an account of practice, knowledge, and science of mental health and its problems in children and adolescents across the world. Like the other volumes in the series, it approaches mental health from a public health and epidemiological perspective rather than dealing primarily with different groups of diseases.

The genesis of the book was in the editors' recognition, from international experience in training and practice, that services for young people are very diverse and all too often face massive challenges. The development of child and adolescent mental health services (CAMHS) is a national priority for many countries. The needs are all too often underestimated. Challenges come from several directions:

- The magnitude of the burden of child and adolescent mental disorders is great and enduring. The surveys described in our sections on epidemiology emphasize that most adult mental disorders begin in childhood and adolescence. Suicide in the young is increasing. Anxiety, depression, and behavioral disorders remain highly prevalent even in countries where physical health has advanced markedly. The prevalence of neurodevelopmental disorders such as autism and ADHD is increasing rapidly in many countries. The stigma attached to mental disorders and conditions such as epilepsy reduces the quality of life.
- These negative aspects of mental health changes come in spite of impressive advances in relevant sciences. Increasing knowledge from trials of how to treat disorders is accompanied by developmental knowledge about social, cultural, familial, neurological, and other physical influences on mental life. They emphasize the potential of a life cycle approach. This book correspondingly includes accounts of adverse influences before birth, in infancy, childhood and adolescence, and in the transition into adulthood. The evidence base for what works has been used to inform recommendations about service development.
- Barriers to treatment are formidable. Financial cuts, geographical difficulties in delivery, and continuing reliance on delivering resources to stand-alone mental hospitals rather than strengthening community capacities to promote resilience and recovery all play a part in failures to match needs with provision. We have therefore included considerations not only of specific therapies but also of how to implement strategies for service delivery in different contexts and for promotion

of health and prevention of disorder. Children and adolescents with mental health problems are a vulnerable and marginalized group. Professionals in primary and specialized care are too few in many countries. The mismatch between the size of the child mental health workforce and the number of children who need support implies that recruitment and training need to be developed, and public health approaches to the problems will be relevant for mental health promotion, prevention of disorder, treatment provision, care, and recovery.

We have therefore aimed to give global coverage of child mental health challenges and service improvement strategies, with a special focus on emerging economies and developing countries. While it aligns with ICD 11 classifications of disorders, our focus has been on these key challenges rather than developing another specialist text built around diagnoses. The book draws on research evidence from many countries, but the emphasis will be on experts giving an integrated account rather than extensive citing of primary sources. The contributing authors come from many countries. They all have wide experience and recognized authority in their various fields. It has been a privilege to work with them.

August 2020

Eric Taylor
Frank Verhulst
John Chee Meng Wong
Keiko Yoshida

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About the Series Editors

Professor Norman Sartorius obtained his M.D. in Zagreb (Croatia). He specialized in neurology and psychiatry and subsequently obtained a Master's Degree and a Doctorate in Psychology (Ph.D.). He carried out clinical work and research and taught at graduate and postgraduate levels at the University of Zagreb, at the Institute of Psychiatry in London, at the University of Geneva, and elsewhere. Professor Sartorius joined the World Health Organization (WHO) in 1967 and soon assumed charge of the program of epidemiology and social psychiatry. In 1977, Professor Sartorius was appointed Director of the Division of Mental Health of WHO. He was the Principal Investigator of several major international studies on schizophrenia, depression, and of mental and neurological disorders. In 1993, Professor Sartorius was elected President of the World Psychiatric Association (WPA) and served as President-elect and then President until August 1999, after which he was elected President of the European Psychiatric Association. Professor Sartorius is currently the President of the Association for the Improvement of Mental Health Programmes, and he is a member of the Geneva Prize Foundation, having been its President from 2004 to 2008. Professor Sartorius holds professorial appointments at universities in different countries including China, UK, and USA.

Professor Sartorius has published more than 400 articles in scientific journals, authored or co-authored 12 books, and edited more than 80 others. He is the coeditor of three scientific journals and is a member of editorial and advisory boards of many scientific journals. Professor Sartorius is also a corresponding

member and fellow of a large number of international organizations and advisory boards. He has several honorary doctorates and is a member of academies of science and of medicine in different countries. He speaks Croatian, English, French, German, Russian, and Spanish.

Dr. Ee Heok Kua is the Tan Geok Yin Professor of Psychiatry and Neuroscience at the National University of Singapore (NUS) and Senior Consultant Psychiatrist at the National University Hospital, Singapore.

He was trained as a doctor at the University of Malaya and received postgraduate training in psychiatry at Oxford University and geriatric psychiatry at Harvard University.

A member of the World Health Organization team for the global study of dementia, he is the previous Head of the Department of Psychological Medicine and Vice Dean, Faculty of Medicine, at NUS, and the Chief Executive Officer and Medical Director at the Institute of Mental Health, Singapore.

His research interest includes depression, dementia, and alcoholism, and he has written 23 books on psychiatry, aging, and addiction. A novel he wrote, Listening to Letter from America, is used in a module on anthropology at Harvard University.

The former President of the Pacific-Rim College of Psychiatrists and President of the Gerontological Society of Singapore, he was Editor of the Singapore Medical Journal and Asia-Pacific Psychiatry journal.

About the Editors

Eric Taylor, FRCP, FRCPsych (Hon), FMedSci, is Emeritus Professor of Child and Adolescent Psychiatry at King's College London, Institute of Psychiatry, Psychology and Neuroscience, and is an honorary consultant at "The Maudsley" and a Trustee of Place2Be. He has been senior consultant for inpatient and outpatient services and developed specialist clinics for child neuropsychiatry. He was a Nonexecutive Director of the South London and Maudsley NHS Trust. His research has included longitudinal epidemiology, nosological distinctions within the ADHD spectrum, neuropsychology and neuroimaging, molecular genetics, and treatment trials. He has trained, supervised, or mentored many individuals, directed a higher training program for child psychiatry specialists, and taught the subject in courses in Italy, Germany, Egypt, Singapore, and Japan. He has won the Ruane Prize from NARSAD for severe child psychopathologies, the Heinrich Hoffman medal from the World ADHD Federation, an ADDISS Award, a Lifetime Achievement Award from APSARD, and the inaugural President's Medal from ACAMH.

Frank Verhulst is Emeritus Professor of Child and Adolescent Psychiatry at Erasmus University Medical Center, Rotterdam, the Netherlands, and Affiliated Professor at the University of Copenhagen, Denmark. He was knighted by the Dutch King and is Member of Merit of the Dutch Society of Psychiatry. His main research field is psychiatric epidemiology. He was Joint Editor and Editor-in-Chief of the *Journal of Child Psychology and Psychiatry* and Editor at large of the *Journal of the American Academy of Child and Adolescent Psychiatry.*

John Chee Meng Wong, MMed (Psych), M.Sc. (Child & Adol Mental Health), FAMS, is the Lin Jo Yan and Yeo Boon Khim Professor in Mental Health and Neuroscience at the Yong Loo Lin School of Medicine, National University of Singapore (NUS), and Senior Consultant Psychiatrist at the National University Hospital (NUH). He is the immediate past Head of Department of Psychological Medicine at the NUS and NUH, Vice Chairman of the Medical Board (Education) at NUH, Founding Executive Director of the Regional Health Planning Office, and Founding Director of the CARE Hub at the National University Health System (NUHS). Dr. Wong is currently the Director of NUHS/NUS Mind Science Centre and President of the College of Psychiatrists, Academy of Medicine Singapore. He has developed and established the child and adolescent psychiatry specialist services at NUH and in Singapore Western health zone community school based community mental health team under the REACH (West) program, with a multidisciplinary team serving more than 90 schools. His research has included a national epidemiology study, clinical trials and non-pharmacological treatment trials in ADHD and Autism Spectrum Disorder, adolescent resilience, and suicide prevention studies. Dr. Wong is actively involved in undergraduate and national residency training programs in child and adolescent psychiatry for program design and core faculty teaching.

Keiko Yoshida DMedSci, is currently Director of the Iris Psychiatric Clinic for Children and Adolescents in Fukuoka, Japan, and honorary Clinical Professor in the Department of Neuropsychiatry, Graduate School of Medical Sciences, Kyushu University. Previously, she was Professor of the Section of Child Psychiatry at Kyushu University Hospital. Dr. Yoshida is a qualified psychiatrist certified by the Japanese Society of Psychiatry and Neurology and a qualified child psychiatrist certified by the Japanese Society for Child and Adolescent Psychiatry. Prior to her recent retirement, most of her work was based at Kyushu University, one of the seven high profile national imperial universities. At an earlier stage in her career, she studied child and adolescent psychiatry at the Maudsley Hospital in London,

UK, and conducted research in perinatal psychiatry while at King's College London Institute of Psychiatry, Psychology and Neuroscience (IOPPN) for 7 years. Since then, she has been a Visiting Researcher at the IOPPN for over 20 years. Since the last few years, as a Professor of Child and Adolescent Psychiatry in Japan, she has focused on the development of a training program in collaboration with Professor Eric Taylor and Dr. Anula Nikapota in London.

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Part I

Diagnostic Classification, Assessment, and Cultural Diversity

Diagnoses

Value and Limitations

1

Rudolf Uher

Contents

Abstract

Making a diagnosis is a fundamental part of child and adolescent psychiatry that facilitates communication and provision of care. The International Classification of Diseases and the *Diagnostic and Statistical Manual of Mental Disorders* codify universal definitions of mental disorders and provide operationalized criteria that improve their reliability. However, diagnoses of mental disorders do not reflect distinct entities with known causes. Many mental disorders lie on a continuum and cannot be unambiguously separated from normality or from one another. Comorbidity, heterogeneity, overspecification, overdiagnosis, and stigma have emerged as major challenges to the use of current diagnostic systems. Prototypic diagnoses and dimensional systems have been proposed as alternatives. Yet, a universal categorical system is necessary to support clinical decisions and effective communication. The present systems are imperfect but useful.

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Appropriate diagnosis makes it more likely that patients receive treatments from which they will benefit. Universality and continuity of diagnostic systems facilitate discoveries and enable evidence-based treatment. This chapter provides a summary of knowledge supporting the use of the present diagnostic systems and provides guidance on using diagnostic categories for the benefit of patients.

Keywords

Mental disorders · Classification of diseases · Validity of diagnosis · Overdiagnosis · Misdiagnosis · Dimensional and categorical models

Diagnosis has been a cornerstone of the clinical practice of medicine for centuries. We first diagnose and then treat. The need for a diagnosis has been accepted by health professionals across disciplines. In the last quarter of the twentieth century, the diagnostic process has been codified, and diagnosis has become a lynchpin of evidence-based medicine. In this context, it may appear unusual that the need for diagnosis in psychiatry has been seriously questioned. The critique of psychiatric diagnosis has raised important issues that need to be discussed and addressed to inform adequate clinical practice. In this chapter, we will cover the concept and practice of diagnosis in the developmental context of child and adolescent mental health. Our aim is for a reader to form a balanced opinion on what can and what cannot be expected from a diagnosis of mental disorder in children and youth.

Introduction

The term diagnosis refers to the process of finding out which disease, disorder, or syndrome explains a person's symptoms. It can also refer to the result of this process, which is typically the name of a disease, disorder, or syndrome. The term *disease* implies the knowledge of a causal mechanism (Albert et al. 1988). Since the causal mechanism leading to a mental difficulty is rarely known, psychiatry prefers the term "disorder," which denotes a recognizable pattern of symptoms that is associated with significant distress, disability, or risk of harm (Stein et al. 2010). The term "mental illness" is also used and is typically reserved for the more severe and definite disorders, such as schizophrenia. Whether we refer to a disease, disorder, or illness, medical diagnosis refers to determining the presence or absence of a condition. Concepts that are either present or absent are referred to as "categorical" and distinguished from continuous concepts that exist across a large number of levels or degrees.

The subjective nature of symptoms and absence of a measurable diagnostic biomarker for mental disorders have created a need to justify the existence of mental disorders. The last century has seen a seesaw between doubt and confidence in psychiatric diagnoses. In the last quarter of the twentieth century, the reliability of psychiatric diagnoses was strengthened through the use of operationalized criteria

(Feighner et al. 1972; Spitzer et al. 1979). These criteria have been codified in universal diagnostic systems, the International Classification of Diseases (ICD) and the *Diagnostic and Statistical Manual of Mental Disorders* (DSM). The operationalized diagnostic criteria have been applied to adults, adolescents, and children (Rutter 1989). Definitions of core disorders were extended to toddlers and infants (ZERO TO THREE 1994). A multiaxial classification was developed to support full formulation of mental and behavioral disorders in developmental and psychosocial context (World Health Organization 1996).

After the strong foundational period, the beginning of the twenty-first century has seen more questions and doubts surrounding the value of mental disorders' diagnoses. A disproportional number of controversies concerned mental disorders of childhood and adolescence. Therefore, in the next paragraph, we will consider the developmental context of mental disorders before reviewing the critique, value, limitations, and practical use of diagnosis in child and adolescent psychiatry.

Diagnosis in Developmental Context

Most individuals who are going to develop a mental disorder at any point in their life will first manifest signs of mental disorder in their childhood or adolescence (Kim-Cohen et al. 2003). As the abilities of the human brain develop, so does the potential for psychopathology. The peak time of onset for the most serious types of mental disorders, such as bipolar disorder and schizophrenia, coincides with the stage of development when the mental faculties are just about to reach their peak: the end of adolescence and the threshold of adulthood. Yet, a major mood or psychotic episode is rarely the first problem to emerge in an individual's life. For example, a large proportion of cases of bipolar disorder or schizophrenia is preceded by attention-deficit/hyperactivity disorder (ADHD) or anxiety disorders in childhood (Meier et al. 2018). Emotional and behavioral disorders of childhood are often transitory, but they may precede and predict the more severe forms of mental illness that affect adults.

We will describe the relationship between child and adult mental health and use the development of anxiety from childhood into adulthood as an example. An anxiety disorder in a 9-year-old child may follow one of three trajectories: (1) *discontinuity*, the anxiety disorder may resolve and the child grows up to be a healthy and resilient adult; (2) *homotypic continuity*, the anxiety disorder will persist and the child will become an adult living with an anxiety disorder; and (3) *heterotypic continuity*, the same person will develop another mental disorder, such as major depressive disorder or bipolar disorder that may overshadow the anxiety disorder as the primary problem (Fig. 1) (Pine and Fox 2015).

Some types of psychopathology are tightly linked to a specific developmental stage. This is especially true of a group of disorders that are referred to as "neurodevelopmental" disorders and include autism spectrum disorders, tic disorders, and ADHD. These conditions typically manifest within the first decade of life. Autism is almost invariably evident by age 3. For ADHD, the apparently orderly

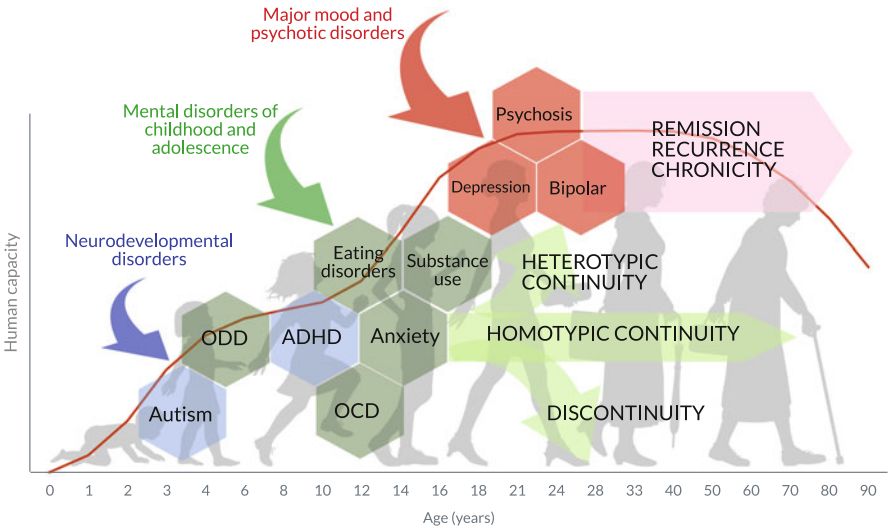

Fig. 1 Diagnoses of mental disorders and development of psychopathology over the life course. *ADHD* attention-deficit/hyperactivity disorder, *ODD* oppositional defiant disorder, *OCD* obsessive-compulsive disorder

relationship with onset in the first decade of life has been challenged by a finding that many cases of ADHD identified in adults are not preceded by similar manifestations in childhood (Caye et al. 2016; Moffitt et al. 2015). While these findings suggest a degree of developmental heterogeneity in adult ADHD, the neurodevelopmental conceptualization applies to the more typical cases.

Since developmental stage affects the manifestations of disorders through childhood and adolescence, the question arises which behaviors are part of the same disorder and which are different. Some disorders are defined in the same way for children and for adults. A trend over the last few decades has been to use the same diagnostic concepts in children and adults where possible. For example, generalized anxiety disorder, a diagnostic category previously used for adults only, is now used in children where it replaced a previously used child-specific "overanxious disorder." In other cases, the manifestations change with age to such a degree that we need to use different diagnostic categories. The continuity and discontinuity of disorders across the life course are then often a matter of specific criteria, degree, and threshold for diagnosis. Oppositional defiant disorder (ODD), conduct disorder (CD), and antisocial personality disorder (ASPD) are a typical sequence where the core psychopathology largely overlaps, but the threshold for diagnosis increases progressively. Many children fulfill criteria for ODD, fewer adolescents fulfill criteria for conduct disorder, and very few adults meet criteria for ASPD. The reducing threshold may create the illusion of reduced continuity in rule-breaking and aggressive behaviors. While most children with ODD will not develop antisocial personality disorder, most adult cases of antisocial personality were preceded by ODD in childhood.

Psychopathology and related impairment need to be assessed with reference to not just calendar age but also the individual's stage of intellectual development and the environment. The multiaxial classification provides a framework for this by coding clinical psychiatric syndromes, specific disorders of psychological development (e.g., language, reading, etc.), general intellectual level, physical health conditions, social environment, and psychosocial disability on the six axes (World Health Organization 1996). Within this system, the level of development and social environment provides context but does not confound the diagnosis of the core mental disorder.

Critique of Diagnosis

With the routine use of operational diagnostic criteria for mental disorders in clinical practice and in research, it became apparent that the use of diagnoses diverges from the original intentions and expectations in several ways:

1. *Comorbidity.* Most individuals with mental disorders require more than one diagnostic category to describe their problems. For example, generalized anxiety disorder and major depressive disorder may occur more often together than separately (Wittchen et al. 1994; Ruscio et al. 2007; Moffitt et al. 2007). Many clinicians question the wisdom of splitting a person's problem into multiple categories.
2. *Heterogeneity.* There are so many ways to meet diagnostic criteria for a given disorder that individuals with rather different sets of problems end up receiving the same diagnosis. Some of the more inclusive diagnoses, such as major depressive disorder, may be mixtures of different conditions that are not specific enough to indicate a treatment approach (Stringaris 2017).
3. *Overspecification*. With revisions of the diagnostic system, the number of categories tends to increase. The fifth revision of the DSM (DSM-5) includes 157 distinct disorders, of which many are rarely used in practice. Even with the growing number of specific diagnostic categories, many individuals receive "not otherwise specified" (NOS) diagnoses, which are inherently less informative. For example, the most common eating disorder according to DSM-5 is not anorexia nervosa or bulimia nervosa, but an "eating disorder – not otherwise specified" (Uher and Rutter 2012b). The overuse of the residual NOS categories may be an artifact of overspecified criteria for the primary disorder (Hyman 2010).
4. *Overdiagnosis*. Overdiagnosis is defined as a detection of a true abnormality that does not benefit the patient (Coon et al. 2014). There have been serious concerns that some diagnoses are used excessively and that variations of normal development are unnecessarily pathologized as mental disorders. Over the last 50 years, the rates of diagnosed mental and behavioral disorders in children have markedly increased in developed countries (Merten et al. 2017). The most dramatic increases have been seemed in the diagnoses of bipolar disorder and ADHD. The diagnosis of bipolar disorder in children in the USA increased 40-fold over a

decade (Moreno et al. 2007). The rates of medication prescription for ADHD varies 30-fold across countries, with high rates in North America and Australia and low rates in Europe and Asia (Raman et al. 2018). The rate of ADHD diagnosis and medication use has been increasing over time in both low- and high-prevalence countries (Raman et al. 2018). ADHD is more often diagnosed and treated in children who are among the younger ones in their school year (Sayal et al. 2017). This relative age effect demonstrated across countries with school year cutoffs at different months of the year shows that the diagnosis of ADHD is driven by factors other than the condition of the child (Coon et al. 2014). The uneven distribution of diagnoses and treatment across and within countries and the fact that diagnoses are typically associated with the prescription of medication with significant side effects suggest that ADHD and bipolar disorder are overdiagnosed in developed countries (Parens and Johnston 2011; Merten et al. 2017). While overdiagnosis is emphasized in the critique of the diagnostic system, it is important to note that overdiagnosis and underdiagnosis coexist. It is likely that ADHD is overdiagnosed in boys who live in North America, Australia, and Northern Europe and who are relatively younger than their classmates. At the same time, ADHD may be underdiagnosed in children living in low-income countries and Western Europe and in girls.

5. *Stigma*. Less often mentioned in academic critique, but perhaps the most important argument against giving diagnoses in practice, is the fact that individuals with a diagnosis of mental disorders are discriminated against by the society and by mental health professionals. There are varied degrees of stigma attached to different diagnoses. Some patients and their close others will campaign for or against a specific diagnosis based on the perceived discrimination risk, leading to shifts in diagnostic practices toward more fashionable and less stigmatized diagnoses. The high degree of stigma attached to personality disorders may be part of the reluctance to diagnose borderline personality disorder in adolescents in spite of evidence that the diagnosis is as valid as in adults (Kaess et al. 2014). Stigma perceived by clinicians as associated with specific mental disorders is also behind the overuse of the less informative "adjustment disorders" diagnosis. There is no evidence-based treatment for adjustment disorder, and therefore this diagnosis has little value therapeutically other than avoiding a potentially stigmatizing label (Rutter and Uher 2012). Stigma remains unaffected by attempts to change the language of diagnosis as it quickly transfers to the new labels. It is a challenge for health professionals, educators, and the society to allow diagnosis of mental disorders to be used freely and uniquely for the purpose of improving health.

Alternatives

The exposed problems with the ICD and DSM systems have stimulated attempts to build an alternative system. The proposed solutions range from small modifications to complete replacements of the present diagnostic paradigm.

One credible alternative is to use a *prototype-based diagnosis* instead of operationalized criteria. The prototype approach consists of asking which diagnosis best reflects the core problems of an individual. This process is more intuitive than the operationalized diagnosis requiring a specific number of criteria being met (Haggerty et al. 2016; Nakash et al. 2018). Prototype-based diagnosis removes the problem of overspecification and reduces the problem of comorbidity but may risk more subjective diagnosis depending on the clinician's impression. It does not remove the problems of heterogeneity, overdiagnosis, or stigma.

More radical departures from the status quo are proposals to introduce a system of continuous measures that would remove the need for categorical yes-or-no diagnoses. One system of dimensions linked to putative brain functions, the Research Domain Criteria (RDoC), has been proposed as a framework for research with the long-term ambition to create a causal classification and facilitate the development of new mechanism-based treatments (Insel 2013). A decade after its launch, RDoC has yet to make an impact on the clinical practice or treatment development, and it may have misdirected research efforts from the most severe types of mental illness (Ross and Margolis 2019).

Other attempts at dimensional classification are based on symptom questionnaires and groupings of symptoms into dimensions based on correlations using factor analysis and related methods. Such a system has been proposed as a replacement for the categorical diagnoses of personality disorders in the fifth edition of DSM, but this proposal was rejected because of concerns about its practical applicability. Since then, attempts have been developed for an entirely dimensional system of all types of psychopathology (Krueger et al. 2018). This system would describe an individual with a profile of levels on multiple scales, hierarchically organized into general higher-order and specific lower-order dimensions. Hierarchical dimensional system has considerable validity in terms of explaining variation across the population and capturing non-specific and general effects on psychopathology (Caspi et al. 2014; Allegrini et al. 2020).

Contemplating the clinical applications of dimensional systems reminds us of the reasons why diagnoses are needed in the first place: as a means to efficiently communicate the type of problem, select treatment, give prognosis, and record the use of health services. A dimension contains more information than a category; therefore it has greater explanatory potential, but it is also harder to use (Uher and Rutter 2012a). Dimensions do not require assumptions about the existence of a clear boundary between health and disorder and better reflect the reality that most symptoms of common mental disorders lie on a continuum with normal human experiences. However, most of this continuum is irrelevant to health care (Fig. 2): it is not a role of health professional to deal with below-average degrees of psychopathology-like traits (Kessler 2002; Uher and Rutter 2012a). The lack of utility across the range of a dimension negates the advantage of dimensional system in clinical applications (Kessler 2002). Almost all clinical decisions are of the categorical yes-or-no type: admit or discharge, prescribe treatment or wait, and refer to specialist or not; and only the upper end of a symptom distribution is relevant to these decisions. Between a definite disorder and definite health, there is a flexible

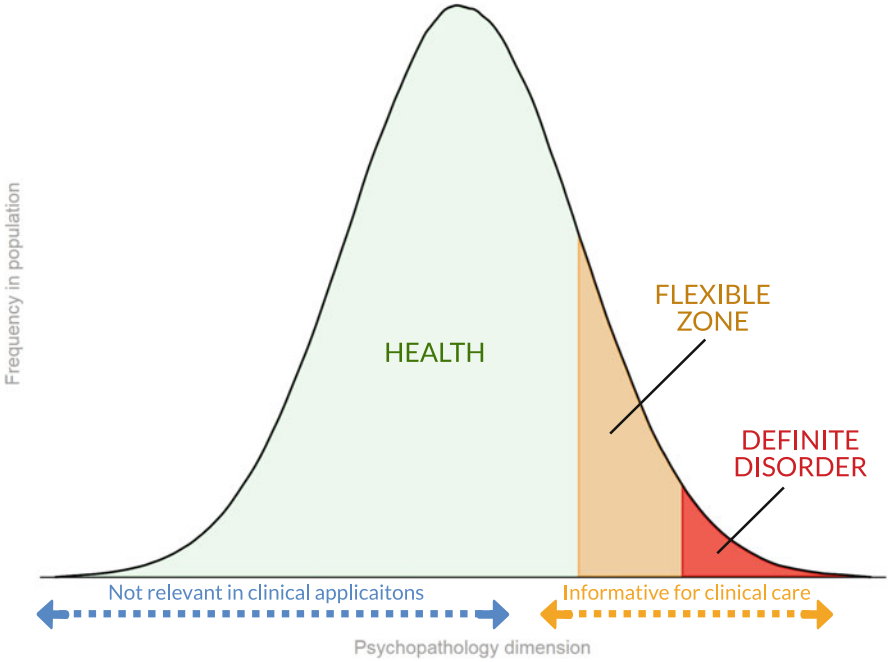

Fig. 2 Dimensional psychopathology and categorical diagnosis

zone, where dimensional measures may be most useful in informing clinical decisions (Fig. 2). Also, treatments are not administered on dimensions. What we know about the efficacy of treatments suggests that they need to be given in optimal dose: low dose is ineffective and high dose may be dangerous. Dimensional measures are needed to assess the outcome of treatments, but they do not replace diagnosis in the decision of whether to treat or not and which treatment to use. Any application of dimensions to such decisions requires establishing a cut point, which is a return to a categorical system. Currently, a practical assessment suggests that psychiatry will be best served by complementary systems of categorical diagnoses and dimensional measures. Judicious use of the current system will do more good than attempts at revamping it (Ross and Margolis 2018).

Usefulness of the ICD and DSM Diagnostic Systems

It is a human tendency to undervalue the familiar, criticize the present, and forget about the benefits of progress (Pinker 2018). As the psychiatric profession has been challenged by criticism of its diagnostic systems, it may be more important than ever to remind ourselves of the successes that may have been taken for granted. First, the last decade has seen the most definite discoveries about the causation of mental

illness to date. Genetic studies of categorical diagnoses have discovered hundreds of genetic variants that increase the risk for schizophrenia, bipolar disorder, major depressive disorder, autism, ADHD, obsessive-compulsive disorder, and anorexia nervosa (Cross-Disorder Group of the Psychiatric Genomics Consortium 2019). The genetic variants are partly disorder-specific and partly trans-diagnostic. These variants are strongly concentrated in genes that are expressed in the developing brain, providing for the first time an incontrovertible proof that mental disorders are illnesses of the brain. Second, diagnosed mental disorders have significant predictive and prognostic value. Mental disorders in parents strongly predict the risk of mental disorders in offspring (Rasic et al. 2014). Mental disorders diagnosed in childhood are precursors of mental illness in adulthood (Meier et al. 2018; Pine and Fox 2015). Mental disorders are robust predictors of real-life outcomes including employment, disability, and mortality (Copeland et al. 2015; Mojtabai et al. 2015; Walker et al. 2015). Third, and perhaps most importantly, our diagnostic systems serve us to test the efficacy of treatments for defined groups of patients. While there is not a one-to-one relationship between diagnosis and treatment, several diagnoses are strongly linked to the efficacy of a particular class of treatments. Lithium and anticonvulsants are specifically effective as maintenance treatment for bipolar disorder but are ineffective for schizophrenia. While a variety of antidepressants are effective for major depressive disorder, obsessive-compulsive disorder responds specifically to serotonergic agents, such as serotonin reuptake inhibitors and clomipramine. While schizophrenia requires the use of dopamine antagonists, hyperkinetic disorder is associated with the efficacy of dopamine agonists, the psychostimulants (Uher and Rutter 2012a). Overall, the synthesis of evidence suggests that the commonly used categorical diagnoses have adequate validity for etiological research, prognosis, and treatment with important distinctions between diagnostic categories but incomplete specificity.

What We Can and Cannot Expect from a Diagnosis

As with most tools, the present diagnostic systems are useful for some but not all purposes. Knowing the benefits and limits of diagnoses will help us use them well in context. Below is a brief list of what we reasonably can and cannot expect from a diagnosis of a mental disorder in a child or adolescent.

We **can** reasonably expect that well-applied diagnoses of mental disorders will:

1. Provide a concise description of the core problems at a given time for most patients
2. Provide means of communication between health professionals, health-care funders, and policy makers
3. Help determine prognosis
4. Increase the likelihood that a person will receive treatment from which he or she will benefit

We should **not** expect that a diagnosis of mental disorder will do any of the following:

1. Full description of one person's problems in a single category
2. Clean separation of cases and non-cases
3. A guarantee of effective treatment
4. Define diseases that are distinct entities

These expectations are not substantially different from common non-communicable diseases in other areas of medicine. There are also relatively few differences between child and adult mental disorders. The main difference is that in children we can expect more change within shorter time (Copeland et al. 2013).

How to Use Diagnostic Criteria to the Benefit of Our Patients

A good clinician uses diagnoses judiciously in context of the present state of knowledge. Here we summarize some of the general rules that have emerged from practice and reflection. The first rule is to diagnose definite cases of a disorder. When doing so, the clinician should reference the DSM or ICD diagnostic criteria to ensure that the language of diagnosis is used consistently. While there is often a reluctance to make a diagnosis in a young person, there is more damage being done by not giving appropriate diagnoses than by giving them. In many cases, there will be a degree of uncertainty, because the individual's presentation falls within the flexible zone between definite disorder and health, because part of the information need for diagnosis is not available, or because there is conflicting information from different sources. In these cases the clinician will make the best guess and consider the likely benefits and risks of giving and not giving a diagnosis. The first question in these cases is whether the general criteria for a disorder are met: do the mental and behavioral symptoms cause significant distress or impairment? In children and adolescents, the diagnostician needs to implement the distress/impairment criterion in developmental context. Many children and adolescents will not communicate distress in response to direct questions, and the diagnostician needs to make a judgment based on indirect indications (e.g., avoidance behavior). Lack of educational progress and learning due to mental health symptoms is a sign of impairment. Each young person's progress should be judged against his or her own potential: if a previously excellent student starts getting average grades because of anxiety or depression, then impairment is present. If the answer to the distress or impairment question is affirmative, then a diagnosis of a mental disorder should be made. If diagnostic criteria are met, it is preferable to give an informative diagnosis (e.g., social anxiety disorder) that can meaningfully guide treatment selection rather than an uninformative diagnosis (e.g., adjustment disorder with anxiety). A clinician should not hesitate to give multiple diagnoses at the same assessment if criteria for multiple disorders are met. It is useful to explain that we often need more than one name to capture a person's problems and put emphasis on which disorder is primary

at the given time. Before finalizing a diagnostic conclusion, it is useful to ask whether the selected categories capture the core of the person's presentation. A good clinician will make sure to capture the obvious main problem with the first listed diagnostic term to maximize the communication value of the diagnostic formulation. While a diagnosis is meant to be used descriptively, most clinicians will also consider the actionability of a diagnosis in terms of available treatment, care, supports, or school accommodations. When a young person presentation sits on the boundary between two disorders, a clinician may lean toward first considering the disorder for which a treatment is available. Finally, it is important not to neglect the aspects of presentation that are not part of diagnostic criteria. For example, the course of illness (single episode/recurrent episodic/fluctuating/persistent) is an important characteristic that may help select the most appropriate treatment but is not part of criteria for most disorders.

The knowledge underlying the classification of mental disorders continues to develop. The practice of psychiatry, including the diagnostic process, needs to adapt to trends in society and the changing relationship between patients and professionals. Therefore, no manual or rule is set in stone. The next decades will bring new discoveries and new challenges. At each time, it is the role of clinicians to combine the new and accrued knowledge to make the best decision for the patient.

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Screening Methods and When to Use Them

2

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Abstract

In terms of child and adolescent mental health, screening can be conceptualized as identifying those young people who are at high risk of having a psychiatric disorder, due to having risk factors for the development of a disorder, and/or already having raised levels of psychopathology or experiencing psychiatric symptoms. The intention of screening should be to improve outcomes via prevention or early intervention. In child and adolescent psychiatry, there is often a significant window of time in which risk factors or early symptoms can be detected prior to the diagnosis of a full psychiatric disorder, making them suitable for screening.

Screening tools used in psychiatry are usually questionnaires or measures which have a threshold for determining whether or not a child is "screen-positive." These tools can be used on an opportunistic basis or as part of a systematic program of targeted or universal screening – for example, in young offenders or school pupils. Those screening positive can then be referred for more comprehensive assessment.

However, no screening measures are completely accurate. Therefore, before deciding to use a tool in practice, it is important to consider whether it is validated for that population, the potential harms and benefits, and the impact of a false-negative or false-positive result. Finally, the decision to screen should also be influenced by how the result will inform management. It is potentially unethical to identify young people who may need further assessments and intervention, if the availability and/or effectiveness of these is limited.

Keywords

Screening · Test accuracy · Universal screening · Targeted screening

Introduction

This chapter will begin by introducing some general concepts relating to screening, including screening tests and test statistics, before providing some specific examples of the use of screening measures in practice in child and adolescent psychiatry, and their limitations.

Screening: Definition and Purpose

The World Health Organization (2018) defines screening as "the presumptive identification of unrecognized disease in an apparently healthy, asymptomatic population by means of tests, examinations or other procedures that can be applied rapidly and easily to the target population."

A simpler definition of screening is as follows: "Screening is the process of identifying healthy people who may be at increased risk of a disease or condition. The screening provider then offers information, further tests and treatment."

In terms of child and adolescent mental health, screening can be conceptualized as identifying those who are at high risk of having a psychiatric disorder, due to:

- Having risk factors for the development of a disorder
- Having raised levels of psychopathology or experiencing psychiatric symptoms

There is also an increasing interest in the use of screening to identify protective factors alongside risk factors, for example, to distinguish children who may have well-developed coping skills and strategies from the most vulnerable who may not, although this is a relatively little-studied area to date (Pat-Horenczyk et al. 2014). Some child mental health screening tools also include subscales measuring positive factors, such as the prosocial subscale of the Strengths and Difficulties Questionnaire (SDQ) (Goodman 1997) and the Child RADAR (Burns and Rapee 2018).

Speechley et al. (2017) provide a useful discussion of the common characteristics of the concepts and definitions of screening, which include the use of observations offered to "asymptomatic" people to detect "something putatively prognostic," which could be a risk factor, precursor, or unrecognized pathology. The underlying assumption is that early detection of this factor "will be followed by prompt efficacious intervention that will alter natural history and improve the screened individual's outcome (e.g., longer survival, fewer complications, higher quality of life) relative to not having been screened."

Therefore, while the immediate aim of using a screening test is to identify risk factors or unrecognized pathology, the intention of screening should be to *improve outcomes* via *prevention or early intervention*, which may sometimes overlap. According to Mrazek and Haggerty, public mental health prevention includes "reducing. . ., the time spent with symptoms, or the risk condition for a mental illness, preventing or delaying recurrences and also decreasing the impact of illness in the affected person, their families and the society" (Mrazek and Haggerty 1994). Consequently, screening should always yield a potential benefit for the population screened.

Types of Screening

The term "screening" is also often used as an umbrella term to refer to a range of activities related to the detection of risk factors or early signs of disease. Table 1 illustrates three of the main types of screening.

Screening undertaken on an "ad hoc" or opportunistic basis is usually part of another clinical encounter or as "case-finding" in high-risk individuals. In public health, screening usually refers to programs which are organized and systematic. Such programs may be decided and delivered on a national, regional, or local basis and often use formal registers and invitations to screening.

Table 1 Main types of screening

Type of screening	Population	Example
Opportunistic screening	Usually involves people attending services for another condition who might be "high risk"	Mental health screening in a pediatric clinic Screening for alcohol misuse on attendance at accident and emergency
Universal screening	Offered to the whole population or a whole age group	School-based universal screening
Selective or targeted	Offered to a population selected due to having an "at-risk" characteristic or to being subjected to a risk factor	Mental health screening for children in care/looked after children

Criteria for Screening Programs

In classical epidemiology, Wilson and Jungner (1968) identified the criteria that ideally all screening programs should meet, which have been widely used for evaluation. These criteria have been updated in various forms, for example, by the UK National Screening Board, who currently use the criteria in Box 1 to decide on whether or not to recommend the implementation of proposed screening programs (2015).

Box 1 Criteria for a Screening Program from Public Health England's National Screening Board (2015)

- The condition should be an important health problem.
- The epidemiology and clinical course of the disease should be adequately understood.
- The screening test should be safe, simple, precise, and validated; a suitable cutoff value should be defined and agreed.
- The test should be acceptable to the population.
- High-quality randomized controlled trials should provide evidence that the screening program effectively reduces morbidity.
- The screening program should be clinically, socially, and ethically acceptable to health professionals and the public.
- The benefit from screening should outweigh the physical and psychological harm.
- The cost of the screening program should be economically balanced in relation to expenditure on medical care (value for money).
- There should be the potential to benefit from treatment.

Screening and Surveillance

Screening should be differentiated from the related public health activity of surveillance, which is the "systematic, ongoing collection, analysis and interpretation of data, closely integrated with the timely and coherent dissemination of the results . . .. to those who have a right to know so that action can be taken for health improvement or illness prevention" (Porta et al. 2008). For example, the UK Child and Adolescent Psychiatry Surveillance Service uses monthly reports from senior child and adolescent psychiatrists to study the service-level incidence, characteristics, and management of rare conditions, events, and processes that are otherwise difficult to study (Eke et al. 2019; Lynn et al. 2012). Similarly, the UK national child and adolescent mental health surveys in 1999, 2004, and 2017 used screening tools (the Strengths and Difficulties Questionnaire; (Goodman 1997)) and standardized diagnostic assessments (the Development and Wellbeing Assessment (DAWBA): (Goodman et al. 2000)) in thousands of children and young people to monitor population mental health over time and identify factors which might influence prevalence and management at a population level. The surveys were not intended to identify at-risk individuals and apply interventions, although participants were provided with information about mental health and useful contacts.

The Case for Screening in Child Mental Health

Child psychiatric disorders fulfill the condition-related criteria for a screening program, in that they are undoubtedly important and that the epidemiology and clinical course are increasingly well-understood.

There is often a significant window of time in which early symptoms can be detected prior to meeting the diagnostic criteria for a disorder. Children who go on to develop psychiatric disorders experience symptoms for an average of 2 years prior to meeting the diagnostic criteria for that disorder (Costello 2016). In theory, this allows time for early symptoms to be detected and intervention to take place. For many psychiatric disorders, there is evidence that interventions early in the course of the disorder could shorten the duration or severity, as well as prevent or ameliorate adverse outcomes associated with the disorder (McGorry and Mei 2018).

However, across many health systems, only a proportion of children and adolescents with psychiatric symptoms or a disorder go on to access treatment. For example, the US National Comorbidity Survey Adolescent Supplement found that fewer than half of adolescents with any mental health disorder had ever received disorder-specific treatment (Merikangas et al. 2011). Data from the British Child and Adolescent Mental Health Surveys suggested that fewer than a third of children with a psychiatric disorder had contact with Child and Adolescent Mental Health Services (CAMHS) (Ford et al. 2007a). This relatively low level of contact with services is

likely, to some extent at least, to be influenced by under-detection of disorders in children (Humphrey and Wigelsworth 2016).

Humphrey and Wigelsworth (2016) argue that under-detection or late detection occurs because the system as a whole still primarily operates using two models:

- "Refer-test-place" (Dowdy et al. 2010), where ad hoc identification leads to referral, testing, and eventually suitable provision of mental healthcare
- "Wait to fail," where adverse events such as school exclusion or criminal justice contact result in the child being brought to the attention of mental health services

Pathways to mental healthcare for children and young people can be lengthy and complex and often involve multiple "informal" contacts with family and friends as well as with professionals in more universal settings such as teachers and GPs (MacDonald et al. 2018). However, while it often falls to teachers, parents, or primary care to detect and act on early symptoms, evidence suggests that professionals may feel poorly equipped to identify such high-risk children, especially in the case of "internalizing" disorders such as anxiety and depression, and studies have also shown that ADHD symptoms in girls are often missed (Kidger et al. 2009; Papandrea and Winefield 2011; Mowlem et al. 2018). The role of screening is to provide a framework for more systematic and accurate detection, in theory leading to improved outcomes, provided that identification leads to improved access to effective interventions.

Screening Tests

Screening tests themselves are the tools used to detect those at increased risk of having or developing a condition. In mental health, screening tests are usually questionnaires or measures, such as the Child Behavior Checklist (CBCL) (Achenbach 1999), the Strengths and Difficulties Questionnaire (Goodman 1997) (www.sdqinfo.org), or the Hospital Anxiety and Depression Scale (Zigmond and Snaith 1983). They may detect risk factors for a condition or early signs of the condition. This is in contrast to a diagnostic test, which is intended to establish (more or less definitively) the presence or absence of a disease. Screening tests, if positive, can then be followed by diagnostic tests. For example, in breast cancer screening, mammography is the screening test, which if positive is followed by diagnostic tests including biopsy. However, the line between screening and diagnostic tests is not necessarily clear-cut; the most important point of difference is the target population and purpose (see Table 2 for differences between screening and diagnostic tests).

In psychiatry, the discussion of screening versus diagnostic tests is complicated by the lack of diagnostic tests compared to tests used in other branches of medicine – e.g., histological examination of biopsies for suspected cancers or polymerase chain reaction testing for suspected *Escherichia coli*. The "gold standard" in psychiatry is usually a diagnosis based on information derived from standardized diagnostic interviews (SDI), such as the CAPA or DAWBA (see Table 2), or diagnoses based on clinical evaluations. Disorders often represent extremes of variation in a

Table 2 Differences between screening and diagnostic tests

	Screening test	Diagnostic test
Purpose	To identify individuals who are more likely to have, or be at risk of, a certain condition	To provide a diagnosis and confirm the presence or absence of a condition (in conjunction with clinical judgment)
Population	Large numbers of potentially at-risk individuals, who are usually, but not always, asymptomatic	Individuals with symptoms or in asymptomatic individuals following a positive screening test
Key characteristics of test	Acceptable (e.g., minimally invasive, intrusive, or time-consuming) Cost-benefit: large numbers of people will need to be screened to identify a small number of potential cases	Main consideration is accuracy rather than acceptability Higher costs may often be justified by need to establish diagnosis before treatment can begin
Meaning of a positive test	Higher probability than before the test was done (depending on the properties of the test) that the individual has the condition or is at risk of the condition	Definitive diagnosis of a condition
General example	Mammogram; a positive mammogram indicates that further investigation for breast cancer is needed	Biopsy and pathology examination; if cancer cells are detected, the diagnosis of breast cancer is confirmed
Child mental health examples	Child Behavior Checklist (CBCL; Achenbach and Rescorla 2001), Strengths and Difficulties Questionnaire (SDQ; (Goodman 1997) High scores indicate a high probability that the child has a psychiatric disorder	Child and Adolescent Psychiatric Assessment (CAPA; Angold and Costello 2000) Development and Wellbeing Assessment (DAWBA: Goodman et al. 2000) Both generate diagnoses based on structured interviews against diagnostic criteria

population, so in order to make a categorical diagnosis, there is always a judgment about where to set a threshold (Craddock and Mynors-Wallis 2014). Child psychiatric diagnostic categories also change and evolve; for example, the diagnosis of disruptive mood dysregulation disorder (DMDD) first appeared in the 2013 *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) (APA 2013), although it is worth highlighting that this phenomenon is not unique to psychiatry, as definitions of hypertension or diabetes have also altered over time.

The Role of Informants

A "multi-informant" approach to assessment and diagnosis is commonly taken in child and adolescent psychiatry (Kraemer et al. 2003), in contrast to adult psychiatry where this approach is (perhaps unfortunately) less often used. In addition to the

child themselves (dependent on their age), informants usually include the parent or carer and often a teacher. As well as providing information about difficulties when the child is too young to provide a complete picture, one of the main benefits of using multiple informants is to understand how consistent the problems are across different settings (De Los Reyes et al. 2015). The diagnosis of some conditions requires evidence of symptoms in more than one setting, most notably attention deficit hyperactivity disorder, where the DSM-V criteria stipulate that "several inattentive or hyperactive-impulsive symptoms are present in two or more settings (e.g., at home, school, or work; with friends or relatives; in other activities)" (APA 2013). In this case, the teacher is a particularly valuable informant in providing information on the child's presentation in school.

Studies of agreement between informants on child mental health screening measures demonstrate discrepancies, for example, between teachers and parents, and children and parents, with only low-to-moderate levels of agreement reported (De Los Reyes et al. 2015). However, this does not mean that the measures are not reliable, but is likely to reflect the different perspectives of informants, as well as the situation-specific behaviors of children (Fält et al. 2018). When interpreting multi-informant reports as a clinician, or in the course of screening, it is also helpful to understand that agreement may vary according to the problem, with higher levels of agreement for externalizing than internalizing difficulties (De Los Reyes et al. 2015), possibly because such for the latter, the symptoms are harder to observe (Stone et al. 2010; Fält et al. 2018). Adolescents' self-report of internalizing symptoms may be different (and more valid) than reports by their parents (Kuhn et al. 2017). There is also some evidence to suggest that sociodemographic, economic, and family factors can also influence disagreement in symptom reporting between children and parents and between parents and teachers (Moens et al. 2018). For example, living in a one-parent family has been associated with both teacher-parent disagreement and child-parent disagreement (Van Roy et al. 2010; Cheng et al. 2018). It is therefore important to consider the outcome of multi-informant measures in light of the wider family context. Overall, the use of multiple informants in child mental health appears to increase detection of disorder and is therefore the best practice (Jensen et al. 1995; De Los Reyes et al. 2015; Kuhn et al. 2017).

Properties of Screening Tests

The decision as to what constitutes a "good" or suitable screening test is based on consideration of the costs and harms of the test versus the benefits, in terms of prevention of mortality and morbidity. Costs and harms of the test may be financial but can also relate to other important factors, for example, time, inconvenience, adverse effects from the test, or raised anxieties from a false-positive result. This is discussed in more detail later.

As screening tests are intended to be offered to a wider, "healthier" population than diagnostic tests, it is generally considered that they must be simple and inexpensive – or at least, more so than a diagnostic test. Similarly, because they

are to be used in people who may not (yet) meet the diagnostic criteria for a diagnosis, the test needs to be acceptable to those being screened, in terms of being minimally invasive and intrusive. Again, this comes down to the consideration of the benefits versus the costs of screening.

Test Reliability

Tests should also be reliable, that is, the results of the test should be consistent with repeated testing. Test-retest reliability in screening tests refers to the degree of agreement between scores obtained from the same respondents at different time points (where whatever is being measured remains constant – which is not necessarily the case). Inter-informant reliability refers to the agreement between different informants – i.e., whether they obtain the same or similar scores. These types of reliability are often expressed using correlations or differences between mean scores or by using the intraclass correlation coefficient (ICC). For categorical tests of "caseness," reliability can be assessed by examining the "overall percentage agreement" between two observers, or by calculating the kappa statistic, which is defined as the fraction of observed agreement which is not due to chance.

Test Accuracy

One of the most important points in screening is that the tools used are never 100% accurate in identifying the presence or absence of a disorder, or the construct being tested for, meaning that false negatives and positives are inevitable. This is the "trade-off" for not subjecting all members of a low-risk population to a full diagnostic assessment which usually is more accurate but also more invasive, expensive, or otherwise less acceptable. For example, instead of subjecting a low-risk population to a full-length psychiatric diagnostic assessment, it is much more efficient to use a low-cost and easy to administer rating scale to identify a sample of high-risk children who will subsequently undergo an in-depth diagnostic evaluation.

The validity of a screening test relates to how good it is at accurately identifying who does and does not have the condition of interest. The accuracy of a screening procedure is usually tested against an appropriate "gold standard." Where the result of the screening test is dichotomized, this comparison is presented in the "2 by 2" table – see Table 3.

Accuracy in screening tests is usually discussed in terms of the constructs listed in Table 4, which are calculated from the 2 by 2 table shown in Table 3.

Thresholds in Screening Measures

However, most screening measures used to detect child psychopathology are rating scales, which do not automatically yield a dichotomous result. Such scales usually have a threshold value which is used to determine whether further assessment is needed. For example, in the Strengths and Difficulties Questionnaire, the total difficulties scale can be scored from 0 to 40 (Goodman 1997). Based on validation studies, the cutoff for a "high" score on the parent rated SDQ total difficulty score is

Table 3 The classic 2 × 2 table for examining accuracy of a screening or diagnostic test

		Presence of condition according to the "gold standard"	
		Positive	Negative
Result of screening test	Test positive	**True positive (a)**	False positive (b)
	Test negative	False negative (c)	**True negative (d)**

Table 4 Concepts in test accuracy in child psychiatry (Greenhalgh 1997; Sheldrick et al. 2015)

Question	Concept	Calculation	Definition
How good is the test at **identifying** children **with** the target disorder? (i.e., identifying true positives)	Sensitivity	Proportion of those who have the condition who test positive a/(a + c)	The proportion of children with psychopathology who are correctly classified as having a psychiatric disorder by the screening test
How good is the test at **identifying** most children **without** the target disorder? (i.e., identifying true negatives)	Specificity	Proportion of those who do not have the condition who test negative d/(b + d)	The proportion of children without psychopathology who are correctly classified as not having a disorder by the screening test
How good is a positive test result at indicating whether a disorder is **present?**	Positive predictive value (PPV)	Proportion of those testing positive who have the condition a/(a + b)	The proportion of children with positive screening results who have psychopathology (and are therefore correctly classified)
How good is a negative test result at indicating whether a disorder is **not present?**	Negative predictive value (NPV)	Proportion of those testing negative who do not have the condition d/(c + d)	The proportion of children with negative screening results who do not have psychopathology (and are therefore correctly classified)
How much **more likely** is a positive test to be found in a child **with** the condition than in a child **without** it?	Likelihood ratio of a positive test	Sensitivity/(l-specificity)	The likelihood that a given test result would be expected in a child with the disorder compared to the likelihood that that same result would be expected in a child without the disorder
How much **more likely** is a negative test to be found in a child **without** the condition than in a child **with** it?	Likelihood ratio of a negative test	(l-sensitivity)/specificity	The likelihood that a given test result would be expected in a child without the disorder compared to the likelihood that that same result would be expected in a child with the disorder

17 (Goodman and Goodman 2009). The total difficulties score is therefore often dichotomized in this way when used as a screening tool, but in fact norms offer three (close to average, borderline, and high) or four (splits high into high and very high) levels of risk based on large epidemiological studies (www.sdqinfo.org). It is also worth noting that despite identical questions to each informant, the cut-points vary depending on whether the informant is a parent/carer, teacher, or young person.

Choice of these threshold scores is a complex process, especially as the consequences of false-negative results in child psychiatry may be less clear-cut and easy to determine than in some branches of medicine. In setting thresholds, it is important to consider the following (Sheldrick et al. 2015):

Box 2 Considerations in Setting Thresholds for Screening Tests

- Prevalence of the condition in the population to be screened
- Impact of a false-negative result:
  - What does it mean for the child and their family?
  - For example, does it place them at greater risk of harmful outcomes – e.g., missing a diagnosis which could affect performance at school or which could increase the risk of self-harm or suicide?
- Impact of a false-positive result:
  - What does it mean for the child and their family?
  - For example, does it lead to unwarranted anxiety, stress, or time off school or work while they undergo further assessment?
  - Demand on follow-up services.

Lowering the threshold on a test usually increases the sensitivity at the cost of lowering the specificity – i.e., the test will be more likely to detect children with the condition, but also more likely to falsely identify children as disordered who do **not** have the condition. This will lower the positive predictive value of the test. Conversely, by raising the threshold, the test will become less likely to detect children with the condition, but will be more likely to exclude children who do not have the condition. This usually leads to a higher positive predictive value – i.e., a positive test result will be a better indicator of whether or not a disorder is present, as discussed below under "Test Accuracy in Different Populations."

The Receiver Operator Characteristic (ROC) Curve

ROC curves plot the sensitivity and (1-minus) specificity of a test for every possible threshold value, showing how the proportion of true positives and false positives change with changing thresholds, and the trade-off between sensitivity and specificity. The closer the curve follows the left-hand border and then the top border of the ROC space, the more accurate the test. The closer the curve comes to the 45-degree diagonal of the ROC space, the less accurate the test. The AUROC (area under the curve) is a measure of accuracy. A "perfect" test would have an AUROC value of 1, and a "worthless" one a value of 0.5.

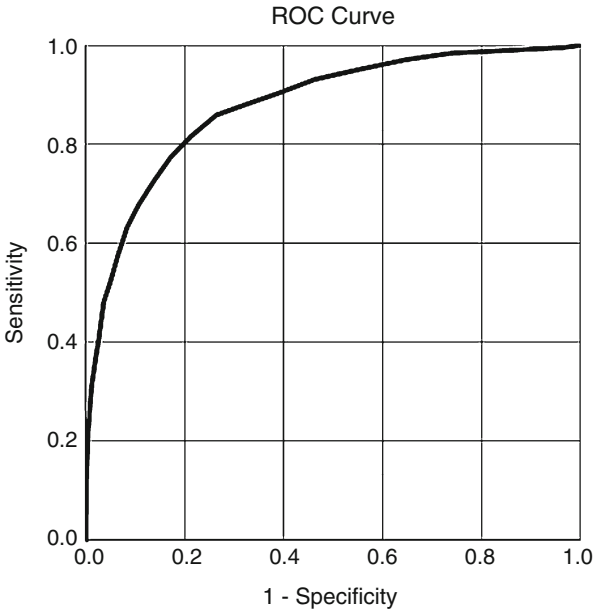

Fig. 1 Example ROC curve for the parent-rated total difficulty score on the SDQ as a test for the presence or absence of psychiatric disorder in the British Child and Adolescent Mental Health Survey 2004 (Green et al. 2005)

The example ROC curve below (Fig. 1) plots sensitivity and specificity for the parent-rated total difficulty score of the SDQ (the test) against the presence of any psychiatric diagnosis on the "gold standard" DAWBA in the 2004 British Child and Adolescent Mental Health Survey (Green et al. 2005). It can be clearly seen that the curve follows the left hand and top border of the ROC space fairly closely and is well away from the 45-degree diagonal. The AUROC is 0.88, indicating a good level of test accuracy in terms of how well the SDQ distinguishes between those who do and do not have a psychiatric disorder.

Test Accuracy in Different Populations

Both sensitivity and specificity are independent of prevalence of disease and are specific to the test itself. However, the PPV and NPV of a test vary with the prevalence of the condition and are population specific. Usually, a higher prevalence increases the PPV of a test, meaning that a higher proportion of those testing positive are likely to have the condition. Similarly, in a population where there is higher prevalence, a lower proportion of those with a negative result will actually *not* have the condition (i.e., the NPV is low). An easier way to remember this is that unless specificity is perfect, lower prevalence leads to false-positive results.

This is important in considering which screening tool to use and in interpreting the result of a test. For example, where a test is validated in a clinical population with a high prevalence of a disorder, but is used in a community population with a much lower prevalence of disorder, those interpreting test results will need to consider that

the meaning of a positive test may be quite different and statistically less likely to indicate the presence of the condition. The converse also applies. A study validating the SDQ in children in care found the measure had a higher positive predictive value (and a lower negative predictive value) in this sample compared to when the SDQ was initially validated in a community sample of children living in private households – for example, a positive test in a child in care was more likely to indicate the presence of psychiatric disorder (Goodman et al. 2004).

For this reason, screening tests should be validated in the appropriate populations in which they will be used.

Screening in Practice

This section discusses some examples of the use of child mental health screening tools in health and social care systems in practice: firstly, in targeted screening and, secondly, in wider population screening.

Examples of Targeted Screening

Improved understanding of risk factors and a greater focus on early intervention and prevention have led to interest in the use of targeted mental health screening in various "at-risk" groups, for example, children in care/child welfare and young offenders. More detailed examples of targeted screening in some of these groups are given below.

Screening of Children in Care/Child Welfare

Children in government care, including those in foster and residential care, have higher rates of psychopathology than those outside the care system (Ford et al. 2007b). Even very young children in care are likely to have mental health problems that could be identified by appropriate screening (Hardy et al. 2015).

Children and young people in care therefore fulfill a number of criteria making them a suitable group for screening. Furthermore, as children go through assessment processes when moving into care, there is potential to incorporate screening into this procedure, contributing to a more streamlined process. A number of studies have evaluated the validity of the Strengths and Difficulties Questionnaire as a screening tool for this group and found that the total difficulties and impact scales discriminated well between children with and without a disorder (Lehmann et al. 2014).

In England, a requirement was introduced in 2008 for local authorities to ensure that the Strengths and Difficulties Questionnaire is completed for all children in care for 12 months or more. The intention is that the SDQ be used as part of an initial health assessment and health plan for children in government care and to identify emotional and behavioral difficulties that might require referral to Child and Adolescent Mental Health Services or other interventions. At a national level,

this data is also intended to act as a population-level indicator of the mental health of this group – i.e., in surveillance. Cocker, Minnis, and Sweeting (Cocker et al. 2018) used data collected from the SDQ screening on children in care between 2009 and 2017 to examine representativeness and trends. They hypothesized that, should screening have had a positive impact on practice by leading to effective interventions, one might expect to see reduced SDQ scores in this population over time, but this was not the case, and there appeared to be considerable missing data (Cocker et al. 2018). This finding is discussed further under "Harms and Limitations" below.

In the USA, many states mandate multistage mental and behavioral health screening and assessment in child welfare systems. While such screening is widespread, studies of screening in practice report limited use of evidence-based screening tools which are validated for this population (Hacker et al. 2014). An example of these programs is in Washington State's foster care system, where children are eligible for a Child Health and Education Tracking (CHET) screen after being in care for 30 days. CHET includes the Ages and Stages Questionnaire: Social-Emotional (Squires et al. 2002) and the Pediatric Symptom Checklist 17 (Gardner et al. 1999). In this system, a designated "screening specialist" reviews the results and then notifies the social worker if a mental health referral or other action is indicated. Pullmann et al. (Pullmann et al. 2018) studied the flow of children through the system and found that 61% screened positive (defined as scoring above the "clinically significant" threshold for at least one of the CHET screen assessments). Unfortunately, there are no data available on whether children underwent full clinical assessment and subsequently received a diagnosis, which might help determine whether these were "true" or "false" positives. However, information was collected on service use within 4 months of entry to care. Of those who were screen-positive, 60% went on to receive some kind of service within the time period. A third of those who screened negative also went on to receive a service in the same timescale. The authors suggested this finding could reflect a need for ongoing screening for later emerging disorders, and/or a possibility that they were "false negatives," indicating a lack of sensitivity of the screen. Lack of detailed data also meant that the nature of the service received, and whether it was evidence-based, was unknown.

Screening Young Offenders

Rates of psychiatric disorder including depression, anxiety, conduct disorder, and attention hyperactivity deficit disorder (ADHD) are higher in young offenders, making them another "at-risk" group that could be offered mental health screening (Chitsabesan et al. 2006; Richardson et al. 2015). While a recent systematic review noted that there was limited evidence on the effectiveness of specific interventions for mental health problems in young offenders (Richardson et al. 2015), there has been particular interest in screening for ADHD in this group, as epidemiological studies in adults with ADHD suggest that pharmacological treatment may reduce offending and reoffending rates (Lichtenstein et al. 2012).

Consequently, a number of screening programs aimed at young offenders have been developed. In England, the use of the Comprehensive Health Assessment Tool (CHAT) (Chitsabesan et al. 2014) is mandated for screening young offenders admitted to institutions and includes sections for mental health, substance misuse, and neurodisability (such as traumatic brain injury or speech language and communication difficulty). In the case of ADHD, the CHAT includes an ADHD screening section but focuses on externalizing symptoms, meaning that inattention could be missed by this initial screen. The current consensus statement from the UK ADHD Partnership recommends that if there is a suspicion of ADHD, the CHAT should be followed up by a specific validated ADHD rating scale and full clinical assessment (Young et al. 2018).

Screening Tools as Part of the Referral and Assessment Process in Child and Adolescent Mental Health Services

In the UK, the number of referrals to specialist CAMHS has increased by a quarter over the last 5 years, and up to a quarter are rejected for reasons including lack of information and not meeting eligibility criteria (Frith 2017). There is interest in using screening tools and standardized diagnostic assessments as part of formal referral and assessment pathways, with the aim of more systematically identifying children likely to have a disorder, that could potentially therefore benefit from specialist intervention (Aebi et al. 2012; Ford et al. 2013). In many areas, decisions on whether to accept referrals for further assessment have often been based on referral letters from primary care, school reports, and/or unstructured initial assessment. Consequently, the use of screening tools as part of the referral and assessment process could be considered to be a form of targeted screening as well as a form of triage.

Many Child and Adolescent Mental Health Services across the UK are now routinely requesting that the parent, teacher, and child complete the Strengths and Difficulties Questionnaires as part of the process of referral to CAMHS, where it is used alongside other sources of information to decide how the referral is managed. Condition-specific tools may also be used as part of the referral and assessment process. For example, a number of ADHD referral pathways (e.g., the Dundee ADHD Clinical Care Pathway) use ADHD rating scales as screening tools to decide whether a further full assessment is warranted (Coghill and Seth 2015).

Wider Population Screening

The previous examples have focused on screening programs in populations which are at higher risk of psychiatric disorder than the general population. This section discusses examples of universal or less targeted screening in population settings, with particular reference to schools.

Schools probably have the widest reach of any potential screening setting for their age group, presenting the opportunity for truly universal screening. While hearing and vision checks form part of universal screening delivered by school nurses in many countries, mental health screening is less commonly offered. Traditional approaches to identification of mental health problems in schools have often been too unsystematic to be properly described as "screening" (Humphrey and Wigelsworth 2016). Additionally, a recent UK survey reported that although one-quarter of educational institutions conducted targeted screening of pupils, and one in seven conducted universal screening of all pupils (NatCen 2017), half of those schools used what were described as "bespoke questionnaires" which may not have been validated for use in this manner. This increases the risks of under- or overidentification of difficulties in terms of false negatives and false positives (see section below) and of unintended consequences.

There is some evidence that screening in schools can identify a higher proportion of children with diagnoses compared to ad hoc identification (Dowdy et al. 2011) and increase the proportion identified as needing support (Splett et al. 2018). A number of studies have suggested that at-risk children identified in schools receive more parental and school support than those identified in other settings, who may be more likely to refuse further assessment and referral (Hacker et al. 2014). However, a recent systematic review found that strong evidence was lacking regarding the accuracy of different identification models, as well as their effectiveness in increasing access to appropriate specialist support (Anderson et al. 2018).

Harms and Limitations of Screening

Harms and Limitations Relating to the Test

Interviews or questionnaires commonly used to assess child and adolescent psychopathology are not associated with harms that may accompany more invasive physical tests, such as pain or infection. However, this does not mean that there are no disadvantages, and few studies of mental health screening for children have explicitly examined adverse events or harms (Anderson et al. 2018). The process of screening can raise anxieties among children and parents, and as false positives may occur, some children may undergo further assessment but turn out not to have the condition in question. As levels of psychopathology may fluctuate, screening at one point in time also risks over- or under-identification of difficulties, and little is known about the timescales or extent of such fluctuation with many of the measures used as screens.

There are also potential harms where screening tools are misused to deny access to further support or assessment based on a "normal" screening test alone: firstly, as the tool may be too narrow to pick up some difficulties or unvalidated in that population; secondly, as "false negatives" may occur; and thirdly, as this may deter young people and their parents or carers from seeking help should the child's mental state deteriorate.

Take-Up and Reach of Screening Programs

Another limitation of screening is that programs may not be consistently offered to those who could benefit and that uptake of screening offered is also influenced by beliefs, attitudes, and acceptability. It is well established that uptake of screening for many conditions including breast cancer, cervical cancer, and colorectal cancer is lower among more disadvantaged groups, which can widen health inequalities (Smith et al. 2016; Kelly et al. 2017). Examination of the English dataset of SDQ scores for children in care found that up to a third of eligible children had "missing" SDQs, either because screening was not offered or accepted, or because the data was not returned. Furthermore, children from black and minority ethnic backgrounds were more likely to have missing SDQs, as were children with disabilities (Cocker et al. 2018).

Screening Alone Does Not Prevent or Treat Disease

Concerns around mental health screening often focus on the ethics of identifying young people that may need further assessments and intervention, if the availability and/or effectiveness of these is limited. It is a central tenet of screening programs (with the possible exception of those focusing on infectious diseases) that the person being screened has the potential to benefit. For example, the US Preventive Services Task Force currently recommends screening for major depressive disorder in adolescents with the caveat that it should be offered: "when systems are in place to ensure accurate diagnosis, psychotherapy (cognitive-behavioural or interpersonal), and follow-up" (Siu 2016). Child and adolescent mental health systems in many developed countries have limited capacity (Brondbo et al. 2011; Frith 2017). The potential increased scale of need identified by universal screening makes this an especially salient consideration for school-based or other wider screening programs. For example, schools themselves report concern about their ability to respond effectively to an increase in students identified as needing intervention (Taggart et al. 2014). Previous work has identified a perceived mismatch between the expectation that schools will address and refer these problems and the availability of mental health consultation and services (Rothì et al. 2008).

Even where screening increases the number of children and young people who may receive a service, there is a question about whether the interventions they receive are evidence based and lead to improved outcomes. In the UK, the Children and Young People's Improving Access to Psychological Therapies (CYP IAPT) program, introduced in 2011, aims to increase the delivery of evidence-based interventions. However, robust data are currently lacking on whether evidence-based interventions are being widely offered within services and of whether they are associated with improved outcomes where this is reported (Deighton et al. 2016). The fidelity of adoption of interventions in schools and more specialist services is likely to be highly variable, with a number of barriers to full implementation being

identified including training, attitudes, resources, and an increasingly complex caseload (Novins et al. 2013; Fazel et al. 2014).

Conclusions

In principle, there are considerable benefits to be gained from mental health screening in children and young people, given the significant under-detection and undertreatment of psychiatric disorders and the sometimes convoluted pathways to care. This chapter has described how screening tools can be applied in targeted at-risk populations as well as in universal settings. However, the key messages from this chapter for practice include the importance of a considered approach to planning any screening. These considerations must involve the choice of a suitable, validated tool for the population, a clear pathway for how the result will inform management and recognition of the potential impacts of a false-negative or false-positive result. Where screening is undertaken in the traditional systematic sense, the program of screening should be assessed against established criteria including the balance of costs and the balance of harms and benefits. The major challenge in this field at present is the need to demonstrate that screening in this population improves outcomes, through high-quality evaluation of universal screening and its cost-effectiveness and, related to this, the provision of evidence based further assessment and intervention for those who screen positive.

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Multicultural Perspectives on Assessment and Taxonomy of Psychopathology

3

Thomas M. Achenbach

Contents

Abstract

This chapter presents the top-down approach to taxonomy embodied in the American Psychiatric Association's (Diagnostic and statistical manual of mental disorders, 5th edn. Author, Washington, DC, 2013) "*Diagnostic and Statistical Manual*" and the World Health Organization's (Mental disorders: glossary and guide to their classification in accordance with the tenth revision of the international classification of diseases, 10th edn. World Health Organization, Geneva, 1992) "*International Classification of Diseases*." In this approach, experts decide on diagnostic categories and then specify criteria for each diagnosis. Standardized diagnostic interviews (SDIs) have been developed to operationalize the diagnostic criteria in terms of questions that trained interviewers ask parents and children. Perhaps owing to methodological differences, SDIs have yielded vastly different prevalence rates for diagnoses in different societies. The chapter also presents the

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bottom-up approach, which starts with pools of items describing specific child problems that are rated by informants such as parents, teachers, and the children themselves. Ratings for large samples of children are factor analyzed to derive syndromes of co-occurring problems. Individual children can then be assessed by rating their problems and by summing the ratings of items comprising scales for each syndrome. To enable users to evaluate the magnitude of scale scores, norms are constructed for children of each gender within particular age ranges rated by particular kinds of informants for various multicultural groupings. Cutpoints are applied to the scale scores to identify possible needs for help and probable needs for help. Factor analyses of data from multiple cultures have supported the cross-cultural generalizability of some statistically derived syndromes. The sum of ratings for all items provides a global index of psychopathology that varies much less across societies than prevalence estimates for diagnoses.

Keywords

Assessment of psychopathology · Taxonomy of psychopathology · Multicultural aspects of psychopathology · Cross-informant agreement on assessment of psychopathology

"Taxonomy" may sound remote from the urgent realities of psychopathology, its causes, course, treatment, and outcome. However, official nosologies such as the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual-Fifth Edition* (DSM-5) and the World Health Organization's (1992) *International Classification of Disease-Tenth Edition* (ICD-10) are often viewed as taxonomies of mental disorders in the sense of providing definitions and criteria for identifying the types of mental disorders that actually exist.

The diagnostic categories specified by DSM-5 and ICD-10 are influential foci for training, research, epidemiology, treatment, and reimbursement related to psychopathology. Labels and acronyms for the diagnostic categories are widely used outside mental health circles, as well as by mental health professionals. Examples of widely used labels and their acronyms include Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Conduct Disorder (CD), Obsessive-Compulsive Disorder (OCD), and Oppositional Defiant Disorder (ODD). Whether used by mental health professionals or by others, these terms tend to imply that psychopathology exists in the form of categorical entities whose presence is defined by the DSM-5 or ICD-10 diagnostic criteria and that individuals can be identified according to the diagnostic categories, such as "the ADHD child."

The DSM-5 and ICD-10 diagnostic categories have been constructed by committees who decide what categories to include, what names to give the categories, and what criteria to use for determining whether individuals have a particular disorder. Although the committees may consider input from many sources, their approach is "top down" in the sense of stemming from the committees' concepts of the disorders that they believe to exist and their choice of criteria for deciding who has each disorder.

While the DSM-5 and ICD-10 are highly influential, their categories of disorders do not necessarily reflect features of psychopathology that have been empirically found to occur together, nor do their diagnostic criteria necessarily comprise features that have been found to distinguish between psychopathological entities. In order for diagnostic categories or other taxonomic constructs for psychopathology to embody sets of features that actually co-occur, taxonomic constructs can be statistically derived from assessments of large samples of people. This can be viewed as a "bottom up" approach, because it starts with assessment data from which taxonomic constructs are derived, in contrast to the top-down approach that starts with committees' concepts of disorders for which the committees then define criteria.

The top-down and bottom-up approaches both involve assessment and taxonomy, which can be defined as follows with respect to psychopathology:

1. *Assessment* is the identification and measurement of the distinguishing features of individuals and of patterns of problems.
2. *Taxonomy* is the grouping of individuals and of patterns of problems according to their distinguishing features.

Although the top-down and bottom-up approaches both involve assessment and taxonomy, they differ in the following ways:

1. The top-down approach starts with concepts of diagnostic categories for which criteria are then chosen. Assessment procedures must subsequently be developed to determine who meets the criteria for each disorder, as illustrated in Fig. 1. In other words, assessment procedures are invented to *operationally define* the diagnostic categories. For children, standardized diagnostic interviews (SDIs) are the most widely used methods for operationalizing DSM and ICD criteria. (For brevity, "children" will be used to include adolescents.)
2. The bottom-up approach starts with data obtained from standardized assessments of problems in large samples of individuals. The assessment data are then subjected to statistical analyses – such as factor analysis – to identify problems that tend to co-occur to form syndromes, as illustrated in Fig. 2. The syndromes are operationally defined in terms of scores an individual obtains on the items comprising each syndrome. For children, rating forms completed by parents, teachers, and the children themselves are the most widely used methods for obtaining the item scores that operationalize syndromes derived via the bottom-up approach.

The Need for Multi-informant Assessments

Children seldom seek mental health services for themselves. Instead, adults – such as parents, teachers, school counselors, and health care providers – typically decide whether children may need mental health services. When such services are sought,

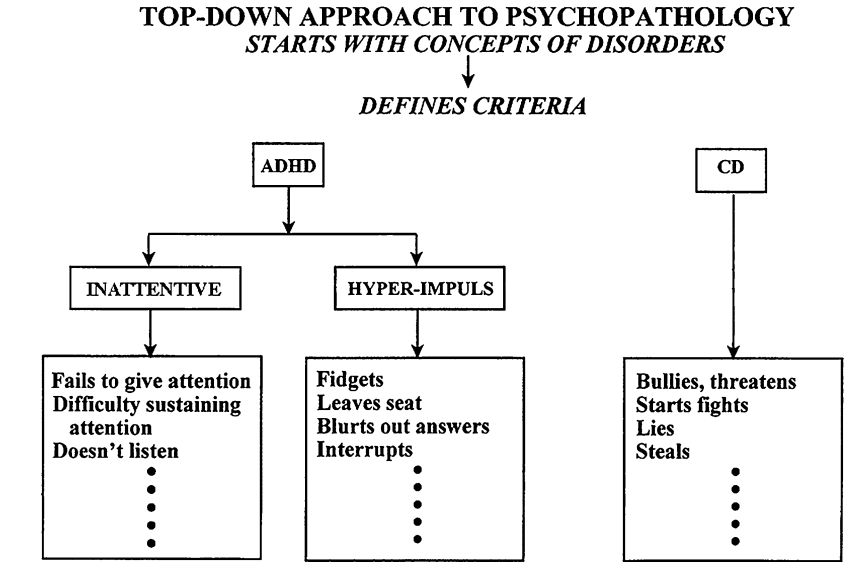

Fig. 1 Top-down strategy for basing diagnostic categories on experts' judgments. (Copyright T.M. Achenbach. Reproduced by permission)

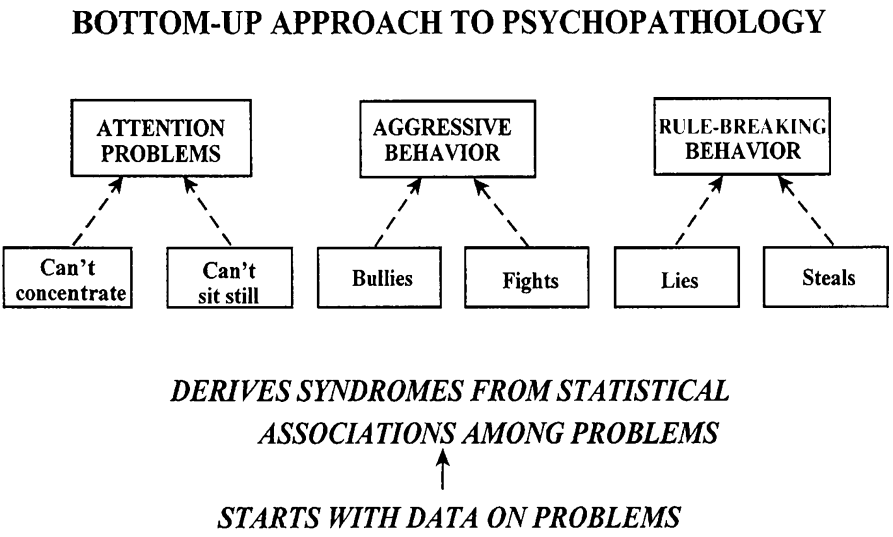

Fig. 2 Bottom-up strategy for deriving syndromes from statistical associations among problem items. (Copyright T.M. Achenbach. Reproduced by permission)

parents or guardians must typically bring the children and provide information regarding the problems to be addressed, family background, etc. If a child is functioning poorly in school, information may also be requested from teachers.

Early meta-analyses of correlations between reports by different informants regarding child psychopathology revealed that cross-informant agreement tends to be low to moderate (Achenbach et al. 1987). Between reports by pairs of informants who see children under similar conditions and play similar roles with respect to the children (pairs of parents, teachers, mental health workers, and observers), the mean correlation was 0.60. Between reports by pairs of informants who see children under different conditions and play different roles with respect to the children (parents vs. teachers vs. mental health workers vs. observers), the mean correlation was only 0.28. And between self-reports by children versus reports by adults (parents, teachers, mental health workers), the mean correlation was a still lower 0.22. Meta-analyses of studies published since the 1987 meta-analyses have found similar low to moderate correlations between pairs of informants regarding child psychopathology (De Los Reyes et al. 2015).

As the modest levels of agreement between informants are among "the most robust findings in clinical child research" (De Los Reyes and Kazdin 2005, p. 483), most mental health professionals who work with children now recognize that different informants may provide different but valuable information. Consequently, it is essential to obtain reports from multiple informants, such as each of a child's parents, the child's teacher(s), and the child him or herself. Most mental health workers also recognize that discrepancies between reports by different informants may reveal differences in how children function in different contexts and in how they are perceived by people having different mindsets regarding the children. Both the evidence for variations in children's functioning and the differences between perceptions of the children need to be considered in efforts to help children and their families.

As an example, discrepancies are often found between teachers who report features of ADHD and parents who deny ADHD because their child spends hours absorbed in videogames. Such discrepancies may result both from genuine differences in the child's functioning at school versus home and from differences between the mindsets of teachers seeking to educate large groups of children versus parents who interact with their children as family members rather as educators in classrooms. Discrepancies between reports by different informants should thus not be blamed on the unreliability or invalidity of teacher-, parent-, or self-reports. On the contrary, very good reliability and validity have been found for standardized ratings of child psychopathology by teachers, parents, and older children (Achenbach and Rescorla 2001).

Rather than being written off as unreliability or invalidity, discrepancies between informants' reports argue for obtaining and comparing data from multiple informants when assessing children's problems. For clinical evaluations, comparisons of data obtained from different informants who complete parallel standardized assessment instruments enable clinicians to identify consistencies and discrepancies between reports from different informants. For example, if all informants report ADHD features, this could argue for an ADHD diagnosis. However, if ADHD features are reported by only one informant – such as a teacher – this would argue for more detailed assessment of the child's functioning in relation to that informant in order to determine whether characteristics of the informant and/or the context contribute to the problems reported by that informant.

Top-Down Use of Multi-informant Data

To meet criteria for ADHD, DSM-5 specifies that "Several inattention or hyperactive-impulsive symptoms are present in two or more settings (e.g., at home, school, or work; with friends or relatives; in other activities)" (American Psychiatric Association 2013, p. 60). The DSM-5 criteria for ADHD require that at least six of nine listed symptoms of inattention or of hyperactivity-impulsivity "have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities" (American Psychiatric Association 2013, p. 59). However, the DSM-5 does not provide assessment procedures for obtaining data from teachers, parents, children, or others to determine whether they report that at least six out of nine inattentive or hyperactive-impulsive symptoms "have persisted for at least 6 months . . ." Nor does DSM-5 tell clinicians how to determine whether the different informants' reports of "several inattentive or hyperactive-impulsive symptoms" meet the six out of nine criterion in two or more settings.

Because neither DSM-5 nor ICD-10 provide assessment procedures for obtaining data from different informants, diagnosticians vary in how and from whom they obtain assessment data. Because neither DSM-5 nor ICD-10 specify how to combine data from different informants, diagnosticians also vary greatly in whether and how they combine often-discrepant data from different informants in order to make yes-versus-no judgments of whether each diagnostic criterion is met and whether a child does or does not have a disorder such as ADHD.

Standardized Diagnostic Interviews (SDIs)

To meet the need for assessment data on which to base decisions about which diagnostic criteria are met by which individuals, several standardized diagnostic interviews (SDIs) have been developed. These interviews are intended to ascertain which individuals meet criteria for DSM or ICD diagnoses by asking questions pertaining to each diagnostic criterion. For assessing children, interviewers question parents about whether their child manifests each criterial symptom of each diagnostic category to a specified degree over a long enough period to meet criteria for the symptom and, ultimately, for the disorder. As an example of assessment for ADHD, trained interviewers question parents about whether their child "Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading)," with follow-up questions regarding age of onset, duration, inconsistency with the child's developmental level, and impacts on social and academic/occupational activities, plus questions to rule out other disorders (e.g., mood, anxiety, and personality disorders) that might account for the symptoms.

Some SDIs are designated as "respondent-based" or "structured," because they ask structured questions to elicit responses that determine whether each criterial feature of a disorder is present. The Diagnostic Interview Schedule for Children (DISC; Shaffer et al. 2000) is a respondent-based SDI for which findings have been widely published.

Other SDIs are designated as "interviewer-based" or "semistructured," because clinically trained interviewers are free to clarify questions and to seek clarification of interviewees' responses. Interviewers are also free to make judgments regarding whether interviewees' answers indicate that diagnostic criteria are met. The Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS – "K" stands for "kiddie;" Ambrosini 2000) is an interviewer-based interview for which findings have been widely published.

The Development and Well Being Assessment (DAWBA; Goodman et al. 2000) resembles respondent-based SDIs in that it obtains assessment data via structured, respondent-based interviews with parents and children. Questionnaires are used to obtain supplementary data from teachers. When parents or children report symptoms, interviewers can ask open-ended questions to obtain details. A computer program prints a summary of the interview information, plus algorithm-generated diagnoses. However, the DAWBA differs from respondent-based SDIs in that clinicians then make diagnoses from the computerized summary. When interview and/or questionnaire data are obtained from multiple informants, the clinicians "decide which informant to believe when presented with conflicting information" (Goodman et al. 2000, p. 648). Goodman et al. refer to the DAWBA as "investigator-based," rather than respondent-based or interviewer-based.

Cross-informant Agreement on SDI Diagnoses

Some of the best evidence regarding cross-informant agreement on child diagnoses made from SDIs comes the Methods for Epidemiology of Child and Adolescent Mental Disorders (MECA) study in which DISC interviews were administered to over a thousand parents and their 9- to 18-year-old children in three US metropolitan areas and San Juan, Puerto Rico. For major DSM diagnostic categories, the kappa coefficients for agreement from parent versus child DISC interviews were ADHD = 0.09, ODD = 0.14, CD = 0.10, Overanxious Disorder = 0.15, and Major Depression = 0.11, with a mean kappa = 0.12 (Jensen et al. 1999).

According to the inventor of kappa (Cohen 1960, p. 43), kappa's magnitude usually approximates the phi coefficient, which is the Pearson correlation computed between two binary variables, such as the presence-versus-absence of a particular diagnosis made from the parent DISC versus the presence-versus-absence of that diagnosis made from the child DISC. Because binary and other categorical data typically yield lower coefficients for reliability and validity of mental health assessment than do continuous (also called "dimensional" or "quantitative") data (Markon et al. 2011), the kappas for agreement between DSM diagnoses made from parent versus child DISC interviews might be smaller than if the assessment data were continuous. However, the small kappa coefficients are not merely statistical artifacts, because they reflect agreement between diagnoses made from parent versus child DISC interviews as the diagnoses are categorically defined by the DSM. Other studies have also reported low agreement between diagnoses made from parent versus child SDIs (e.g., Breton et al. 1999; Shaffer et al. 1996; Verhulst et al. 1997).

In meta-analyses of agreement between diagnoses made from SDIs versus clinical evaluations, a mean kappa of 0.39 was found for children (Rettew et al. 2009).

The mean kappa of 0.39 is considerably larger than the mean kappa of 0.12 found for agreement between parent and child DISC interviews in the MECA study (Jensen et al. 1999). However, the kappa of 0.39 indicates chance-corrected agreement on 39% of the diagnoses, which means that 61% of diagnoses made from SDIs differed from diagnoses made from clinical evaluations.

As Rettew et al. (2009, p. 12) pointed out, requirements for present-versus-absent decisions about diagnoses may underestimate agreement regarding specific problems manifested by the assessed individuals. As an example, if six out of the nine symptoms required for an ADHD diagnosis are endorsed in an SDI with a parent but an SDI with their child or a clinical evaluation endorses only five out of the nine required symptoms, this disagreement regarding one symptom yields 100% disagreement on the diagnosis of ADHD. The 100% disagreement on the diagnosis of ADHD masks the fact that the parent SDI, child SDI, and clinical evaluation all yielded about the same moderate number of ADHD symptoms, i.e., either six or five symptoms. The DAWBA solution of having clinicians "decide which informant to believe" (Goodman et al. 2000, p. 648) may miss the point that each informant may provide valuable information regarding the child's functioning in particular contexts, such as a teacher's report of ADHD features in school versus a parent's denial of ADHD features based on the child's absorption in videogames. In other words, the solution that clinicians should decide which informant to believe assumes (a) that informant discrepancies reflect differences between true and false reports about the child's functioning and (b) that clinicians can determine which reports are true versus false.

Bottom-Up Use of Multi-informant Data

The top-down approach recognizes the need to obtain multi-informant data in order to make at least some diagnoses, such as ADHD. However, the top-down approach portrays each disorder listed in the DSM or ICD as either present or absent. Consequently, to deal with discrepant informant reports, clinicians must decide whose reports to believe in order to diagnose a particular disorder as present versus absent. By contrast, the bottom-up approach starts with data obtained separately from different kinds of informants – such as parents, teachers, and children – and statistically derives syndromes of co-occurring problems from ratings by each kind of informant.

Standardized Rating Forms

The bottom-up data are obtained from rating forms completed by each type of informant. The items on the rating forms describe specific problems – such as *Unhappy, sad, or depressed* – that are rated on Likert scales such as *0 = not true, 1 = somewhat or sometimes true,* and *2 = very true or often* true, based on a specified period, such as the preceding 6 months. To take account of age differences, the items to be rated and the kinds of informants are geared to the children's ages (Achenbach and Rescorla 2000, 2001). For example, an assessment form completed

by parents for ages 1½–5 includes items such as *Resists toilet training*, which would not be appropriate for older ages. For ages 6–18, an assessment form completed by parents includes items such as *Truancy, skips school*, which would not be appropriate for younger ages. For ages 1½–5, there is an assessment form designed for completion by preschool teachers and daycare providers who see children in group settings lacking the academic structure imposed by formal schooling at later ages. For ages 6–18, an assessment form completed by teachers is geared to the formal schooling common at those ages. For ages 11–18, there is a self-report form appropriate for adolescents.

Ratings of problem items are factor analyzed separately for each gender within subgroups of ages within each age range, such as ages 6–11 and 12–18 rated by parents and by teachers. Syndromes derived from various factor-analytic methods for each gender/age group rated by the different kinds of informants are compared to identify syndromes that are similar across factor-analytic methods, gender/age groups, and kinds of informants. Even though some items may differ on the forms completed by different kinds of informants (e.g., caregivers and teachers are not asked to rate *Nightmares*, which parents are asked to rate), six syndromes common to parent- and caregiver-teacher ratings have been found for ages 1½–5. An additional syndrome designated as *Sleep Problems* was found only in parent ratings, as caregivers and teachers lack first-hand knowledge of children's sleep problems. For ages 6–18, eight parallel syndromes have been derived from parent-, teacher-, and self-ratings.

Unlike the diagnostic categories of the top-down approach, the syndromes derived from the bottom-up approach comprise sets of problems found to co-occur in ratings by informants who have first-hand knowledge of the relevant aspects of children's functioning. Also unlike the top-down approach, each bottom-up syndrome is operationally defined as the sum of ratings on the problem items comprising the syndrome. Moreover, each child's syndrome score obtained from ratings by each kind of informant is evaluated in relation to normative distributions of scores obtained for that syndrome by population samples of children rated by that kind of informant. This is done by converting raw syndrome scores to standard scores (normalized *T* scores) that indicate the degree of deviance on each syndrome.

The preceding paragraphs described rating forms, derivation of syndromes, and norm-based standard scores for the parent-completed Child Behavior Checklist for Ages 1½–5 and 6–18 (CBCL/1½ and CBCL/6–18), the Caregiver-Teacher Report Form (C-TRF), the Teacher's Report Form (TRF), and the Youth Self-Report (YSR), which are members of the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach 2009). Other forms for rating children's problems include the Behavior Assessment System for Children (BASC; Reynolds and Kamphaus 2004); Conners (2001) Rating Scales (CRS); and Strengths and Difficulties Questionnaire (SDQ; Goodman 1997).

Cross-informant Agreement on Scale Scores

The rating forms measure children's problems in terms of continuous quantitative scale scores. Although categorical cutpoints can be imposed on scale scores to

discriminate between criterion groups of children considered to need help versus those not needing help, use of scale scores preserves information about gradations in problems that are obscured by present-versus-absent categories.

Correlation coefficients are typically used to measure agreement between scale scores obtained from different informants. The cross-informant correlations on these rating forms tend to be low to moderate, like those cited previously from meta-analyses (Achenbach et al. 1987; De Los Reyes et al. 2015). Because the low-to-moderate cross-informant correlations reflect the realities of variations in children's functioning in different contexts, plus differences in the mindsets of different informants, discrepancies between reports provide potentially valuable clinical and research information, rather than requiring clinicians to decide which reports are true and which are false. To make it easy for users to compare data from multiple informants, ASEBA software displays profiles and side-by-side bar graphs of syndrome scores obtained from ratings by different informants standardized for norms appropriate for the child's gender/age group, for the type of informant (parent, teacher, self), and – as explained later – for the multicultural norm group corresponding to each informant's background.

In addition to the statistically derived syndromes, ASEBA software scores the informants' item ratings on DSM-oriented scales comprising items identified by international panels of experts as being very consistent with particular DSM diagnostic categories. The items are also scored on broad-spectrum internalizing, externalizing, and total problems scales, as well as scales comprising problem items found to be associated with particular disorders such as OCD, plus scales comprising items that assess competencies and adaptive functioning (Achenbach and Rescorla 2007, 2010).

Multicultural Findings for Top-Down and Bottom-Up Models of Psychopathology

Much of the research on both top-down and bottom-up approaches to psychopathology has originated in a few rather similar societies ("societies" refer to geopolitically demarcated populations where a particular language is dominant, such as countries but also including distinctive portions of countries, such as Hong Kong and Flanders – the Flemish speaking region of Belgium). To test the generalizability of top-down and bottom-up models beyond their societies of origin, and to enable clinicians, researchers, and trainees in additional societies to use the assessment procedures, it is necessary to apply the procedures to population samples in each society. For societies where people are found to understand and accept the assessment procedures, data obtained by assessing population samples can be compared with data from other societies to identify similarities and differences that need to be considered in building a multicultural science of psychopathology and in adapting assessment tools for use by clinicians, researchers, and trainees in many societies. Table 1 summarizes characteristics of top-down and bottom-up assessment and taxonomy in population studies of child psychopathology.

Table 1 Assessment and taxonomy in population studies of child psychopathology

Top down		Bottom-up	
1.	Starts with official criteria for diagnoses	1.	Starts with items that describe problems to be rated (e.g., 0-1-2) by informants (parents, teachers, children)
2.	Formulates questions to ask parents and/or children about each diagnostic criterion	2.	Rating forms are pilot tested with the intended informants
3.	Trains interviewers to administer questions	3.	Scales are derived by factor analyzing item ratings
4.	Interviews are pilot tested with parents and/or children	4.	Population samples are assessed by having informants fill out rating forms or interviewers read items to informants
5.	Population samples are assessed by having trained interviewers administer questions to parents and/or children	5.	Scores are computed by summing ratings of items comprising each scale
6.	Algorithms determine whether each diagnostic criterion is met (yes or no)	6.	Norms may be constructed by assigning percentiles and/or standard scores based on population samples
7.	If all criteria are met, diagnosis is made	7.	Scale scores may be displayed in relation to norms
8.	If >1 informant provides data, clinician or algorithm decides who to believe	8.	Cutpoints may be applied to scale scores to discriminate between normal, borderline, and clinical ranges
		9.	Item ratings and scale scores can be compared across informants to identify consistencies and discrepancies for planning interventions

Designations of the two approaches to assessment and taxonomy as "top down" and "bottom up" reflect the following epistemological difference: The top-down approach assumes that psychopathology exists in the form of categorical disorders that are known to experts whose expert knowledge enables them to work down from the categories to the specification of criteria for determining whether a person has a particular disorder. By contrast, the bottom-up approach assumes that samples of children must be assessed in order to obtain data from which to work up to taxonomic constructs. In other words, the top-down approach assumes that experts already know how to categorize psychopathology, whereas the bottom-up approach assumes that taxonomic constructs should be derived from assessment data.

Although the process of formulating disorders and criteria for the DSM or ICD includes input from many sources, committees of experts ultimately choose the diagnostic categories and criteria to be published. These diagnostic categories and criteria then become the basis for SDI questions and algorithms intended to provide operational definitions of the diagnoses.

Top-Down Multicultural Findings

Few studies have directly compared top-down taxonomic decisions (i.e., diagnoses) derived from applying the same standardized assessment procedures to population samples of children in more than one society within the same study. However, more than a dozen studies have administered SDIs to parents and/or children in population samples from single societies and have reported prevalence rates for diagnoses in those single societies. Studies varied widely with respect to the diagnostic procedures, children's ages, interviewing of parents, children, or both, methods for dealing with informant discrepancies, completion rates, specific diagnoses reported, etc.

Findings for Prevalence Estimates

A review of population studies reporting diagnoses made from those SDIs that were used to assess ≥300 children in ≥5 societies (the DAWBA and DISC) obtained prevalence estimates for any diagnoses (i.e., the percentage of children identified as having ≥1 DSM diagnosis) that ranged from 1.8% in Goa, India to 50.6% in the previously cited MECA study of three US metropolitan areas and San Juan, Puerto Rico (Achenbach et al. 2012). The 28-fold difference between the prevalence estimates of 1.8% for Goa, India (Pillai et al. 2008), and 50.6% for the MECA study (Shaffer et al. 1996) implies enormous differences in the prevalence of psychopathology in India versus the US and Puerto Rico. However, the review also included a study from Bangalore, India (Srinath et al. 2005) that yielded a prevalence estimate of 12.8%, which was only slightly less than the 13.1% estimate for a US national sample (Merikangas et al. 2010). The prevalence estimates of 1.8% from Goa, India, and 50.6% from the MECA study were at the ends of the distribution of prevalence estimates from 19 studies, but there was also great variation between these extremes, even within societies, such as estimates ranging from 13.1% to 50.6% for US samples. Such large discrepancies between estimates make it hard to draw conclusions about the true prevalence of psychopathology defined according to the DISC and DAWBA SDIs.

Because neither DSM nor ICD specify assessment operations, different SDIs operationalize the diagnostic criteria differently, which may yield different diagnoses for the same cases. For example, one of the few direct comparisons between diagnoses of the same children made from different SDIs yielded a mean kappa of 0.03 between "definite" DSM diagnoses made from the DISC and the K-SADS (Cohen et al. 1987). Use of a more lenient criterion of agreement between "possible" diagnoses yielded a mean kappa of 0.14.

Although most population studies of diagnoses of child psychopathology have used versions of the DISC, differences between different versions of the DISC (e.g., versions based on DSM-III, DSM-III-R, DSM-IV), the sources of data (parent, child, or both), the number of different diagnostic categories assessed, and algorithms for dealing with comorbidity and informant discrepancies could have contributed to the marked differences between prevalence estimates based on DISC interviews. Differences between the DAWBA and various versions of the DISC could have additionally contributed to differences between prevalence estimates.

Bottom-Up Multicultural Findings

In contrast to the top-down assumption that psychopathology exists in the form of the categorical disorders defined by DSM or ICD, the bottom-up approach derives taxonomic constructs from data obtained by assessing samples of children via rating forms completed by parents, teachers, and/or the children themselves. The taxonomic constructs are operationally defined by summing ratings of items that are statistically found to co-occur and are then aggregated into scales. Some types of analyses yield narrow-spectrum scales corresponding to syndromes (e.g., an Attention Problems syndrome), while other types of analyses yield broad-spectrum scales designated as internalizing problems (including problems of depression, anxiety, social withdrawal, and somatic complaints without apparent medical cause) and externalizing problems (including rule-breaking and aggressive behavior) (Achenbach et al. 2016). The narrow-spectrum and broad-spectrum scales are not contradictory, but comprise different levels in a hierarchy, such that several narrow-spectrum syndromes are included in the broad-spectrum internalizing scale, while other narrow-spectrum syndromes are included in the broad-spectrum externalizing scale.

Findings for Taxonomic Constructs

Because the bottom-up taxonomic constructs are derived from assessment data, it is important to compare constructs derived from data obtained for samples in different societies. The review of prevalence estimates for diagnoses made from SDIs that were used to assess ≥300 children in ≥5 societies (the DAWBA and DISC) also reviewed findings from bottom-up rating forms (CRS and SDQ) that were used to assess population samples of ≥300 children in ≥5 societies (Achenbach et al. 2012). A companion review presented findings for samples of ≥300 children assessed with ASEBA instruments in 44 societies (Rescorla et al. 2012).

The review of bottom-up findings found exploratory factor analyses (EFAs) of several versions of the CRS that were used to obtain teachers' ratings of students of various ages in four societies besides Canada and the USA, where the initial CRS derivation data were obtained. The syndromes obtained from EFAs differed somewhat among the societies, although the differences may have reflected differences in the versions of the CRS that teachers completed, as well as differences in the students' ages, in the factor-analytic methodology, and in societal effects.

The review found several confirmatory factor analyses (CFAs) as well as EFAs of the SDQ. CFAs provide stronger tests of the replicability of bottom-up scales than EFAs do, because CFAs test the degree to which scales derived from EFAs of ratings for a particular sample of children fit ratings for a different sample of children, such as children living in a society other than the society where the scales were initially derived. Constructed in the UK, the original SDQ syndrome scales are designated as *Emotional Symptoms, Hyperactivity, Conduct Problems,* and *Peer Problems*, plus a scale designated as *Prosocial*.

PCFAs of samples from some societies supported the SDQ model of four syndromes and a prosocial scale, although with assorted variations. However,

CFAs of samples from several societies supported models that included broad-spectrum internalizing and externalizing scales, plus a Prosocial scale, which included some favorable items that were reverse-scored for assignment to syndrome scales in the original SDQ 5-scale model. As an example, in the 5-scale model, the item *generally liked by other children* is reverse scored to count toward the Peer Problems scale score but was found to load on a broader Prosocial scale in some analyses (e.g., Dickey and Blumberg 2004).

To test relations between the standard SDQ 5-scale model and the internalizing-externalizing-prosocial model supported in several studies, Anna Goodman, Lamping, and Ploubidis (2010) performed second-order CFAs on SDQ parent, teacher, and self-ratings for UK children. The second-order CFAs tested whether any of the narrow-spectrum scales mutually correlated to form broader spectrum scales. It was found that the SDQ's Emotional Symptoms and Peer Problems scales correlated to form a broad-spectrum internalizing scale, while the Conduct Problems and Hyperactivity scales correlated to form a broad-spectrum externalizing scale. Anna Goodman et al. (2010) also found that the broad-spectrum internalizing and externalizing scales were more valid than the standard narrow-spectrum SDQ scales in population samples.

The review of findings for ASEBA taxonomic constructs presented CFAs of assessment data obtained by indigenous researchers in 44 societies for eight syndromes that were derived separately from CBCL/6–18, TRF, and YSR ratings (Rescorla et al. 2012). The syndromes are designated as *Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior*, and *Aggressive Behavior.* Reflecting differences in problems ratable by parents versus teachers versus youths, the items comprising the syndromes differ somewhat between the CBCL/6–18, TRF, and YSR (e.g., *Steals at home* is on the CBCL/6–18 and YSR but not the TRF version of the Rule-Breaking syndrome, as teachers are not asked to rate *Steals at home*). In CBCL/6–18 samples from 42 societies, TRF samples from 27 societies, and YSR samples from 34 societies, CFAs supported the syndromes that were originally derived from parent-, teacher, and self-ratings of US samples.

Findings for Total Problems Scores

In addition to tests of statistically derived scales in different societies, multicultural applications of bottom-up assessment and taxonomy involve comparisons of scale scores across multiple societies. In parallel to the comparison of prevalence estimates for $\geq$1 diagnosis made from SDIs, the Achenbach et al. (2012) review of SDQ studies compared total problems (general psychopathology) scores across population samples. (Because the CRS lacks total problems scores, no such comparisons were feasible for the CRS.) For the SDQ, a study by Lai et al. (2010) compared the mean "Total Difficulties" scores (sum of 0-1-2 ratings on 20 SDQ difficulties items) obtained from parents' ratings in population samples of various age ranges in six societies. The mean Total Difficulties scores ranged from 7.2 in the USA to 11.8 in Hong Kong. Despite differences in age ranges and sampling methodology, the use of the same SDQ (in translation for non-Anglophone societies) yielded a range of mean

Total Difficulties scores whose highest score was only 1.6 times greater than the lowest score.

A study by Ravens-Sieberer et al. (2008) compared the percentage of 12- to 18-year-olds from 12 European societies whose SDQ self-rated Total Difficulties scores exceeded a clinical cutpoint for Total Difficulties. The clinical cutpoint for Total Difficulties had been established on the basis of self-ratings in a previous UK sample. The percentage of Total Difficulties scores that exceeded the cutpoint ranged from 10.0% in Germany and Switzerland to 23.6% in the UK, which was 2.7 times greater than the 8.6% of UK youths whose scores exceeded the cutpoint in the UK sample on which the cutpoint was established. Among Raven-Sieberer's 12 - European samples, the largest percentage of deviant scores (23.6% in the UK) was 2.4 times greater than the smallest percentage (10.0% in Germany and Switzerland). However, the finding that the 8.6% prevalence of deviant scores in the original UK sample was smaller than the prevalence of deviant scores for any of the 12 Ravens-Sieberer samples (including 23.6% for the UK) shows that a cutpoint based on one sample may not be valid for identifying clinical deviance in other samples.

The Rescorla et al. (2012) review included multisociety comparisons of CBCL/6–18, TRF, and YSR scores for Total Problems, eight syndromes, six DSM-oriented scales, internalizing, and externalizing. ANOVAs of problem scale scores showed small to medium effects of societal differences and nonsignificant to small effects of age, gender, and interactions with society, according to Cohen's (1988) criteria for effect sizes. Figure 3 displays mean CBCL/6–18 Total Problems scores for 42 societies from all inhabited continents. The mean Total Problems scores ranged from 14.6 in Japan to 43.4 in Brazil, with an omnicultural mean (the mean of all mean Total Problems scores) of 24.04.

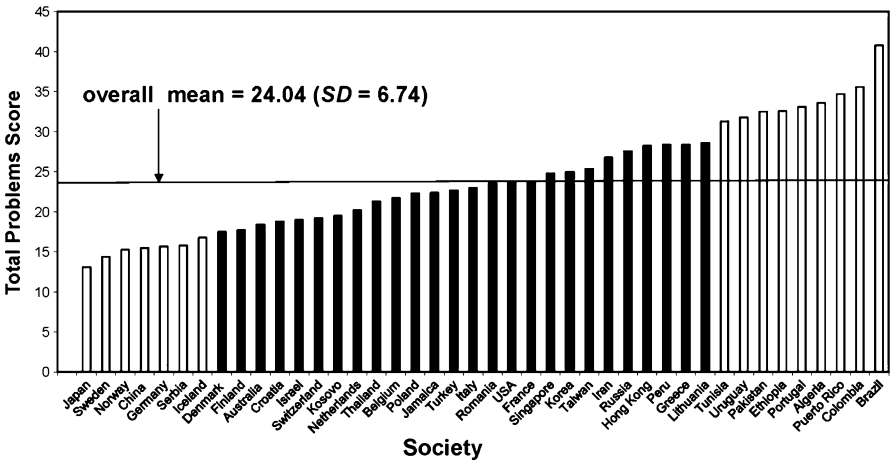

Fig. 3 Child Behavior Checklist for Ages 6–18 (CBCL/6–18) mean Total Problems scores in 42 societies ($N = 69{,}866$). (Copyright L.A. Rescorla. Reproduced by permission)

Comparisons of Societal and Cultural Effects

Because certain societies may share particular cultural characteristics, it is important to tease apart variance in problem scores that is associated with the shared cultural characteristics of populations versus variance in problem scores that is associated with populations defined according to their society of residence. In a study designed to estimate effects on problem scales that were associated with clusters of culturally similar societies versus effects associated with individual societies not aggregated by cultural similarities, hierarchical linear modeling (HLM) analyses were applied to CBCL/6–18 problem scale scores for 72,493 6- to 16-year-olds living in 45 societies from all inhabited continents (Rescorla et al. 2019). The societies were divided into ten clusters on the basis of cultural similarities identified in the Global Leadership and Organizational Behavior Effectiveness Study (GLOBE; House et al. 2004). Examples of the culture clusters include Anglo, Confucian Asia, and Latin America.

For 14 of the 17 CBCL/6–18 problem scales that were analyzed, the effects of society were larger than the effects of culture cluster, indicating that parents' ratings of their children's problems are typically more strongly associated with characteristics of particular societies than with characteristics of culture clusters. However, across the 17 scales, the combined effects of society and culture cluster averaged only about 10%, compared to about 90% for the effects of individual differences within societies and culture clusters. In order words, problem scores on the CBCL/6–18 reflected individual differences among the children and their parents who rated them much more than differences between societies and culture clusters.

Multicultural Norms

Although individual differences in problem scores exceed the effects of societal and cultural differences, it is nevertheless important to take account of those differences, as well. To take account of societal differences in CBCL/6–18 problem scores, norms were constructed for each gender at ages 6–11 and 12–18 in societies having mean Total Problems scores >1 *SD below* the omnicultural mean Total Problems score (this multicultural norm group is designated as *Group 1*). Norms were also constructed for each gender at ages 6–11 and 12–18 in societies having mean Total Problems scores >1 *SD above* the omnicultural mean (designated as *Group 3*). Societies included in Group 1 and Group 3 are represented by white bars in Fig. 3. Because the mean Total Problems score for the US normative sample was equal to the omnicultural mean and because the US norms were already widely used for clinical and research purposes, the US norms are used for societies with mean Total Problems scores between −1 and +1 *SD* from the omnicultural mean (designated as *Group 2*).

ASEBA software can display all problem scales scored from the CBCL/6–18 with *T* scores and percentiles based on user-selected Group 1, 2, or 3 norms, according to the society appropriate for respondents who complete the CBCL/6–18. TRF and YSR problem scale scores can likewise be displayed in relation to *T* scores and percentiles based on Group 1, 2, and 3 norms. The norms were

constructed separately for the CBCL/6–18, TRF, and YSR in order to reflect the different distributions of scores obtained from parent-, teacher-, and self-ratings. In some societies, the scores obtained from different informants qualify for different norm groups. For example, CBCL/6–18 and TRF ratings from Mainland China and Japan qualify for Multicultural Norm Group 1, whereas YSR ratings from those societies qualify for Group 2, because Chinese and Japanese youths rate their problems considerably higher than their parents and teachers do. Three groups of multicultural norms have also been constructed on the basis of CBCL/1½–5 and C-TRF data from many societies around the world (Achenbach and Rescorla 2010).

Categorical and Dimensional Models

Table 1 lists some characteristics of top-down and bottom-up approaches to child psychopathology. Although not necessarily intrinsic to the top-down approach, the current versions of the top-down approach embodied in DSM-5 and ICD-10 portray psychopathology in terms of categorical disorders that are judged to be present according to fixed rules for determining whether the requisite yes-versus-no criteria are met. By contrast, the bottom-up approach embodied in rating instruments such as the CRS, SDQ, and ASEBA portrays psychopathology in terms of problem items whose ratings are factor analyzed to derive taxonomic constructs, which can include narrow-spectrum syndromes, broad-spectrum groupings (such as those designated as internalizing and externalizing), and Total Problems as a measure of general psychopathology. Individual children are scored on scales for each taxonomic construct by summing informants' ratings of the scales' constituent items.

Users can evaluate the magnitude of a particular scale score by comparing it with norms for the child's age and gender, the type of informant, and appropriate multicultural norm group. Cutpoints can be used to mark scale scores that are deviant enough to indicate possible needs for help (designated as the borderline clinical range), or probable needs for help (designated as the clinical range). Cutpoints can be chosen on the basis of statistical criteria (e.g., $\geq$2 *SD* from the mean of a normative distribution), or on the basis of documented discrimination between children who do versus do not need help according to independent clinical criteria, or on the basis of a combination of statistical and clinical criteria. Different cutpoints can be used for different purposes, such as initial screening, clinical decision-making, evaluation of progress and outcomes, research, epidemiology, etc. The important point is that scale scores for taxonomic constructs provide measures of the quantity and severity of particular kinds of problems. Users are free to apply the scale scores in various ways without being restricted by fixed rules for defining illness versus health.

Quantitative/dimensional models for psychopathology are not inherently incompatible with categorical models, as DSM and ICD criteria include lists of symptoms and cutpoints for the number of symptoms needed to qualify for a diagnosis. For example, the DSM-5 criteria for ADHD include lists of nine inattention symptoms and nine hyperactivity-impulsivity symptoms. To be diagnosed as having ADHD, a

child must be judged to manifest ≥6 of the 9 symptoms of either inattention or hyperactivity-impulsivity.

To quantify the DSM symptom criteria for ADHD, it would be possible to use the number of symptoms judged to be present (0–9) to measure the severity of inattention and/or hyperactivity-impulsivity. It would also be possible to construct population-based norms for the 0–9 symptom counts and to specify cutpoints for children of each gender in different age ranges, rated by different informants, and in relation to appropriate multicultural norms. However, for ADHD to be judged present, DSM-5 also requires categorical "yes" judgments for four other criteria (several symptoms present before age 12; several symptoms present in ≥2 settings; symptoms interfere with social, academic, or occupational functioning; symptoms are not better explained by another mental disorder).

Although there are important gaps between current categorical and dimensional models for psychopathology, the introduction to DSM-5 states that "dimensional approaches to diagnosis ... will likely supplement or supersede categorical approaches in coming years" (American Psychiatric Association 2013, p. 13). Top-down models for child psychopathology thus need not be viewed as inherently incompatible with bottom-up dimensional models. However, assessment of children in diverse societies is needed to compare the distributions and correlates of various problems reported by different informants within and between societies and to aggregate assessment data into taxonomic constructs whose validity and utility can be tested. Continued multicultural research collaborations are needed both to advance the international science of psychopathology and to provide tools for using that science to help children and families around the world.

Summary and Conclusions

Assessment is the identification and measurement of the distinguishing features of individuals and of patterns of problems. *Taxonomy* is the grouping of individuals and of patterns of problems according to their distinguishing features. This chapter presented the top-down approach to taxonomy of child psychopathology, which starts "at the top" with concepts of diagnostic categories and works down to criteria for each diagnosis. Assessment procedures – especially standardized diagnostic interviews (SDIs) – are then constructed to operationalize the diagnostic criteria by translating them into questions that trained interviewers ask parents and children. The chapter also presented the bottom-up approach, which starts "at the bottom" with assessment of large samples of children via ratings of problem items by informants such as parents, teachers, and the children themselves. The ratings are then factor analyzed to derive syndromes and broader spectrum groupings such as internalizing and externalizing.

Both the top-down and bottom-up approaches must deal with the challenges of discrepancies between assessment data from different informants. The top-down

approach does this largely by requiring clinicians or algorithms to decide which informant to believe. The bottom-up approach preserves data from each informant by scoring it on dimensional scales in relation to norms. Users can then compare data from different informants to identify consistencies and discrepancies, which may indicate needs for interventions tailored to particular situations and interaction partners. Most mental health professionals who work with children now recognize the need to obtain data from multiple informants in order to take account of variations in children's functioning from one context to another (such as home vs. school), as well as differences among informants' views of the children.

SDIs have been used to obtain prevalence estimates for DSM diagnoses in several societies, but the 28-fold range found for prevalence estimates probably reflects major methodological differences, such as the differences in how SDIs operationalize diagnostic criteria, different numbers of diagnoses assessed, age range of the children, use of data from parents, children, or both, procedures for dealing with cross-informant discrepancies, etc.

Bottom-up rating forms have been used to assess children in many studies, including studies that used the same rating forms to assess population samples in multiple societies. Factor analyses of problem ratings from some samples have supported some syndromes scored from the Strengths and Difficulties Questionnaire (SDQ), but factor analyses of other samples have supported broad spectrum internalizing and externalizing groupings of SDQ problems. Confirmatory factor analyses of data from dozens of societies have supported the eight syndromes scored from parent-, teacher-, and self-rated Achenbach System of Empirically Based Assessment (ASEBA) forms. Distributions of problem scale scores on a particular rating form differ much less between societies than do prevalence estimates for diagnoses. However, discrepancies between the percentages of children scoring above a particular cutpoint in different samples argue against applying cutpoints based on a single sample to all other samples. The ASEBA therefore provides separate norms for each gender within particular age ranges, based on parent-, teacher-, and self-ratings, according to multicultural norm groups.

Current top-down models portray psychopathology in terms of categorical disorders defined by fixed rules. By contrast, bottom-up models portray psychopathology in terms of quantitative dimensional scales whose scores measure the frequency/intensity of problems comprising a particular taxonomic construct. Top-down models need not be viewed as inherently incompatible with dimensional models, as lists of criterial symptoms for particular diagnoses can be quantified. Moreover, DSM-5 states that "dimensional approaches to diagnosis . . . are likely to supplement or supersede categorical approaches in coming years" (American Psychiatric Association 2013, p. 13).

Cross-References

► Diagnoses

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Part II

Epidemiology

Trends in Child and Adolescent Mental Health Prevalence, Outcomes, and Inequalities

4

Stephan Collishaw and Ruth Sellers

Contents

Abstract

Child and adolescent mental health problems are common and have serious impacts on wellbeing, relationships, education, and long-term health. A public health priority is to reduce the burden associated with mental health problems. This chapter considers changes in the population prevalence of child and

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adolescent mental health problems, in outcomes for children with mental health problems, and factors that might have contributed to mental health trends. Robust epidemiological evidence suggests some major changes in prevalence over time. Converging evidence points to increasing rates of adolescent emotional disorders. The contribution of socio-economic inequalities, lifestyle changes, social relationships, and family risk is considered. The chapter concludes by highlighting priorities for future research – there is currently limited evidence on child mental health trends in lower- and middle-income countries. There is also a need to develop and apply robust methodologies in time trends research.

Keywords
Time trends · Secular change · Prevalence · Outcomes · Depression · Emotional problems · Adolescence · Global · Inequality

Importance of Understanding Trends in Mental Health

Improving children and young people's mental health is a societal priority. This is because mental health problems are common and have major impacts on social development and education, and because they are linked with poor long-term health morbidity and mortality. Mental health problems are becoming a leading cause of disease burden amongst adolescents globally (Patton et al. 2016). Monitoring the prevalence of child mental health problems is important for understanding whether efforts to improve children's mental health are successful. Tracking trends in child mental health is also important for planning investment in mental health services to address future need. In addition to tracking *trends in prevalence*, it is also important to know whether *outcomes are changing* for children who suffer from mental health problems. In other words, is the prognosis for these children improving or becoming worse? Finally, it is clear that social change and modern demands do not impact on all children, families, and communities in the same way. *Understanding which groups are most affected* can help pinpoint drivers of mental health trends and is critical for understanding how to improve children's mental health at the population level. Recent reviews of the evidence about trends in mental health provide a more detailed synthesis of the literature than is possible here (e.g., Bor et al. 2014; Collishaw 2015). The aims of this chapter are to summarize general conclusions regarding trends in child and adolescent mental health, to consider possible contributory factors, and to identify priorities for future research.

Trends in Prevalence in High-Income Countries

The Need for Unselected Population-Based Comparisons

The majority of children with mental health disorders and impairment do not receive a clinical diagnosis nor receive help via mental health services (Davies 2014; Olfson et al. 2015; Patton et al. 2016). When children do seek help, it is often in other

settings, particularly in schools (Anderson et al. 2018). For this reason, child mental health disorders identified in health care settings likely reflect the "tip of an iceberg" of child mental health need. This is important for interpreting the substantial increases that have occurred in clinical diagnoses and treatment of child and adolescent psychiatric disorders including ADHD, autism, anxiety, and depression (Olfson et al. 2015). These trends likely reflect changes in the classification of disorders, patterns of help seeking, service provision, and clinical practice (Collishaw 2015). In other words, these trends may simply reflect that more of the iceberg is visible today than it was in the past. It is not possible to tell from clinical record data alone whether the population prevalence of child mental health problems is changing. This chapter addresses the extent to which there are underlying changes in population prevalence and therefore focuses on evidence from epidemiological designs that more readily permit like-with-like comparisons of unselected population cohorts.

Trends Differ by Type of Mental Health Problem, Child Age, and Gender

The past two decades has seen an increase in time trends research providing a wealth of evidence from repeated unselected epidemiological studies. Findings are broadly consistent and point to several important conclusions.

In contrast to the marked increase in clinical diagnosis and treatment of neurodevelopmental disorders, underlying population rates of ADHD and Autism Spectrum Disorders have not changed or have only changed very little (e.g., Collishaw 2015; Duinhof et al. 2015; Lundstrom et al. 2015; Polanczyk et al. 2015; but there are exceptions, e.g., van Vuuren et al. 2018). Youth behavior problems (e.g., conduct problem, violence) have shown more substantial changes over time. Different sources of data (victim surveys, recorded crime, parent, and youth reports) all suggest a substantial increase in youth antisocial behavior, crime, and violence in many countries between the 1960s and late 1980s/early 1990s followed by an equally substantial drop since that time (Collishaw 2015; Frøyland and von Soest 2018; Humphreys et al 2019; Salas-Wright et al. 2017; UNODC 2016). These trends have been seen in many but not all regions globally. Notable exceptions include countries in Central and South America which have seen a continued increase in youth violence (UNODC 2016; Murray et al. 2013). Finally, there is robust evidence from cross-time comparisons of anxiety and depression symptom screens that the prevalence of adolescent emotional problems increased in many countries between the 1980s and 2000s, including in Canada, Finland, Greece, Iceland, the Netherlands, Norway, Sweden, and the UK (see Collishaw 2015 for a review), and studies provide further evidence for a substantial increase in depression and anxiety, especially among adolescent girls (Blomqvist et al. 2019; Mishina et al. 2018; Patalay and Gage 2019; Thorisdottir et al. 2017; Twenge et al. 2018; but see also exceptions, e.g., Pitchforth et al. 2018).

Direct epidemiological comparisons of unselected cohorts using interview-based assessments of mental health are rarely undertaken, but in the UK three surveys

including a total of around 30,000 children and young people were carried out in 1999, 2004, and 2017 using the DAWBA psychiatric interview assessment. Around one in eight children met criteria for a psychiatric disorder in 2017 (up from one to ten in the previous survey years) and increasing rates were specifically seen for emotional disorders (Sadler et al. 2018). A similar study in Australia compared rates of psychiatric disorder assessed using the DISC-IV (parent) between 1998 and 2014, and this study points to similar conclusions. At least one in ten children met criteria for a psychiatric disorder, there was no temporal increase in rates of ADHD or conduct disorders, but a substantial rise in adolescent major depressive disorder especially in females (Sawyer et al. 2018). Finally, annual survey data in the USA of a total of 350,000 adolescents and young adults using the DISC-IV (self-reports) also finds an increase in the 12-month prevalence of adolescent major depressive episodes, again particularly in females (Mojtabai et al. 2016).

Trends in child and adolescent mental health clearly differ by type of problem. In particular, there are different patterns of change in rates of neurodevelopmental problems, behavioral difficulties and emotional symptoms, and differences in trends by age and by gender. It is also likely that mental health trends differ between and within countries, but firm conclusions here are more difficult with the available data. An important caveat is that most of these studies have been undertaken in high income countries.

Explaining Mental Health Trends

Trends in youth mental health likely stem from the interplay of individual susceptibility and multifaceted social change in children's lifestyles, family environment, and social conditions. Testing specific reasons for changes in youth mental health is challenging because society has changed in numerous inter-related ways and because few cross-cohort comparisons have included measures of putative explanatory factors and mental health at the individual level. Social change is also unlikely to have impacted uniformly on young people, with children growing up in more disadvantaged circumstances or with preexisting individual mental health problems being most vulnerable (Sadler et al. 2018; Sellers et al. 2019).

Trends in Socio-Economic Disparities

Many governments and international bodies have highlighted the importance of tackling inequalities in children's physical and mental health (Her Majesty's Treasury 2003; Marmot et al. 2010; WHO 2008). Unfortunately, it is now clear that substantial inequalities in child health remain, including in most high-income nations (The Lancet 2013; Royal College of Paediatric and Child Health 2017). This is also true for children's mental health. In fact, evidence suggests that the mental health gap between poorer and better-off children is not closing but increasing (Elgar et al. 2015; Collishaw et al. 2019). The widening of the mental health gap

between socially advantaged and disadvantaged children needs to be seen in the context of substantial public spending cuts in many countries following the 2008 world-wide recession. These have impacted most on the incomes, financial security, health and support services for the most disadvantaged families in society (Stuckler et al. 2017). Without redressing this, it seems likely that child mental health inequalities will continue to grow.

Child Health-Related Behavior and Lifestyle

There have been marked changes in children's lifestyles. For example, sleep, exercise and sedentary behavior, obesity, screen time, and substance use are all posited as potential causal risk factors associated with adolescent depression and anxiety, and each has shown rapid change over time. Young people today sleep less and more poorly (Patalay and Gage 2019), are more likely to be over-weight (Chorin et al. 2015), and spend substantially more time engaged in screen-based activities using social media to interact with others than did previous generations (Twenge et al. 2018). At the same time, recent decades have also seen more positive changes in young people's lifestyles, notably a global reduction in youth smoking (Azzopardi et al. 2019). Studies are now needed to test directly the extent to which these changes have contributed to (or mitigated) changes in youth mental health.

Social Relationships and School Environment

Difficulties in social relationships can include bullying, loneliness, and lack of supportive friendships. These can be significant concerns for many children and adolescents as they grow up. In addition to negative impacts of mental health problems on children's social functioning, there is now also strong evidence of risk effects of social functioning problems on mental health (Arsenault et al. 2010). Population-level changes in the prevalence of bullying and other social relationship difficulties are therefore important to consider as potential contributors to youth mental health trends, especially with the widespread introduction of anti-bullying programs in schools in many countries. Evidence suggests traditional victimization has decreased in many countries (Chester et al. 2015) and that nation-wide school-based antibullying programs might be linked to decreases in traditional bullying where these have been implemented (Tiiri et al. 2019). In contrast, rates of cyber-bullying have shown an increase over time (Kessel Schneider et al. 2015). Other difficulties in children's social relationships such as loneliness and isolation remain common with little change in prevalence over time (Lempinen et al. 2018). It has also been suggested that young people's mental health is adversely affected by increasing academic expectations, pressure, and work load (West and Sweeting 2003; Collishaw 2015). However, evidence regarding trends in child-perceived academic pressure and as an explanation for trends in mental health is mixed (Nygren and Hagquist 2017; Klinger et al. 2015; West and Sweeting 2003).

Family Risk

While trends in family demographics are well documented (e.g., long-term increase in parental separation; Seltzer 2019), far less is known about trends in family dynamics (e.g., parental discord, parenting and parent-child relationship quality). This is because most cross-cohort comparisons have not utilized comparable measures of family life. While there is some evidence that young people worry more about family stability and relationships than before (Sweeting et al. 2010), there is little evidence for the view that there has been general decline in quality of parenting. For example, a comparison of adolescents in 1986 and 2006 found that young people in the later cohort reported equally strong or better emotional support, communication, and quality time with parents (Collishaw et al. 2012). There is stronger evidence that trends in youth mental health might involve intergenerational transmission of risk. There is substantial evidence that problems like anxiety and depression run in families and that this reflects not only heritable but also social transmitted risk (Tully et al. 2008). An important implication is that increases in youth emotional problems in one generation will likely lead to increased risk of emotional problems in subsequent generations. Indeed, a two-generational study using the ALSPAC cohort indicates higher rates of depression in young women in pregnancy today than in their mothers during their pregnancies (Pearson et al. 2018), and a previous cross-time cross-generational study found that increases in parental mental health problems "explained" a nontrivial portion of the increase in adolescent mental health problems (Schepman et al. 2011).

Priorities for Future Research

Global Child Mental Health Trends

Research on child mental health trends has mostly been undertaken in high-income countries. However, with the majority of the world's 2.5 billion children and adolescents living in lower and middle income countries (LMICs), it is critical to understand global trends in child and adolescent mental health (Patton et al. 2016). This is particularly pertinent as LMICs often experience rapid social change and there are often unique social challenges that impact on children's mental health not seen in higher income countries. These challenges include higher rates of internal and international displacement/migration, rapid urbanization, and natural disasters associated with climate change (Patel et al. 2018). Despite an increasing awareness of the importance of understanding impacts of social change on child mental health globally, there remains very little systematic monitoring of child mental health trends beyond high income countries. There have been notable steps in improving many aspects of children's physical health globally (e.g., improved vaccination coverage, neonatal care, nutrition, and a reduced disease burden due to infectious diseases; UN IGME 2018). In contrast, the global burden of disease attributable to mental disorders is likely to rise, but accurate estimates of mental health need will not be possible

without expanding the global coverage of epidemiological data on children's mental health (Erskine et al. 2017).

Trends in Outcomes for Children with Mental Health Problems

Most time trends research has focused on changes in mental health symptom and disorder prevalence. Where children's mental health has been assessed in repeated longitudinal cohorts, this offers the powerful opportunity to assess whether the outcomes for children with mental health problems are also changing (Collishaw 2015). It is interesting here not simply to consider historical trends in the course and prognosis of core mental health symptoms, but also to consider the broader functional impacts of mental health problems on young people's health and development. At present there is limited evidence to base conclusions on, but emerging research indicates that society may have become more challenging in recent years for those children who do experience mental health difficulties. For example, Sellers et al. (2019) compared three longitudinal birth cohorts in the UK and found that for children with mental health problems identified at age 7 years, there were increased risks of loneliness and peer victimization in middle childhood, a higher risk of school exam failure, and higher levels of psychiatric problems in adolescence. Importantly, those risks were substantially greater for children growing up in the 1990s and 2000s when compared to children growing up in the 1960s and 1970s. One of the challenges faced by this study that will need to be overcome going forward relates to the harmonization of mental health and outcome data across cohorts set up in very different eras.

Developing Robust Methodologies

Finally, an important priority is the development of robust methodologies to allow for valid and reliable comparison of prevalence, risk factors, and outcomes across time. This requires careful consideration of possible differences in the sampling, retention, and measurement of mental health in cross-cohort comparisons. For example, missing data can skew prevalence estimates because children at greater risk of mental health problems are typically less likely to participate in surveys. Where missing data patterns vary between cohorts then this can be a major threat to cross-cohort comparisons if this is not accounted for appropriately, e.g., using attrition weights or multiple imputation. A second challenge is where measures change between studies – this is not an uncommon challenge because of the need for innovation in assessment methods in line with methodological and conceptual advances in the field (MRC 2014). What is clear is that even apparently minor changes, e.g., in question wording, can have major impacts on estimated prevalence rates (Goodman et al. 2007). One way to overcome this problem is to use calibration methods that make use of independent samples where study members complete old and new versions of the measures of interest (Collishaw et al. 2004; Sellers et al. 2019). The greatest challenge, however, is that even with identical measures it is uncertain whether observed changes reflect real shifts in mental health or simply

changes in reporting about mental health. One solution may lie in the development of "anchoring vignettes" to measure and account for variations in reporting (King et al. 2004), but these also present substantial practical and conceptual challenges (von Soest et al. 2011). An alternative possibility is to use genomic data to benchmark comparisons.

Conclusion/Implications

Policy makers are keen to present children's mental health as a priority. It is clear, however, that in contrast with other aspects of children's health, there have been few improvements in prevalence, inequalities, and outcomes. Instead this review suggests that in many ways things have worsened over time. Understanding why this is and what needs to be done to improve children's mental health is important for moral, social, and health reasons. There are also strong economic arguments to support investment in prevention and treatment of mental health conditions (Chisholm et al. 2016). It is estimated that the global economic costs of mental disorders will amount to US$16 trillion for the period 2010–2030 (Bloom et al. 2011), yet just 0.1% of total development assistance for health is allocated to child and adolescent mental health (Patel et al. 2018), and there are also stark disparities in funding for mental health research (MQ 2019). Addressing these disparities will be critical, with a need to understand which young people are at greatest risk and when and how to intervene to improve their long-term mental health.

Cross-References

- ▶ A Public Health Response to Mental Health
- ▶ Burden and Cost Associated with Childhood Bullying Victimization
- ▶ Epidemiology of Child Psychopathology
- ▶ Diagnoses
- ▶ Family Issues in Child Mental Health
- ▶ Gaps Between Knowledge, Services, and Needs
- ▶ Parents with Psychiatric Conditions
- ▶ Self-harm and Suicidality in Children and Adolescents
- ▶ Socioeconomic Inequalities and Mental Health Problems in Children and Adolescents

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Gaps Between Knowledge, Services, and Needs

5

Daniel Fatori and Guilherme V. Polanczyk

Contents

Abstract

Child and adolescent mental disorders are prevalent and impairing conditions with low rates of treatment. Even though there are a variety of evidence-based interventions to treat mental disorders, several barriers prevent children and adolescents from receiving mental health care. Gaps between knowledge, services, and needs could be considered the main reason behind this problem. In this chapter, we discuss how traditional and innovative strategies could help tackle this challenge. Epidemiology is an indispensable tool to assess needs for child and adolescent mental health care and help plan services. Active screening in multiple contexts using different approaches can assist in detecting cases. But a continuum of mental health care, from traditional interventions to innovative treatments delivered by digital technology and a variety of professionals, is needed to meet

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the demand. To translate knowledge into action, sufficient financial investments must be made to implement policies with the potential to reduce the treatment gap. New research will be needed to test the efficacy of innovative strategies and measure the impact of child and adolescent mental health-care policies.

Keywords

Child and adolescent mental health · Treatment gap · Epidemiology · Public health · Mental health care policy · Mental health services

Introduction

Approximately 338 million children worldwide have a mental disorder (Polanczyk et al. 2015; United Nations Department of Economic and Social Affairs, Population Division 2017). Child and adolescent mental disorders are impairing and often chronic conditions known to be one of the leading causes of disability in this age group (Erskine et al. 2015). It is estimated that one-half of them do not receive any treatment. It is worth noting that in low- and middle-income countries, the rates of children receiving treatment are even lower (Rocha et al. 2015). The prevalence of people with mental disorders who do not receive care is called *treatment gap*, a complex problem that may be the result of gaps between scientific knowledge, available services, and needs from the population.

Promoting actual change to reduce treatment gap is no small task. Child and adolescent psychopathology is a complex phenomenon with elusive etiology. The intricate interplay between biological, psychological, and social elements is known to play an important role in the onset and trajectory of mental disorders, creating a challenge for researchers to delineate specific targets for therapeutic and preventive strategies. Stigma and lack of knowledge about mental disorders are very common in the population. Social and economic vulnerability factors generate and maintain mental disorders. Despite the complex scenario, policy makers and stakeholders must rely on the body of knowledge produced by researchers to identify, select, and implement strategies. This is not always intuitive for the community that frequently does not require the same level of scientific evidence from mental health interventions that usually require interventions of other areas of medicine, like cardiology. Moreover, policy makers and stakeholders may suffer pressure from the community, voters, and industries to adopt interventions that are not yet ready for implementation or that do not have the required level of evidence. On the other hand, interventions with demonstrated efficacy in research settings when implemented in real-world settings do not always demonstrate effectiveness or have enormous costs that do not translate in adequate benefits. Commonly, tested interventions focus on specific elements of psychopathology, ignoring global needs of children and their families. These interventions usually have demonstrated efficacy over short period of time, on narrow outcomes, which clearly do not capture long-term and broad needs of children and adolescents over development.

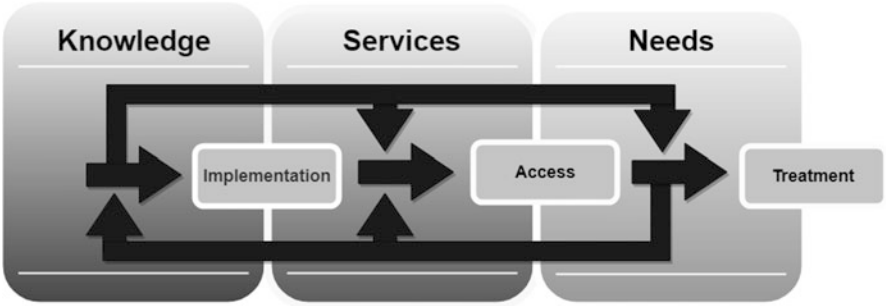

Fig. 1 The relationship between knowledge, services, and needs in child and adolescent mental health

Despite the challenges to develop and test interventions for child and adolescent mental disorders and the frequent caveats of existing interventions, scientific knowledge is the basis of successful services implementation that may meet the needs of children and adolescents (Fig. 1). In this regard, to understand needs and plan services accordingly, the knowledge generated by epidemiological studies is fundamental.

Characterizing the Needs

Epidemiology, as the cornerstone of public health, is an important tool to understand the distribution and determinants of mental disorders in children and adolescents. It can also provide important insights on the causal pathways of mental disorders and guide the planning of services to adequately meet population needs of treatment. In other words, epidemiological data is the foundation of evidence-based services planning and policy making. Well-planned epidemiological studies can reach the population of children and adolescents with mental disorders that are not receiving treatment, providing not only an objective measure of the treatment gap but also much-needed sociodemographic and clinical data. Longitudinal studies can map services use and help understand the trajectory of caregivers searching for diagnosis and treatment. Continuous evaluation of services access and treatment delivery can contribute to the understanding of the effectiveness of strategies that are already in place and guide further changes. Additionally, public health surveillance systems can provide systematic information on a variety of indicators, for example, the number of treated patients, diagnoses, and the presence of risk factors. It must be noted that while it is ideal to conduct local epidemiological studies to have more fine-grained data, it can be costly and difficult to execute these studies in some specific settings, such as in low-income countries. Lack of epidemiological data should not prevent decision-makers to take action. In the absence of data collected from primary sources, studies conducted elsewhere can be helpful. For instance, the prevalence of specific mental disorders is generally comparable across countries, and the

presence of well-known risk factors such as poverty and violence is associated with increased rates of mental disorders. Consequently, actions prioritizing groups exposed to deprivation and other risk factors are important and valuable, despite the lack of data collected from primary sources.

Case Identification: The Starting Point to Access to Services

Understanding the needs for child and adolescent mental health treatment is key to plan services, but not sufficient. Barriers to access of services must be considered and addressed. Even though there is a broad range of effective evidence-based interventions available to treat youth with mental disorders, the majority of children and adolescents with mental disorders are left untreated due to limited access to care. The starting point to improve access to services is case identification. In child and adolescent mental health, identification can occur because a professional or caregiver detects problematic behavior. Among professionals, mental health practitioners are trained to recognize symptoms and diagnose and treat mental disorders. However, the number of mental health professionals available in the world is known to be suboptimal. While high-income countries have a median number of mental health professionals of 71.7 per 100,000 people, low-income countries have less than 2 mental health professionals per 100,000 people (WHO 2017). In the case of child and adolescent mental health professionals, the numbers are even lower. Other professionals that are close to the daily life of children and adolescents (e.g., school teachers) can help identify mental disorders. However, it must be acknowledged that identifying cases reliably is a complex procedure that requires evidence-based training programs and careful implementation procedures.

Often, caregivers are the ones who identify symptoms of mental disorders, even though it is very challenging for them to differentiate between typical development, normal behavior, and emerging symptoms. Initially, caregivers try to handle difficulties by asking advice to relatives or friends or by handling the difficulties themselves. For example, aggressive behavior is usually handled using a more restrictive parental discipline. Adolescents, however, are known to be highly self-reliant and have negative feelings toward seeking mental health treatment, especially in the context of hospitals or health centers (Gulliver et al. 2010). Mental health professionals are usually sought after problematic behaviors become more severe and/or too difficult to handle. Even when symptoms are detected by caregivers, stigma and lack of knowledge on where to receive mental health care can be an important barrier. Stigma is the process of attributing prejudicial attitudes and negative attributes to conditions such as mental disorders. In this sense, a caregiver with a child with problematic behavior may avoid seeking help because of a belief that treatment would result in being judged by others to be a bad parent or that the child will be judged as different or inferior (Dempster et al. 2013).

In the case of lack of knowledge about mental health care, the complexity of health systems and lack of integration between services in the health-care continuum can be very difficult for caregivers to understand. Differences between primary,

secondary, and tertiary care, as well as the roles of different types of health-care facilities and professionals, are not obvious and can potentially be overwhelming. In this regard, enhancing mental health literacy (MHL) can positively impact these barriers. MHL is defined as knowledge and beliefs that can enhance recognition, management, and prevention of mental disorders. Since MHL translates into a better understanding of symptoms, mental disorders, and risk factors, ultimately it can enhance caregivers' ability to detect mental disorders in children and adolescents (Kutcher et al. 2016). Having an understanding of mental disorders can help mitigate caregiver's feelings of failure, rejection, and shame, which ultimately can lead to isolation. Furthermore, MHL is associated with the reduction of stigma by means of deconstructing stereotypes and negative labels related to people diagnosed with mental disorders. Brief interventions focused on improving MHL are known to improve recognition of mental disorders, change beliefs about treatment, and reduce stigma (Morgan et al. 2018).

Actively screening for cases is also essential to improve case identification. However, the current dominant model of case identification and treatment delivery is based on traditional medical practice, where patients or families have to be aware of their symptoms and seek professional help; then, diagnosis and treatment occur in one-to-one sessions at a health-care facility or private office (Kazdin 2019). Even though the physician's practice model is widespread and considered efficient for most medical specialties, it is limited in terms of reach, it is not focused on active identification of cases in the community, and it is not flexible in terms of treatment delivery. Strategies must go over and beyond this model (Fig. 2). For example, community health screening has been proven to be a low-cost and effective approach

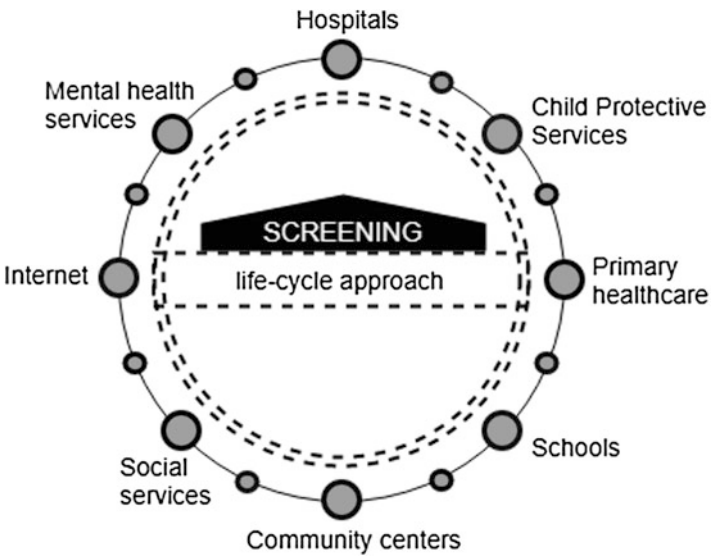

Fig. 2 Model of active screening for cases of child and adolescent mental disorders in multiple contexts using different methods considering a life-cycle approach

to detect early signs of cardiovascular diseases and diabetes (Gaziano et al. 2015; McKeirnan et al. 2015). Similar community health screening strategies could be developed and implemented to detect cases of child and adolescent mental disorders. Furthermore, national campaigns to improve knowledge and awareness have been used in multiple contexts to prevent various diseases but have been underutilized by the mental health field. Schools are in a prime position to incorporate such campaigns and mental health screening strategies due to the time children and adolescents spend studying.

Learning from Theoretical Advances

Most evidence-based programs developed to detect child and adolescent mental disorders, as well as training programs for non-health workers, have focused on specific problems (e.g., attention-deficit and hyperactivity disorder, depression, etc.). Even though this type of targeted approach can be effective, there are several drawbacks that should be considered. Mental disorders are highly comorbid between them, and a general factor of psychopathology has been increasingly recognized. More intensity of general psychopathology will usually indicate more functional impairment, symptoms, risk factors, and a stronger association with biomarkers (Caspi and Moffitt 2018). Moreover, the onset of mental disorders is frequently preceded by a state of mental distress with symptoms that are not yet clustered in syndromes, for example, a 15-year-old experiencing stress and then insomnia, leading to lack of energy, slowness of cognitive processes, and depressed mood, finally leading to functional impairment, eventually meeting full criteria for depression (van Os 2013). In addition, mental disorders are associated with adverse outcomes through broad psychological dimensions (Blanco et al. 2019). For decades now the field of child and adolescent mental health has been showing that early intervention is key to maximizing treatment results and guaranteeing optimal outcomes. If early intervention is key, early detection of mental disorders in children and adolescents is paramount. Focusing on only one specific mental disorder may not be the most cost-effective strategy. Furthermore, this type of approach will also fail to detect nonspecific states of mental distress preceding mental disorder onset. Future screening programs should be based on up-to-date psychopathology knowledge.

Continuum of Care and Integration Between Sectors

The full range of health services across all specialties and covering all stages of illness is referred as the continuum of care. In the case of child and adolescent mental health, this continuum must be expanded to include other sectors where assessment and intervention can potentially benefit patients. Promoting a continuum of care with intersectoral collaboration can have a powerful effect on the treatment gap. Mental health care for children and adolescents should not be restricted to specific health

facilities and geographical areas. The current dominant model is based on the expectation that caregivers detect mental health problems in their children, locate health facilities and mental health professionals, schedule a visit, and bring their children to the clinic. Most of the time, the trajectory from detection to treatment will present barriers that can ultimately prevent the child from receiving treatment (Kazdin 2019; Scorza et al. 2019). Moving toward the integration of different sectors and thus guaranteeing a continuum of care has the potential to reduce these barriers.

Schools and community centers could incorporate mental health screening periodically or have a mental health professional within the school system. Since children and adolescents spend a great amount of time in school, it is an ideal environment for mental health action. Mental health programs in schools can support students' learning, promote mental health literacy, and prevent mental disorders and adverse outcomes (Atkins et al. 2010; Carsley et al. 2018; Graeff-Martins et al. 2006), among other possibilities. However, the full potential of integrating mental health programs in schools is yet to be fulfilled (Patalay et al. 2018).

Additionally, recognizing that mental and physical health are indivisible can lead to greater integration between psychiatry and other medical specialties, like pediatrics and neurology. Screening for mental disorders can be part of a routine visit to the pediatrician and part of the triage system of a health-care facility or included in a home visit protocol of a community health worker (CHW). To improve access to mental health care, intersectoral collaboration must be well coordinated to avoid barriers between the referrals from non-health services to health-care service.

The Role of Digital Technology

Instead of waiting passively for patients, health-care systems can benefit from advances in technology that have taken place in the last 10 years. For instance, mobile technology could help overcome one of the most important barriers preventing children and adolescents from getting access to treatment: low rates of case identification. Mobile technology could easily be integrated into community health care. However, it must be noted that the majority of studies and programs using electronic data collection are mostly adapting conventional scales to digital format. There is one major potential issue related to this practice. In order to perform a comprehensive assessment, long or multiple scales must be used to assess different mental disorders and domains, creating a time-consuming interview that can take hours to be fully completed. Hence, in lieu of conventional scales adapted to digital format, data collection could be done via mobile devices powered by statistical algorithms. In this sense, computerized adaptive testing (CAT) is a promising tool in the field of mental health. CAT is a dynamic assessment in which the specific questions and its sequences are determined by previous responses, reducing hour-long interviews to minutes. Previous studies have shown that CAT was able to reduce a 1-hour-long assessment of depression to less than 5 min. High sensitivity

and specificity can be achieved using an average of four items per participant (Gibbons et al. 2016).

A CAT administered by CHWs could be a low-cost case identification strategy with two advantages: feasibility and scalability. It is feasible because the current hardware and software are available to develop and implement this strategy. Also, it is low-cost when compared to highly specialized mental health professionals. Most costs would occur in the development (e.g., programming) and implementation (e.g., acquisition of mobile devices, training) stages. Since most countries do not have a sufficient number of mental health professionals to assess children and adolescents (Bruckner et al. 2011), CHW equipped with mobile devices with CATs could provide support in detecting and referring children with mental disorders to health services. Responses from caregivers and other professionals (e.g., teachers, social workers) could also be useful to improve the accuracy of the test. Future studies should investigate the viability of CATs to assess child and adolescent mental disorders in different contexts.

Digital technology can also help bridge distances in regions where there is unequal geographic distribution of mental health professionals, an issue known to occur in many low-income countries (Kakuma et al. 2011). One solution is to use the ever-evolving tools of telehealth, that is, the use of technology to provide access to health assessment, diagnosis, intervention, consultation, and supervision across distance via interactive telecommunication with audio and video. Telehealth enables a two-way real-time interactive communication between patients and health professionals bridging any geographical distance. With almost half the world's population having access to the Internet and hardware able to provide a robust telecommunication environment becoming cheaper every year, telehealth can potentially scale up to help patients that otherwise would not receive adequate treatment. The use of telehealth in the context of child and adolescent mental health has already been extensively studied, proving to be an effective tool in diverse contexts from clinical to nonclinical settings. Its flexibility allows not only assessment and intervention but also training and/or supervision of nonspecialists. If implemented adequately following guidelines and respecting legal, regulatory, and ethical considerations, telehealth can become an important tool to overcome the treatment gap (American Academy of Child and Adolescent Psychiatry (AACAP) Committee on Telepsychiatry and AACAP Committee on Quality Issues 2017).

Social Media and Digital Footprints

In a very short time since its inception, social media has become ubiquitous worldwide. Social media are websites and/or applications where people can create and share content, as well as connect and communicate with friends and relatives. Facebook, the largest social media and social networking service, reports 2.4 billion monthly active users. Children and adolescents nowadays are already using social

media very early in life several hours per day. Much has been debated about the potential deleterious effects of social media use on mental health and well-being (Orben and Przybylski 2019), but less attention has been given to the potential beneficial effects it can have on a number of outcomes. For example, awareness campaigns via social media could improve MHL, given traditional approaches are adapted to better suit the Internet environment. It is already known that youth experiencing symptoms of mental disorders have a tendency to look for information searching the Internet (Burns et al. 2010). Often, information found on the Internet can be misleading and even cause harm. Therefore, using social media to disseminate evidence-based knowledge is advantageous, considering youth propensity to use the Internet and social media. Furthermore, there are numerous advantages of using social media to improve MHL in the population. The reach, scalability, and affordability of social media surpass any traditional campaign or program. Shared content on social media can reach thousands and even millions of people in a few days. Even though there are multiple initiatives worldwide currently disseminating mental health knowledge through social media, few studies have been done to test the efficacy of such interventions, especially in the field of child and adolescent mental health. Nevertheless, the use of social media to enhance MHL is promising and should be further investigated (Hui et al. 2015).

In addition, social media has the potential to help identify cases of mental disorders. This approach is in line with the idea of actively screening outside the traditional boundaries of the dominant health-care model previously mentioned. Every day, billion bytes of data are being generated by people creating digital footprints, that is, traces of data derived from our daily life interactions with every type of computer (e.g., PC, smartphone, wearable device) (Bidargaddi et al. 2017). This data is already being systematically analyzed for commercial purposes by business companies, enabling accurate predictions of customer behavior, among other outcomes. In the case of mental health, research findings have been promising. Using characteristics of Twitter usage, such as frequency of words, ratio of positive affect words, number of posts per day, and average number of words per post, researchers were able to predict depression with an accuracy of 69% (Tsugawa et al. 2015). In another study, researchers extracted features from photos shared on Instagram, including the presence and number of human faces, pixel-level averages for hue and saturation, and color properties, to generate predictive models of depression with higher precision than general practitioners' average diagnostic success rate (Reece and Danforth 2017). Machine vision and natural language processing algorithms are improving every year, leading to better models and higher predictive values. In the future, they could be used for beneficial purposes in the field of child and adolescent mental health. Evidently, attention must be paid to ethical and privacy concerns, since using data generated by children, adolescents, and caregivers, without transparency and consent, could do harm and create mistrust among parties involved in the process. If done adequately and ethically, actively screening digital footprints can eventually lead to suicide prevention strategies (Coppersmith et al. 2018), potentially saving lives.

Mobile Applications and Bots

Smartphones have spread rapidly around the world, becoming more prevalent every year. Even in countries with emerging economies, approximately 45% of the population currently owns a smartphone (Pew Research Center 2019), showing smartphones are becoming more accessible. The ubiquity of smartphones leads to the development of mobile-based interventions, a new field that experienced fast growth in the last years. Mental health interventions delivered via smartphone applications (apps) have efficacy demonstrated in clinical studies (Firth et al. 2017; Huguet et al. 2016). Most strategies used in interventions via apps are based on cognitive and behavioral psychology. Decades-old techniques used in psychotherapy sessions are being adapted to the digital context, enabling the delivery of interventions that are automated or partially mediated by a mental health professional. An interesting example is the case of behavioral activation, an intervention designed to help depressed patients identify, schedule, and engage in positive and productive activities to address lack of positive reinforcement and behaviors of avoidance (Martin and Oliver 2018). While in one-on-one psychotherapy sessions behavioral activation is highly customized, taking into account numerous characteristics, such as symptomatology and life aspects, it can be simplified and adapted into apps due to its inherent simplicity. In general, the structured and manualized nature of cognitive-behavioral therapy (CBT) is well-suited to be translated to a digital environment. In addition, smartphone apps can easily be integrated to wearable devices with sensors capable of monitoring physical activity, heart rate, and ambient light, among other characteristics, thus allowing a more comprehensive and longitudinal evaluation that could further customize the intervention to each individual need.

Progress in machine learning and artificial intelligence is already enabling the development of automated talking therapies. Recently, researchers used instant messenger apps to implement a conversational bot able to deliver a fully automated CBT intervention for depression. Traditional hallmarks of CBT, like mood monitoring and psychoeducation, are delivered through text messages, images, and short videos. The experience is tailor-made to the individual experience taking into account every response (Fitzpatrick et al. 2017). The field of child and adolescent mental health could benefit greatly from this technology. For example, parent training and MHL programs could be adapted to be delivered by conversational bots. This type of intervention should not be considered substitutes for human interaction and traditional forms of psychotherapy but a complement able to circumvent the issue of lack of mental health professionals, as well as a potential initial treatment to cases of mild or moderate severity. More studies should be made to test the efficacy of these technologies in the context of child and adolescent mental health, since most studies have been done in adults.

Expanding the Workforce

Improving the availability of mental health professionals is an important task that requires long-term investments (Scivoletto et al. 2019). In the meantime, expanding the mental health-care workforce to adequately treat children and adolescents in need might be the solution. This could be done using the task shifting approach, where lay individuals or nonspecialist health workers are trained to deliver interventions that are generally delivered by health professionals. In the field of global health, task shifting has proven to be a successful strategy to treat and prevent a number of communicable and noncommunicable diseases. In adults, interventions delivered by nonspecialists have shown to be effective to treat depression, anxiety, post-traumatic stress disorder, alcohol use disorders, eating disorders, and schizophrenia (Kazdin 2019; van Ginneken et al. 2013). Clinical interventions usually delivered by psychologists have been successfully simplified and adapted to be adequately administered by nonspecialists in different contexts (Ekers et al. 2011; Patel et al. 2017). Still, it must be noted that more research is needed to determine the feasibility and efficacy of task shifting solutions in the field of child and adolescent mental health.

Pharmacological treatment is an important line of effective intervention to treat child and adolescent mental disorders that is often not available in contexts with a scarcity of medical doctors, such as low-income countries. In extreme, but not rare cases, there are no medical doctors available in some deprived areas. One potential solution to this challenge that has been discussed in the last decades is the implementation of policies allowing nonmedical prescribing. Many countries have already implemented nonmedical prescribing policies to some extent, such as the United Kingdom, Australia, Canada, and the United States, among others. This strategy can take the form of supplementary prescribing, where the prescriber is in contact to a doctor and the treatment plan must be developed in agreement, or independent prescribing, where the health professional is responsible for treatment decisions. In both cases, certified training programs in educational institutions provide the necessary knowledge and expertise on pathophysiology, clinical assessment, and pharmacology, among others, to nonmedical professionals. Nurses and pharmacists are the most common independent nonmedical prescribers; however, many other allied health professionals are also trained to provide supplementary prescription (Stewart et al. 2012). Studies have shown that nurses working as substitutes for medical doctors in the primary care system are able to provide equal or, in some cases, better quality of care for a number of outcomes in adults when compared to medical doctors (Laurant et al. 2018).

Policy Making

The lack of specific policies for mental health can strongly influence the treatment gap. A report by the World Health Organization showed that 28% of countries do not have a stand-alone policy for mental health (WHO 2017). Effective legislation

focused on the specific needs of child and adolescent mental health can provide a much-needed structured national plan to help countries tackle the treatment gap. Alongside the implementation of policies, investments must be made to make sure mental health systems are equipped to provide care. Government expenditure on mental health worldwide is known to be insufficient. While the global median health expenditure per capita is US$ 141.0, the global median mental health expenditure per capita is US$ 2.5. Only the American and European WHO regions spent more than US$ 10 per capita on mental health. Without proper government investment, it is very difficult to establish a solid basis of initiatives to start providing mental health care to all children and adolescents in need. Advocacy groups, researchers, and mental health professionals can monitor and pressure governments and policy makers to guarantee that sufficient investments are made and specific policies are developed. Without policies, knowledge cannot be translated into action.

Constant and direct interactions between researchers, policy makers, and stakeholders are vital for translating knowledge into action. Interventions vary in terms of efficacy, cost, and complexity, making it difficult for policy makers to select and implement them. Consequently, evidence must be synthesized through systematic reviews and communicated in an accessible manner. Setting priorities and policy agendas can help streamline the process. Ideally, every policy should be designed with an evaluation plan for its impact from the start. Impact measures can help modify aspects of a given policy that are not effective in delivering targeted outcomes. Policy making should be viewed as an ongoing process in constant need of change to deliver better results (Haines et al. 2004).

Achieving universal health coverage (UHC) is going to be critical to address the treatment gap. UHC is defined as a health-care system able to provide to all individuals of a population all essential services, from health promotion and prevention to treatment and rehabilitation, without incurring a financial burden to individuals and families. At the moment, half of the world's population do not have access to essential health services to cover basic needs (WHO 2019). Child and adolescent mental health is an indispensable part of UHC. Given the often chronic and complex nature of mental disorders, patients may need multiple types of interventions for months or years, sometimes resulting in financial hardships that can create a vicious cycle of impoverishment. One of the sustainable development goals, signed by all United Nations member states in 2015, is to achieve UHC by 2030, a difficult but not impossible task that will have a big impact on the treatment gap.

Conclusions

Presently, the field of child and adolescent mental health offers a variety of evidence-based treatments to treat mental disorders. Certainly, there is a need for better and more cost-effective interventions. Nevertheless, several barriers are preventing children and adolescents from receiving evidence-based mental health care. Reducing the treatment gap will be one of the crucial challenges for the next decade (Patel et al. 2018). Throughout this chapter, we discussed how traditional and innovative

strategies could help tackle this challenge. Epidemiology is an indispensable tool to assess needs for child and adolescent mental health care and help plan services. Active screening in multiple contexts using different approaches can assist in detecting cases. But a continuum of mental health care, from traditional interventions to innovative treatments delivered by digital technology and a variety of professionals, is needed to meet the demand. To translate knowledge into action, sufficient financial investments must be made to implement policies with the potential to reduce the treatment gap. New research will be needed to test the efficacy of innovative strategies and measure the impact of child and adolescent mental healthcare policies.

Cross-References

► A Public Health Response to Mental Health
► Mental Health Strategy and Policy

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Epidemiology of Child Psychopathology

6

Major Milestones

Frank Verhulst and Henning Tiemeier

Contents

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Abstract

Background: Child psychiatric epidemiology has developed rapidly from descriptive, cross-sectional studies in the 1960s to the current large-scale prospective cohorts that unravel etiological mechanisms. **Objectives**: To give an overview of epidemiological studies that have influenced child psychiatry. **Methods**: A chronological overview of selected major milestone studies to demonstrate the development of child psychiatric epidemiology, with a more in-depth discussion of findings and methodological issues exemplified in one cohort, the Generation R Study

Keywords

Epidemiology · Child psychiatry · Methodology · Longitudinal · Cohort · Prenatal

Introduction

Ever since the influential work of Lapouse and Monk (1958), the first true child psychiatric epidemiological study published in 1958, epidemiological strategies are inseparably intertwined with research and clinical practice in child and adolescent psychiatry. Although psychiatric epidemiology is often associated with the study of the frequency of disorders in the general population, epidemiological approaches have been used to answer questions pertaining to etiology, diagnostic assessment, treatment, and prevention of child psychopathology. Epidemiological approaches to study child psychopathology have developed rapidly from descriptive, cross-sectional studies in the 1960s, often using ad hoc procedures to assess problem behaviors reported by one informant (e.g., parents or teachers), to the current large-scale prospective cohorts integrating biological measures and multi-informant behavioral assessments to unravel etiological mechanisms.

We will present (1) a brief and selective overview of landmark epidemiological general population-based studies that have influenced child psychiatry; (2) a more detailed overview of one currently conducted large-scale longitudinal cohort study that started pre-birth, the Generation R Study; (3) a discussion of methodological issues relevant to longitudinal epidemiological research, and (4) suggestions for future studies that may move child psychiatry further.

Major Milestone Population-Based Epidemiological Studies

We will present a chronological overview of selected major milestone population-based studies that mark stages in the development of child psychiatric epidemiology. However, we do not intend to give a systematic and complete overview. A number of systematic overviews of child psychiatric epidemiological studies have been published (Thompsom et al. 2010; Achenbach et al. 2012), and our decision on which information to include was based on our knowledge of studies that stand out in the literature.

Table 1 gives an overview of selected milestone population-based studies. Most of these studies are longitudinal; a few cross-sectional studies will be presented because of their relevance to the field.

Studies Initiated Prior to 1960

The study by Lapouse and Monk (1958) was the first to systematically examine the frequency of parent reported problems in a representative sample of 482 children aged 6–12 years from the general population. Prior to this study, the prevalence of child problem behaviors was studied only in quasi-epidemiological studies of nonrepresentative samples. The high rates of fears and worries observed casted doubt on the, at that time, widely held opinion that these problems indicate disturbance.

Before 1960, two *British National Birth Cohort* studies were launched, one in 1946 (*National Survey of Health and Development*) (Wadsworth 1991) and one in 1958 (*National Child Development Survey*) (Power 1992), both consisting of all births in England, Scotland, and Wales in 1 week and with an emphasis on physical health and educational and social development. These studies excelled in size and representativeness, but the assessment of behavioral problems was limited and employed poorly validated definitions of psychopathology. Yet, these studies have been very important in showing that children who, as adults, developed schizophrenia differed from their peers in terms of childhood motor, cognitive, behavioral, and social characteristics (Jones 1997). This finding was confirmed by later birth cohort studies (Welham et al. 2009).

Another seminal study in the pre-1960 era is *The Kauai Longitudinal Study* by Werner (Werner et al. 1971; Werner and Smith 1992). This study monitored the impact of perinatal, psychological, and social risk factors in a cohort of 698 individuals, who were born in 1955 on the Hawaiian island of Kauai, from the perinatal period to age 40 years. The authors observed how newborns with minor degrees of brain damage developed in the longer term. With the exception of serious central nervous system damage, often leading to severe mental retardation or institutionalization, the impact of perinatal complications on later adaptation diminished with time. The outcomes depended strikingly on the quality of the child-rearing environment. This study was one of the first to demonstrate a "washout" of the effects of early neurological insults over time and of the importance of the quality of the postnatal environment interacting with these biological vulnerabilities.

Table 1 Milestone Epidemiological Studies

<1960	1960–1970	1970–1980	1980–1990	1990–2000	2000–2010	2010–2020
National Survey of Health and Behavior (1946)	Isle of Wight Study (1964)	The Dunedin Multidisciplinary Health and Development Study (1972)	Montreal Longitudinal and Experimental Study (1984)	ALSPAC (1991)	GenerationR (2002)	PrOMIS (2012) Pelotas (2015)
National Child Development Survey (1958)	Sudan Study (1964/1965)	The Christchurch Health and Development Study (1977)	Pittsburgh Youth Study (1987)	NICHD (1991)	MoBa/ABC (1999, 2002)	EArly Genetics and Lifecourse Epidemiology consortium (EAGLE, 2010)
Kauai Longitudinal Study (1955)		ASEBA Studies (1976)	Population-based twin samples	Great Smokey Mountains Study (1993)		Finnish Maternity Cohort (2011)
						ABCD study (2018)

Studies Initiated Between 1960 and 1970

A landmark in the history of child psychiatric epidemiology is the *Isle of Wight study* (Rutter et al. 1970). This study started in 1964 and was novel because of its two-stage sampling procedure with multi-informant and multi-method behavioral standardized assessments. Using a population-based approach, all 9-/10-year-olds on the Isle of Wight were screened using parent and teacher ratings, followed by intensive assessments of screen-positive and randomly selected children. Findings that stand out were the 6.8% prevalence of overall psychiatric disorder, the low correlation between parent and teacher ratings of child problem behaviors, and the finding that most children with psychiatric disorder did not receive treatment. Comparisons with other studies (Achenbach et al. 2012) led to the sobering conclusion that prevalence estimates strongly differ due to methodological variation and sparked initiatives for greater standardization. Follow-up studies of this population 4 or 31 years later have been less influential (Rutter et al. 1976; Maughan et al. 2009). Few determinants had been assessed, and the two-stage sampling limits power in those free of disorders at baseline.

Cederblad and co-workers utilized a quasi-experimental nature of two cross-sectional studies carried out 15 years apart in *Khartoum, Sudan* (Cederblad 1968; Cederblad and Rahmin 1986; Rahmin and Cederblad 1984). This "culturally sensitive research" (Rogler 1989) revealed a historical trend in the prevalence of child problem behaviors. In 1964–1965 the authors observed few problems in children living in three villages lying on the outskirts of Khartoum, Sudan, despite poor nutrition and physical health. The largely rural communities subsequently underwent rapid urbanization and economic growth resulting in better housing, nutrition, sanitation, medical care, and education. Despite these improvements, the authors, who copied the methodology of the first study on to the second study, found that mothers reported more problems in their children in 1980. The authors argued that cultural factors might have accounted for this increase. For example, hyperactive behavior was regarded as a problem if children are expected to sit still in school but went unnoticed in the traditional rural life when far less children attended school. There is growing recognition of the need for epidemiological research addressing adaptive and maladaptive functioning across cultures (Achenbach and Rescorla 2007).

Studies Initiated Between 1970 and 1980

The period from 1970 to 1980 marks the start of two highly influential longitudinal epidemiological studies, both from New Zealand: *The Dunedin Multidisciplinary Health and Development Study* (Silva and Stanton 1996) and the *Christchurch Health and Development Study* (Fergusson et al. 1989; Fergusson and Horwood 2001).

The Dunedin Study was initially driven by the question how well children with perinatal problems developed as they pass infancy. This study turned out to become

one of the most influential longitudinal studies tackling a host of major developmental questions. The relatively small sample size and the restriction of the sample to one locality (1,139 eligible 3-year-old children from a 1-year cohort of children born in 1 hospital) were offset by the remarkable retention rate (at age 38 years, 96% were followed up). The study showed that observed behavior at very young age is predictive of adult psychopathology (Caspi et al. 1996). Another innovative line of research showed that childhood onset versus adolescent-onset antisocial behaviors were differentially associated with risk factors and outcomes (Caspi and Moffitt 2001; Odgers et al. 2008). Other important studies showed that adolescent cannabis use was predictive of psychotic symptoms (Arseneault et al. 2002).

Certainly, the most widely cited publications from this cohort are a series of studies suggesting interactions between candidate gene variations and environmental risk factors (cGxE). For example, the authors showed how a polymorphism in the MAOA gene moderates the effect of childhood maltreatment on antisocial behavior (Caspi et al. 2002) or how a polymorphism in the 5-HTT gene moderates the association between stressful life events on depression (Caspi et al. 2003). These studies have prompted many researchers to try and replicate their findings with varying success (Duncan 2013).

The Christchurch Health and Development Study started in 1977 with a birth cohort of 1265 children born in Christchurch, New Zealand, with the latest follow-up at age 30 (Fergusson et al. 1989, 2014). Among the many results, the study increased awareness of the long-term effects of child sexual abuse and of risk factors associated with the onset of suicidal behavior during adolescence (Fergusson et al. 1996, 2000). Apart from these study themes, Fergusson published on many methodological aspects of longitudinal studies, especially those pertaining to measurement.

In 1976, Achenbach and colleagues sampled 1,442 children aged 4 to 16 years randomly from Washington D.C., Maryland, and Northern Virginia. Child problems were assessed with the CBCL (Achenbach and Edelbrock 1981). This generated normative data for child problem behaviors as reported by parents. Achenbach (2009) subjected scores for specific problem items to factor analysis to form scales and evaluated the scale scores in relation to population norms. This empirical approach to assessing child problems, competencies, and adaptive functioning was termed the Achenbach System of Empirically Based Assessment (ASEBA), of which the widely used Child Behavior Checklist (CBCL) is the prototype. The ASEBA forms span a wide age range making this approach valuable for longitudinal epidemiological studies. This approach was extended to assessments by other informants and methods and for different ages and cultures, thus building a framework of multi-informant, multi-method, and multicultural assessment that is used in numerous studies all over the world (Achenbach 2009).

Studies Initiated Between 1980 and 1990

From this period the *Montreal Longitudinal and Experimental Study* (Tremblay et al. 1994), launched in 1984, and the *Pittsburgh Youth Study* (Loeber et al. 2012), launched in 1987, stand out. The Montreal Longitudinal and Experimental Study

consisted of 1,034 Canadian boys of low socioeconomic status who were assessed in kindergarten by their classroom teacher and annually by their teacher between ages 10 and 15 years (Tremblay et al. 1994; Tremblay 1999). Self-reported delinquency measures were obtained after puberty. The main aim was to study early behavioral predictors of later antisocial behaviors. Groups of children were identified who follow distinctive developmental trajectories with a technique novel at that time to child psychiatric epidemiology. Distinct trajectories were found to have different outcomes. For example, boys following a chronic physical aggression trajectory were likely to show physical violence and be involved in the most serious delinquent acts (Tremblay 1999).

The Pittsburgh Youth Study (Loeber et al. 2012) is a longitudinal study of male antisocial behavior. A random sample of inner-city Pittsburgh boys attending first, fourth, and seventh grades in public schools was assessed. To this group, the authors added boys with the most severe disruptive behavior problems. The resulting high-risk sample of 1,517 boys was followed for 21 years with (for the youngest cohort) 19 assessment waves. A sad indication of the success of this sampling strategy was that during follow-up, 37 boys were convicted for committing homicide, and another 39 were homicide victims. The authors found evidence for a gradual developmental progression from less serious to serious antisocial behaviors along three pathways identified as overt, covert, and authority conflict pathways. The authors were able to predict who became a serious offender (risk factors include poverty, living in a disadvantaged neighborhood, poor child-rearing practices) but not which serious offenders will desist. Important conclusions of their work are that almost all homicide offenders had committed violent acts before committing homicide, that almost all homicides were "street" homicides rather than homicide of relatives, and, interestingly, that the majority of homicide offenders did not have a psychopathic personality.

Twin studies showed that genetic factors explained a significant proportion of individual variation in psychopathology. Because a heritability estimate is a population-specific snapshot, and most heritability estimates were based on samples of convenience (Plomin et al. 1980), there emerged a need for representative epidemiological twin samples. Large general population-based twin registries were formed, including *The Virginia Twin Registry* (started in 1987) (Hewitt et al. 1997; Eaves et al. 1997), *The Netherlands Twin Registry* (started in 1987) (Kan et al. 2013), and *The Swedish Twin Study of Child and Adolescent Development* (TCHAD; started in 1993) (Lichtenstein et al. 2007). Across these population-based twin samples, heritability estimates for most common child psychiatric disorders were derived. Later research using longitudinal twin data added information on the influence of genetic (and environmental) stability on the stability of child psychopathology (Kan et al. 2013). Further, twin studies now incorporate more biological and environmental measures to also conduct classical risk factor epidemiology.

Studies Initiated Between 1990 and 2000

The prototypical prospective study designed to include child behavioral and cognitive but also biological measures is *The Avon Longitudinal Study of Parents and*

Children (ALSPAC) (Golding et al. 2001). This birth cohort enrolled over 14,000 mothers during pregnancy in 1991 and 1992. ALSPAC, to this very moment, has been a very productive study with numerous highlights. One focus of the behavioral studies embedded in the ALSPAC cohort was the effect of nutrition during pregnancy on neurodevelopment. Both low maternal fish intake and low maternal iodine urine concentrations during pregnancy were associated with poor child cognitive outcomes (Bath et al. 2013; Hibbeln et al. 2007). Another series of studies from ALSPAC related maternal depression and anxiety during pregnancy to child behavioral problems (Ramchandani et al. 2006). Perhaps, the methodological work embedded in the ALSPAC which addressed confounding made the most impact on child psychiatry (Brion et al. 2011; Shaheen et al. 2010).

The *Great Smokey Mountains Study* was launched in 1993 (Costello et al. 1996). Children between 9 and 13 years who were screened positive for externalizing problems were oversampled, as were American Indian children. This survey of child psychiatric problems became a fruitful longitudinal study. It found that the sharp increase in depression in girls was associated with pubertal stage transition and that this was entirely explained by increasing levels of sex hormones (Angold et al. 1999). A classical finding stems from a natural experiment in which an entire community of American Indians experienced significant income increases as a result of the opening of a gambling casino. Many families moved out of poverty, and the originally higher externalizing, but not the internalizing problems of the children decreased to levels similar to those of children who had never been poor (Costello et al. 2003). These results supported a social causation explanation for conduct and oppositional behaviors but not for anxiety or depression.

The *NICHD Study of Early Child Care and Youth Development* (NICHD Early Child Care Research Network 1997) is a longitudinal study to answer questions about the relationships between childcare and children's developmental outcomes. The study started in 1991 with a sample of 1,364 children followed from 1 month of age through grade 9 when children were about 15 years old. A highly debated conclusion was that early and extensive non-maternal care increased the probability of insecure infant-parent attachment relationships, child aggression, and noncompliance during the toddler, preschool, and early primary school years (Belsky 2001). The effects were not attributed to low-quality care, nor did they merely reflect assertiveness rather than true aggression. However, the negative effects of early non-maternal childcare were modest and did not predict clinical levels of later child psychopathology (Belsky et al. 2007). Other authors used the publicly available NICHD data to address the impact of maternal sensitivity or harsh parenting on child behavior showing that better quality parenting predicts fewer problems and poorer quality parenting predicts more problems. Using this cohort's data, Belsky (Belsky and Pluess 2009) developed his differential susceptibility model suggesting that persons vary in their susceptibility to adverse and enriching experiences.

Studies Initiated Between 2000 and 2010

More recently, a number of birth cohorts were started, all including data collection in the antenatal period [2], but only two have a clear focus on child behavioral and cognitive development: (1) the *Norwegian Mother and Child Cohort Study* (MoBa) (Magnus et al. 2006), and (2) the Dutch *Generation R Study* (Jaddoe et al. 2010; Tiemeier et al. 2012).

The MoBa study includes 109,000 children born from 1999 to 2009. Mothers were recruited at ultrasound examinations around week 18 of gestation. Parent questionnaires, referral information, and linkages to the Norwegian Patient Registry identified cases of ASD, ADHD, epilepsy, and cerebral palsy in the cohort. The strength of this study is its large sample size, which makes it suitable for the study of infrequent disorders such as autism. In one study it was found that the use of prenatal folic acid supplements around the time of conception was associated with a lower risk of autistic disorder (Surén et al. 2013a). The investigators also linked autism to reduced head growth patterns (Surén et al. 2013b).

Studies Initiated from 2010 Onward

Most existing cohort studies are carried out in high-income countries with relatively low levels of exposures to severe social adversities. Birth cohort studies from low- and middle-income countries, including Brazil, Guatemala, India, the Philippines, and South Africa, include study populations that experience high levels of poverty, violence, and physical and sexual abuse (Richter et al. 2011). For example, it is estimated that 40% of South African women will be raped in their lifetime, and Guatemala is listed among countries with the highest homicide rates. Growing up in (many parts of) these countries is a challenge, and individuals who end up relatively unscathed must have been able to build up resilience against the risks associated with such dangerous and distressing circumstances. The 2012 Pregnancy Outcomes, Maternal and Infant Study (PrOMIS) Cohort from Lima, Peru (Barrios et al. 2015), and the 2015 Pelotas Brazil Birth Cohort Study (Hallal et al. 2018) are, sadly enough, examples of studies of populations with extremely high exposures to violence, abuse, and maternal mental health problems. These populations offer ample opportunity to study risks and resilience in adverse environments such as those characterized by intimate partner emotional and physical violence. Publications using PrOMIS data addressed the association of childhood abuse and intimate partner violence with sleep problems, depression, and suicidal ideation in pregnant women (Levey et al. 2019; Zhong et al. 2016).

The 2015 Pelotas study pertains to the fourth cohort of children delivered in the hospitals of Pelotas (a Southern Brazilian city). Earlier cohorts were from 1982, 1993, and 2004. Children from these cohorts are still being followed, constituting what is probably the largest set of birth cohorts in the same geographical location in low- or middle-income countries (Hallal et al. 2018). The 2015 cohort allows the

study of time trends in socioeconomic and other types of health inequalities and of how exposure-outcome associations are changing over time during a period of rapid epidemiological and nutritional transitions in Brazil.

The Scandinavian countries are well known for their nationwide population-based register data. The statistical power of these registries is evident and has the advantage to detect risks associated with uncommon conditions. An innovative example is the Finnish Maternity Cohort (FMC), which consists of virtually all births in Finland from 1983 to the present and which includes archived maternal serum samples. This cohort is linked to other registries to help create a series of nested case-control studies such as the Finnish Prenatal Study of Autism and Autism Spectrum Disorders. These children were followed for the diagnosis of ASD, and the wealth of medical information in the more than 4000 (!) children with as well as those without this diagnosis opens ample opportunities to test associations that may lead to a better understanding of neurodevelopmental disorders (Lampi et al. 2011). One finding was that advanced paternal age (35–49 years) was associated with childhood autism in offspring (Lampi et al. 2013). Another study found evidence that congenital anomalies, especially of the eye, central nervous system, and craniofacial anomalies, were associated with ASD, suggesting that some cases of ASD may originate in the early first trimester of pregnancy (Timonen-Soivio et al. 2015). But the Finnish Maternity Cohort also enabled nested case-control studies of schizophrenia such as a study in 1010 cases and 1010 controls showing that the occurrence of schizophrenia is related to prenatal exposure to abnormal maternal thyroid functioning (Gyllenberg et al. 2016).

Since the brain is involved in behavioral, emotional, and cognitive functioning, neuroimaging studies may elucidate the mediating role of the brain in the association between risk factors and mental health problems. However, to date the best neuroimaging studies are cross-sectional or used small and selected samples, which make them vulnerable to a host of methodological problems including reverse causality, selection bias, and increased type I error due to multiple testing. Large-scale longitudinal population studies with repeated brain images and measurements of risk factors as well as behavioral and cognitive phenotypes are needed to determine associations between risk factors and changes in brain structure and function as well as the mediating role of the brain in the association between risk and behavior or cognition. The US National Institutes of Health Adolescent Brain Cognitive Development (ABCD) study consortium with a funding of $300,000,000 for 2015–2020 alone and equal funding for the consecutive 5 years aims to study the impact of substance use on the structure and function of the developing brain across adolescence. The primary objective of the ABCD study is to create a unique data resource for tracking human brain development from childhood through adolescence to determine biological and environmental factors that impact or alter developmental trajectories (Casey et al. 2018). The study is representative of the US population in terms of race, SES, and rural/urban residence though not strictly population-based given the different sampling strategies and response rates below 15% (Garavan et al. 2018). This multisite study will be an important study investigating the effects of substance use and many other environmental determinants on

adolescent brain, behavioral, and cognitive development. Strength are the detailed psychiatric interviews of child and mother in combination with behavioral symptoms assessment; other strength are the detailed imaging protocols with state-of-the-art movement artifact control.

Mental illness in a parent is a very strong, but unspecific, risk factor for mental illness in the offspring. However, attempts to unravel the molecular genetic basis of psychiatric disorders over the last decade, such as genome wide association studies (GWAS), have not yet been very successful. Until recently, the published genetic studies of common child psychiatric problems have been hopelessly underpowered. Because large mono-site samples are not feasible, it is important to pool cohort or case-control studies exceeding thousands of children to find associations between genetic variants and common psychiatric disorders or traits. This is not so much because child psychiatric disorders are less heritable but mainly because disorders are less specific, not precisely measured and subject to developmental changes. Very recently, a genome-wide association meta-analysis of 20,183 individuals diagnosed with ADHD and 35,191 controls was successful in identifying variants surpassing genome-wide significance in 12 independent loci. This study comprised largely case-control data from clinical samples and unraveled important information about the underlying biology of ADHD (Demontis et al. 2019). In contrast, previous efforts analyzing continuous traits using only data from cohort studies (The Early Growth Genetics (EGG) and EArly Genetics and Lifecourse Epidemiology (EAGLE) consortia) could not identify genetic loci related to attention problems, sleep, or aggression (Middeldorp et al. 2019).

The Generation R Study

The Generation R Study ("R" for Rotterdam) is a population-based cohort of children who are followed from fetal life forward. This multiethnic cohort consists of 9,778 pregnant women and their live-born children. A subgroup of 1,106 women and their children received in-depth assessments. The overall aim of the study was to identify early determinants of children's growth, development, and health, including behavioral, cognitive, and social development. A specific aim was to test the fetal origins hypothesis stating that disproportionate fetal growth programs later disease (Barker 1995).

Among its many measures, we believe that Generation R, compared to other cohort studies, stands out for the following: (1) the use of three prenatal ultrasound measures of the fetal head, brain (including ventricles), and other body parts, enabling the computation of prenatal growth curves; (2) its prenatal biological measures in mothers including cannabis and thyroid hormone; (3) its observational measures, including observations of the home environment, parent-child attachment relationship, parental sensitivity, the child's compliance, temperament, emotion recognition, cheating, and sleep; (4) neurodevelopmental measures, including postnatal 3D brain ultrasound, motor assessment, executive functions, IQ, and language; (5) the use of repeated brain MRI measures (structural, DTI, and

resting state fMRI); and (6) reports on child problem behaviors by multiple informants: fathers, mothers, teachers, child self-reports, and peer nominations (Jaddoe et al. 2010; Tiemeier et al. 2012).

We highlight five research themes that, to our opinion, have generated new insights: (1) associations between maternal prenatal exposures and fetal growth; (2) fetal growth and postnatal child development; (3) social disadvantage and fetal growth; (4) prenatal exposures and postnatal brain development; and (5) infant neuromotor development and childhood problem behavior.

Prenatal Exposures and Fetal Growth

The repeated prenatal ultrasounds made it possible to study the impact of maternal exposures on trajectories of fetal head growth, which reflects early neurodevelopment. Similarly, indictors of fetal cerebral blood flow have been assessed by ultrasound to study neurodevelopment. Maternal smoking, cannabis or SSRI use, low folate during pregnancy, and prenatal maternal depression, anxiety, and family stress were all associated with less fetal head growth, with relatively strong effect estimates observed for maternal smoking, SSRI, and cannabis use (El Marroun et al. 2009; El Marroun et al. 2012; Roza et al. 2007). A finding that stood out was the substantial negative effect of (subclinical) hypothyroidism on fetal growth and birth outcomes (Medici et al. 2013). We concluded that numerous intrauterine exposures are related to fetal growth from first to third trimester.

Fetal Growth and Postnatal Child Development

Low birth weight is associated with several psychiatric problems, including depression and hyperactivity, and poor cognitive functioning (Gale and Martyn 2004; Lahti et al. 2006). However, birth weight is an endpoint measure of fetal growth and does not inform us about variations in intrauterine growth. Therefore, we tested whether prenatal exposures impacted on preschool child behavior and cognition and to what extent this was mediated by variations in fetal growth trajectories. Although we found that intrauterine head growth was associated with delayed early motor development, there was little indication that intrauterine growth was associated with problem behavior, temperamental difficulties, or cognition (Henrichs et al. 2009; Roza et al. 2008). Also, we found that maternal exposures negatively affecting intrauterine growth, such as exposures to nicotine or cannabis, had little, if any, impact on later child problem behavior if carefully controlled for confounding (Roza et al. 2008). If prenatal environmental exposures were associated with later problem behaviors in the preschool period, as was the case for family stress or parental psychopathology, there was no mediation by fetal growth, suggesting that much of the observed intrauterine association was due to genetic confounding or spillover of parental behavior from the prenatal to the postnatal period (Velders et al. 2011). In conclusion, these findings support the view that several negative effects of prenatal

environmental exposures can be compensated later in life. Hence, detailed observations of fetal growth in the Generation R cohort did not support the Barker hypothesis. Of course, we do not know yet what the impact of these environmental exposures is on later functioning at school age and in adolescence.

Social Disadvantage and Fetal Growth

The impact of social disadvantage can be detected from childhood onward. We found compelling evidence that socioeconomic differences can already be found in the intrauterine period and that this extends into the child's postnatal development. Low maternal education was not only associated with premature birth and low birth weight but also with less fetal growth. Importantly, social differences were detectable in fetal brain growth more than in that of peripheral and abdominal tissues (Silva et al. 2010). The association between poor fetal growth and child problem behaviors could largely be explained by parental psychosocial and maternal lifestyle characteristics (Roza et al. 2008). Socioeconomic inequalities could also be documented for early temperamental traits and problem behavior in young children (Jansen et al. 2009). This indicates that health inequalities accumulate in disadvantaged families from the intrauterine period of children's life onward.

So far, most Generation R studies have shown that individual differences arise from a large number of causal factors, with each contributing a relatively small effect. This cumulative risk model suggests that the additive contribution of genetic, perinatal, and environmental risks puts the child at a progressively greater risk, despite the small impact that any single factor is likely to have.

Prenatal Exposures and Postnatal Brain Development

Large-scale repeated MRI measurements during childhood and adolescence allow to study the impact of maternal prenatal exposures on later child brain development. One such prenatal exposure was the exposure to maternal hypothyroidism or hypothyroxinemia during pregnancy. Adequate maternal thyroid function is required for optimal fetal brain development as the fetal thyroid is not fully active before week 20 and thyroid hormone is involved in the regulation of neurodevelopmental processes. In a number of Generation R studies, it was shown that maternal hypothyroidism or hypothyroxinemia during early pregnancy is associated with child adverse neurodevelopmental outcomes, including a lower IQ (Korevaar et al. 2016), a higher risk of autism (Roman et al. 2013), and attention-deficit hyperactivity disorder (Modesto et al. 2015). These observational neurodevelopmental outcomes are indirect and imprecise indicators of the effects of maternal hypothyroidism or hypothyroxinemia during pregnancy on the child's later brain development. A recent Generation R Study of 1981 mother-child pairs related prenatal maternal serum thyroid-stimulating hormone (TSH) and free thyroxine (FT_4) to offspring brain morphology assessed by MRI at 10 years (Jansen et al. 2019). The study showed

that both low and high maternal thyroid function were associated with smaller child total gray matter and cortical volume and that this association depended on the time of thyroid assessment. These novel findings suggest that in particular embryonic brain development is vulnerable to impaired maternal thyroid function. These findings suggest that TSH or FT_4 screening of women in early pregnancy may be beneficial, although recent clinical trials, possibly due to late treatment start, showed no effect Casey et al. 2017).

In a number of Generation R studies, associations between prenatal exposure of maternal cannabis and later child functioning were determined (El Marroun et al. 2019). Maternal cannabis use during pregnancy was associated with adverse birth outcomes (El Marroun et al. 2009), with child problem behaviors at age 10 years (Bolhuis et al. 2018), and with child brain morphology at ages 6–8 years (El Marroun et al. 2016). Observational studies are not ideal to test the causality of effects of prenatal cannabis use on offspring functioning as genetic factors, gene-environment interactions, and comorbidity confound the association between maternal prenatal substance use and offspring problem behavior. In a recent Generation R Study, associations between maternal cannabis use during pregnancy and child problem behavior at ages 7–10 years were compared with associations between maternal preconceptual cannabis use and child problem behavior, as well as associations between paternal cannabis use and child problem behavior (El Marroun et al. 2019). The association between prenatal exposure to cannabis and child externalizing was probably not due to an effect of intrauterine cannabis exposure on fetal development. Both maternal cannabis use before and during pregnancy, but also paternal cannabis exposure during pregnancy was similarly related to offspring externalizing problems. The findings suggested that the association can be explained through residual confounding, most likely through shared genetic vulnerabilities indexed by parental cannabis use and offspring behavioral problems.

Infant Neuromotor Development and Childhood Problem Behavior

At times in which progress in child psychiatry is expected to come from innovative techniques such as neuroimaging, molecular studies, or big data, we tend to overlook the usefulness of existing sources of information such as the "good old" motor assessment in infants. In Generation R, trained research assistants conducted home visits and evaluated the neuromotor development of infants aged 2–5 months by using an adapted version of Touwen's Neurodevelopmental Examination (tone, responses, and senses and other observations). In one study nonoptimal motor functioning was associated with internalizing problems at ages 1.5, 3, 6, and 10 years (Serdarevic et al. 2017). In another study, the genetic predisposition to autistic traits and ADHD was associated with nonoptimal neuromotor development during infancy, and a genetic correlation between nonoptimal neuromotor development and autistic traits was shown (Serdarevic et al. 2020). It was found that genetic liabilities for ASD and ADHD covary with neuromotor development. Shared genetic liability might partly explain the association between nonoptimal neuromotor

development during infancy and autistic traits in childhood. Likewise, the genetic risk score for schizophrenia predicted poor motor development, suggesting that low tonus may be one of the earliest manifestations of schizophrenia risk (Serdarevic et al. 2018).

Methodological Considerations

Confounding and Causal Inference

Associations observed in prospective studies may help to infer causality because of the temporal relationship between risk factor and outcome and the possibility to study within-individual change. However, there are a number of caveats. One type of confusion may arise from the distortion of the effect of an exposure of interest by some extraneous factor when the effect of the extraneous factor is mistaken for or mixed with the actual exposure effect. This is the well-known problem of confounding. To illustrate, think of the association between smoking by the mother during pregnancy and child problem behavior. This association disappeared in the Generation R Study after controlling for educational level, national origin, and maternal psychopathology (Roza et al. 2009). This type of statistical approach relies on adequate measurement of confounding factors but cannot deal with residual confounding caused by unmeasured or unrecognized confounding factors. This is the case with heritable characteristics or behaviors that are commonly overlooked as potential residual confounders. For instance, environmental studies of child IQ often cannot control for maternal or paternal IQ as this was not assessed. Studies of intrauterine influences (e.g., smoking) may reflect unrecognized heritable maternal behavior. Of course, mothers transmit genes to their children, and it may therefore be possible that associations between prenatal exposure and child outcomes arise from genetic variations mothers and children share and not from a direct effect of prenatal exposure.

Several epidemiological approaches have been developed to help tackle this important source of bias. Increasingly they are also applied in child psychiatry. One approach to address residual confounding is studying two or more siblings from each family, which allows testing environmental exposures such as exposure to intrauterine smoking (D'Onofrio et al. 2011). The sibling design automatically rules out environmental differences that vary between families such as ethnicity, socioeconomic status, or neighborhoods. It can overcome genetic confounding as parents randomly distribute genetic variants among siblings. The main limitations of the approach are the availability of differentially exposed siblings and the validity of changing exposure information.

An indication of residual confounding in studies of intrauterine exposure can also be obtained by comparing maternal-paternal exposure associations. This maternal-paternal approach compares the magnitude of the association of the maternal exposure with child outcome to that of the equivalent association for paternal exposure with child outcome. A biological intrauterine effect would be expected to produce a

stronger maternal association, compared with the paternal association, since paternal exposures would not normally be expected to affect the intrauterine environment. For example, there were no differences in associations of prenatal maternal and paternal overweight with child problem behavior. Hence, there was little evidence for a causal intrauterine effect of maternal overweight during pregnancy (Brion et al. 2011).

Another approach recommended for many years to address causality, Mendelian randomization, has rarely been applied in studies of intrauterine influences in child psychiatric epidemiology. Mendelian randomization is a method that uses variation in genes of known function to examine the causal effect of a risk factor on disease. Only a few examples exist where a known relation between a genetic variant and an exposure, here intrauterine exposure to alcohol, could be used to a causal effect of alcohol on cognition. The alcohol dehydrogenase gene (ADH1B) has been studied in the ALSPAC to demonstrate that maternal alcohol use during pregnancy most likely underlies effects on educational achievement (Zuccolo et al. 2013). In general, modifiable exposures in child psychiatric epidemiology have no known genetic determinants precluding Mendelian randomization to demonstrate causality.

Reverse Causality

One way to understand the causal pathway between an exposure and outcome is to determine mediation mechanisms. This approach starts with a general factor (e.g., social disadvantage) and then tries to determine whether the causal inference can be accounted for by more specific elements in this broader variable (e.g., parenting style, physical home environment). Many studies have shown that social disadvantage is associated with young children's problem behaviors. However, less is known about the mechanisms underlying this association. In the Generation R Study, we found that the association between social disadvantage and child problem behaviors was mediated by maternal emotional well-being, disrupted parenting, and characteristics of the observed physical home environment such as the availability of learning materials (Rijlaarsdam et al. 2013). From these findings, we may conclude that maternal depression or parental stress causes child problem behavior, but the reverse may also be true, namely, that the child's problems elicit parental stress.

Cross-sectional studies are notorious for their inability to determine the direction of association. Longitudinal studies, in which the exposure predates the outcome, are much better suited to infer how risk factors impact psychopathology that occurs during follow-up. But even if it is possible to control well for baseline levels of psychopathology, longitudinal studies can hardly ever rule out reverse causality. In particular in psychiatry, with its varying levels of symptom severity across time, reverse causality can arise if subclinical problems or the history of psychopathology are not controlled for. Cohort studies starting in the intrauterine period are better set to exclude reverse causality in studies of child outcomes as some parental factors can be measured before the child is born. Yet, few birth cohorts have investigated whether negative effects of the behavior of the child extend to the family system,

such as parental psychopathology or family functioning. Mostly, such studies were performed controlling for child behavior at baseline, but often the available measures do not allow ruling out reciprocal associations very well. However, examining the bidirectionality of relations between the child and his or her environment is key for understanding the persistence of problem behavior.

An example is a recent Generation R Study in which the longitudinal relationship between childhood problem behavior and brain development was determined (Muetzel et al. 2017). In this study problem behavior was measured with the Child Behavior Checklist at ages 6 and 10 years, and MRI data were collected at ages 8 and 10 years. Higher externalizing and internalizing scores at baseline predicted smaller increases in gray matter volume and global fractional anisotropy over time. The reverse relationship did not hold; baseline measures of gray and white matter were not significantly related to changes in symptom ratings over time. Often, neuroimaging models explain brain structural differences between cases and controls with and without psychopathology as indicating an underlying (causal) neurobiological substrate. However, this Generation R Study suggests that future neuroimaging studies should explore the possibility of the downstream effects of psychopathology on the brain.

Shared Method Variance Bias

A common problem in studies on child development is shared method variance, which is the variance that is attributable to the measurement method or informant reports rather than to the constructs the measures are assumed to represent. For example, if mothers report on their own emotional problems and on their child's behavior, which is common in many large-scale studies in very young children, there is the likelihood of halo effects in ratings, reflecting shared method variance. This is particularly important if maternal traits such as hostility are studied, since hostility may influence the perception of child problems (Velders et al. 2011).

Shared method variance bias can be reduced by using multiple sources of information (e.g., mothers', fathers', teachers' reports, children's self-reports, and peer nominations) and multiple methods (e.g., interviews, questionnaires, observational assessments, or tests). In Generation R, most studies used a multi-method, multi-informant approach enabling us to test associations with different assessment methods or informants for the determinants versus outcomes, thereby reducing error due to common-method variance. The use of multiple information sources makes it possible to test the consistency of findings. For example, in Generation R, we found that maternal and paternal self-reported depression was equally associated with problems as reported by children themselves. However, if mothers reported on her child's problems, maternal depression had a much stronger association than paternal depression with child problems; likewise paternal depression had a stronger association with child problems if reported by the father. This strongly suggests that if parents report both on their own and their child's problems, associations tend to be inflated (Ringoot et al. 2015).

Replication

Not only the discovery but also the replication of associations is a core activity of etiological research. Ioannidis (2008) argued that discovery could be exploratory, opportunistic, and perhaps even selective if replication attempts are frequent. For replication studies, a more restrained approach is desirable; in particular exposure and outcome must be similar to the discovery study. Also, the age range and the follow-up duration should be comparable; else replication efforts become a premature test of the generalizability of not replicated results. Replication can test the biases that may affect the initial study. Large cohort studies offer ideal settings for discovery and replication efforts; they allow a large discovery sample, and similar assessments are available for immediate replication. Yet, the discovery study in child psychiatry is rarely accompanied by an immediate replication effort. Most interesting exploratory analyses are pushed forward in stand-alone publications. Recently, and driven by the critique on the initial gene-environment interaction studies, this practice is changing. The early findings of genetic susceptibility to stress and maltreatment from the Dunedin cohort were published in Science solely presenting discovery analyses. Five years later the initial evidence from the Dunedin cohort that effects of breastfeeding on IQ may partly depend on a single genetic variant included a successful replication in a British Birth Cohort (Caspi et al. 2007). Interestingly, neither approach yielded findings that have since been replicated conclusively.

Selection Bias

Selection bias in cohort studies can occur at baseline because of refusal to participate and later due to loss to follow-up. Poor baseline response can affect generalizability and validity, although a much-cited publication showed that even for a baseline response as low as 30% the effect of nonparticipation was small (Nohr et al. 2006). Generally, cohort researchers worry more about the second phenomenon, loss to follow-up. The Dunedin Study achieved remarkable follow-up rates exceeding 90% at most waves; more recent large-scale studies such as the Danish National Birth Cohort could retain only 60% of families included at baseline (Andersen and Olson 2011). The national health registry in Denmark with excellent coverage enabled the investigators to demonstrate that the presence and magnitude of bias due to this modest follow-up rate may be less than feared. Further, bias strongly depended on the exposure and outcome under study. However, child psychiatric epidemiologists cannot relax; the most pronounced bias was found in the association of maternal smoking and ADHD (Greene et al. 2011). Similarly, researchers in ALSPAC concluded that follow-up rates only marginally affect longitudinal associations, although the observed associations between maternal smoking and behavior differed by more than 30% between responders and nonresponders (Wolke et al. 2009).

Suggestions for Future Studies

Epidemiological studies have been successful in describing the frequency and course of child psychiatric problems. Etiological research clearly demonstrated the strong associations between social disadvantage and child maltreatment with behavioral and emotional development. In contrast, the high expectations that biological factors can be used to better explain, diagnose, or predict child psychiatric problems have not been met.

Future risk factor epidemiology in child psychiatry will undoubtedly follow the lead of cardiovascular and cancer research. After the hype of candidate gene, cGXE and GWAS studies, child psychiatrists are already focusing on epigenetic, microbiomic, and metabolomic studies. Yet, child psychiatry has just begun to harvest the fruit on the GWAS tree. We already discussed the first successful study to identify genetic variants for ADHD by pooling data of 10,000 children (Demontis et al. 2019). Pooling across multiple sites, either within or across nationalities, should ideally comprise information on individuals that were sampled and assessed according to the same protocol as was done, for example, in the IMAGEN study (Nymberg et al. 2013). Pooling of samples from ongoing studies that use different methodologies has the disadvantage that only the limited number of confounders, which were measured uniformly across studies, can be considered. Of course, natural experiments, such as the Romanian adoption studies (Smyke et al. 2009), or studies using high-risk samples, such as the Mannheim Study of Children at Risk (Pitzer et al. 2009), can also be useful to study the etiology of child psychopathology but fall outside the scope of this selected review.

The future epigenetic, metabolomic, and microbiomic studies should adhere to the lessons learnt from the (nonpsychiatric) GWAS studies. The scientific rigor with multiple hypothesis testing and immediate replication must be adapted and applied before child psychiatrists embrace this new research opportunity. In the meantime, child psychiatry may devote some attention to new environmental risks provided by extensive media use and chemicals. Phthalates and bisphosphonates are toxins with a presumably neurodevelopmental effect. If not cohort researchers, who is in the position to assess the impact of these compounds?

Traditionally child psychiatric researchers have relied on continuous phenotype measures both in clinical practice and in research. Likewise, child psychiatrists have recommended a multiple informant approach to assess child psychopathology. Although implemented in clinical practice, researchers do not systematically adhere to this advice. In particular in biological studies such as neuroimaging or genetic research, few examples of multiple informant assessments can be found. Future studies can improve precision and validity of results by complementing mother reports with father, child self, peer, or teacher reports of child problem behaviors.

Clinical cohorts have successfully incorporated neuroimaging techniques in both cross-sectional and longitudinal design. Notably, a maturational delay was demonstrated in children with ADHD and abnormal neurodevelopmental processes in adolescents with early-onset schizophrenia (Brent et al. 2013;

Shaw and Rabin 2009). These findings cannot unravel the direction of the association between disorder and brain development. Population neuroscience is needed to demonstrate whether brain alterations precede the onset of psychiatric problems. This implies that large-scale imaging studies in very young children from the general population are performed.

In summary, future research in child psychiatry will most probably continue to employ sophisticated epidemiological approaches. Multiple imputations, immediate replication, models of causal inference, repeated measures, and multiple informants are increasingly standard practice. Yet to apply genetics, neuroscience, or other molecular research to better understand how the brain produces maladaptive behavior, we need to conduct more ambitious large-scale child psychiatric cohorts. Progress is booked only if we integrate the basic science with more rigorous epidemiological designs.

Conclusion

Epidemiological studies have been successful in describing the frequency and course of child psychiatric problems. The high expectations that biological factors can be used to better explain, diagnose, or predict child psychiatric problems have not been met. More ambitious large-scale child psychiatric cohort studies are needed, carefully applying genetics, neuroscience, or other molecular research to better understand how the brain is involved in the development of maladaptive behavior. Progress will only be booked if the basic sciences are systematically integrated in cohorts with rigorous epidemiological designs rather than hurriedly inserted in child psychiatric clinical studies.

Conflict of Interest Dr Verhulst publishes the Dutch translations of ASEBA from which he receives remuneration.

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Population Neuroscience

7

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Abstract

Population neuroscience is an emerging field of research defined by the intersection of neuroscience with epidemiology. In this chapter, we review large-scale developmental studies conducted in clinical, longitudinal high risk, and typically developing cohorts with neuroimaging. We point out the advantages offered by developmental and neuroimaging research when conducted in epidemiological settings such as better control for confounding and the possibility to enhance generalizability. We discuss the advances in the field that we attribute to population neuroscience approach, for example, the evidence for the maturational delay in ADHD and for the early onset of autistic brain changes preceding symptoms. Current population neuroimaging studies begin to explain the role of a more complex environment such as poverty and abuse, child behavior itself, genes, and their interplay in shaping the structure and function of the human brain. We conclude that the question of how different environmental and genetic factors shape the brain and how the brain predicts child psychiatric behavior can only be addressed in large population-based studies with repeated imaging and behavior assessments using a population neuroscience approach.

Keywords

Population neuroscience · Epidemiology · Brain imaging · Child development · Bias

Introduction

Population Neuroscience has the potential to fundamentally change our etiological and diagnostic understanding of child psychiatric disorders like genome wide association have profoundly expanded our understanding of the biology of psychiatric disorders. Population Neuroscience is an emerging field of research defined by the intersection of neuroscience with epidemiology (Paus 2010). In this chapter, we will focus on the often-discounted advantages offered by developmental and neuroimaging research when conducted in epidemiological settings. The technical and scientific advances of brain imaging acquisition, image processing, and analyses have enabled neuroimaging studies of global and regional brain development in typically developing children and adolescents that are large and population-based. These neuroimaging studies now begin to explain the role of environment, behavior, genes, and their interplay in shaping the structure and function of the human brain. Against the background of the complexity of environmental risks and the challenges of quantifying the genetics of complex traits, the question of how environmental and genetic factors shape the brain can only be addressed in large population-based studies (White et al. 2013). Modern child psychiatric research needs population neuroscience to complement basic science.

Neurodevelopmental Studies

Researchers studying neurodevelopmental disorders have a long tradition of conducting investigations that we might wish to term Population Neuroscience now. A neurodevelopmental approach was first put forward by the Scottish psychiatrist Clouston in 1891 when describing psychosis, "in the course of the growth and development of the brain there are liable to occur certain failures in the attainment of a working standard of nervous and nutritional health" (Clouston 1891). In the more than 100 years since, many different psychiatric disorders have been conceptualized as neurodevelopmental disorders, but researchers continue to emphasize the early onset of disorders, the developmental stages, and the delayed development of central nervous functions. The current DSM defines neurodevelopmental disorders as a cluster of different co-occurring disorders including among others attention deficit hyperactivity disorder (ADHD), learning disorders, and autism spectrum disorder (ASD) (American Psychiatric Association 2013). All disorders are characterized by cognitive problems that manifest in infancy or childhood and have a less-remitting course than behavioral or emotional disorders. A male preponderance is found in all neurodevelopmental disorders, although the sex difference in prevalence of clinical and population studies varies (Thapar and Rutter 2015). Neurodevelopmental disorders are multifactorial disorders occurring across a continuum of symptom severity and impairment. Twin studies demonstrated a strong contribution of genetic risks for all neurodevelopmental disorders and indeed, a polygenetic liability threshold model best explains heritability patterns and is in line with the results of genetic studies demonstrating associations across many loci with small effect sizes. However, classification systems and most medical textbooks view neurodevelopmental disorders as a category rather than a set of quantitative dimensions which more or less characterize a disorder. While autism is often viewed as the prototypical neurodevelopmental disorder, schizophrenia and conduct problems are described only by some scientists as neurodevelopmental problems (Lewis and Levitt 2002). The developmental delay in conduct disorders is often less obvious and symptom levels tend to fluctuate more. Epidemiological researchers now commonly use the terms neurodevelopmental problems or disorders much more broadly and even include affective problems.

Many population neuroscience studies focused on prenatal and early life events prior to the imaging era investigated developmental risk factors for schizophrenia. Studies from large birth cohorts demonstrated that in-utero exposure to maternal infections and malnourishment increased the risk of schizophrenia (Bale et al. 2010). However, birth cohort studies have also identified prenatal conditions as risk factors for major depressive disorder such as influenza and famine, again supporting a link between maternal nutrition and offspring neurodevelopment (van Os et al. 1997).

A key piece of evidence underpinning the neurodevelopment hypothesis of disorders has been the delayed attainment of early motor development milestones, such as walking or standing unsupported, in cases with autism, schizophrenia, or affective disorders (Filatova et al. 2017). Various concepts have been used such as pandysmaturation (Fish 1957), fine and gross motor skills (Burton et al. 2016), and

motor development milestones. However, delays in motor function and deviant language development are associated with broadly defined psychiatric problems, and in a recent study infant neuromotor development and, in particular, low muscle tone and nonoptimal senses consistently predicted internalizing problems (Serdarevic et al. 2017). More recent work showed that the genetic liability for schizophrenia or autism underlies nonoptimal motor development in early infancy (Serdarevic et al. 2018). In summary, these studies suggest that many genetic and environmental risk factors for these disorders may actually underlie these disorders and that they can manifest in the first weeks of life (Murray et al. 2017). Thus, over time the neurodevelopmental hypothesis has morphed into the Developmental Risk Factor Model and has become an integrative framework underlying Population Neuroscience (Carpenter and Strauss 2017).

Key Population Neuroscience Studies

In the 1980s scientists began to study the brains of children with autism, ADHD, dyslexia, and other developmental disorders with computerized tomography. A few years later the first cross-sectional studies followed comparing cases with neurodevelopmental disorders to controls using magnetic resonance imaging (MRI). MRI allows unprecedented access to the anatomy and physiology of the children's brains (Giedd and Rapoport 2010). These were cross-sectional studies conducted for various disorders; the studies can be criticized for their small sample size (typically less than 50 cases) (Szucs and Ioannidis 2017), the broad age range, the referral bias leading to chronic and medicated cases, and the unsystematic selection of healthy controls. While researchers were able to demonstrate numerous unspecific brain morphological and functional correlates of disorders such as autism, ADHD, and learning disorders, they have arguably failed to advanced our knowledge of the etiology, diagnosis, or prognosis of child psychiatric disorders. Imaging in child psychiatry has not become a routine clinical utility and these early studies had little impact on clinical understanding or practice.

Population Neuroscience addresses these shortcomings employing a range of different study designs. First, follow-up studies of clinical cases are well suited to investigate prognosis, both prognosis under treatment and the natural course of a disorder. Second, follow-up studies in high risk populations such as nonaffected siblings or offspring of persons with a disorder can address the etiology and the onset of symptoms. Finally, large neuroimaging studies of typical developing children can help address selection bias inherent to clinical studies, test symptoms of the disorder along the continuum of disease and if designed longitudinally, can test both etiology and prognosis. Seminal studies utilizing these designs will be discussed to illustrate the challenges and key results. Most studies use T_1 and less often T_2 weighted structural imaging sequences, diffusion tensor imaging and in the last 10 years added resting state imaging sequences to the protocol. Only very large studies have introduced task-based MRI and few of these studies can be viewed epidemiological work.

Longitudinal Clinical Studies

Longitudinal clinical studies are ideally suited to address prognosis. In a series of seminal studies, Shaw and colleagues studied brain development in more than 220 children and adolescents with ADHD. In an early follow-up study of 2007, they calculated trajectories of cortical thickness and modeled the peak age of cortical thickness, which follows an inverted U-shaped trajectory (Shaw et al. 2007). They showed that the regional pattern of maturation was similar between cases and controls with primary sensory areas attaining peak thickness earlier than higher order association areas. However, there was a marked delay in ADHD in attaining peak cortical thickness throughout most of the cerebrum, on average about 2 years. The delay was most prominent in prefrontal regions, important for control of cognitive processes including attention and motor planning. This study provided the first neuroanatomic documentation of a maturational delay in ADHD, or any neurodevelopmental disorder, using repeated neuroimaging assessments. In a study of the same population with longer follow-up, the group was able to show that the rate of cortical thinning in the prefrontal cortex increased in parallel with the number of adult symptoms, particularly inattentive symptoms (Shaw et al. 2013). While those with persistent ADHD had a fixed, nonprogressive deficit, the trajectories of cortical thickness among persons with ADHD converged toward typical dimensions among those who remitted. This observation has implications for etiological and clinical research, in particular prognosis, as it suggests patients with ADHD may make the neurodevelopmental delay good. Clearly, these results show the importance of repeated MRI measures in longitudinal designs and of including healthy controls. Also, other longitudinal studies of ADHD have replicated the reductions in cortical volume, surface area, and gyrification particularly in frontal areas (Ambrosino et al. 2017).

Studies of children with autism have consistently identified a subset of children with enlarged head circumference. However, better designed studies with locally recruited controls less often show brain overgrowth as measured by head circumference in autism; thus, these findings may reflect generalizable norm biases rather than a disease-specific biomarker (Raznahan et al. 2013). Reviewing MRI studies, Courchesne and colleagues demonstrated that total brain enlargement is indeed present in children with ASD aged 2 to 4 years but not in older children and adolescents (Redcay and Courchesne 2005). Based on such cross-sectional MRI studies, researchers hypothesized that the brain in children with autism undergoes an abnormal growth trajectory that includes a period of early overgrowth. However, this has never been confirmed by a longitudinal study. Several longitudinal clinical studies of children with autism and controls aged 1.5–2 years at baseline have been performed. This work has demonstrated brain and precocious amygdala enlargement in young children with autism, but although the magnitude of enlargement was slightly greater at 50 months, the relative growth patterns remain unclear due to the late age of inclusion after 1.5 years (Schumann et al. 2010). Moreover, the study base (the population from which the research draws on) of these imaging studies is often not well defined, this implying that convenient control sampling can easily introduce bias.

High-Risk Studies

High-risk studies address causality and examine neurodevelopment before disorder occurrence.

First-degree relatives of persons with an ASD are at increased risk for ASD-related characteristics. This provides the opportunity to assess siblings, some of which will later develop the disorder. Prospective brain imaging studies of infants at high familial risk for ASD are better suited to identify early postnatal changes in brain characteristics occurring before the emergence of clear clinical symptoms that lead to an ASD diagnosis. In such a neuroimaging study of 106 infants at high familial risk of ASD and 42 controls, researchers showed that cortical surface area hyper-expansion between 6 and 12 months of age precedes brain volume overgrowth in those diagnosed with autism later (Hazlett et al. 2017). Similarly, the aberrant development of white matter pathways precedes the manifestation of autistic symptoms. In a prognostic study, other work has shown that that functional connectivity measured by MRI at around 6 months correctly identified which individual children would receive a research clinical best-estimate diagnosis of ASD at 24 months of age (Emerson et al. 2017). Not only do we learn from brain imaging measures using this approach; a prospective high risk study of infants later diagnosed with ASD showed a decline in eye fixation within the first 2 to 6 months of life (Jones and Klin 2013).

In ADHD and substance abuse, sibling designs have largely been used to study the effect of discordant exposure, for example, to explore the association between intra-uterine exposure to alcohol or smoking and ADHD (Donovan and Susser 2011; Obel et al. 2011). Others examined how siblings' facilitation mediates the association between older and younger sibling alcohol use in late adolescence (Samek et al. 2015).

Studies dating back to the 1950s have yielded evidence of developmental risk factors and antecedents in offspring of patients with schizophrenia, including delayed psychomotor milestones or greater neurological soft signs (Rieder and Nichols 1979). Imaging in offspring of individuals with schizophrenia, mostly conducted cross-sectionally (Sugranyes et al. 2017), showed lower grey matter volume as biomarkers of risk for psychiatric disorders. The Edinburgh High Risk Study followed up 162 individuals at high genetic risk of schizophrenia and showed reductions in cerebral volume that were not found in control subjects (McIntosh et al. 2011). Changes in brain structure were also associated with increasing psychotic symptom severity as people developed schizophrenia.

Studies of Typically Developing Children and Adolescents

Large neuroimaging studies of typically developing children and adolescents have provided valuable information on global and regional developmental trajectories of brain development (White 2015). The initial studies excluded children with psychiatric problems, but as these imaging studies include follow-up assessments and

become larger and population-based, they epitomize Population Neuroscience addressing etiology, diagnosis, and prognosis. The table below shows population neuroimaging cohorts in children and adolescents with more than 500 participants.

Cohort	Imaging sequences	N (largest wave)	Age at imaging baseline	Follow-up assessments
Population-based cohorts				
Saguenay youth study	sMRI, MRT	1024	12–18 years	1 wave
Generation R	sMRI, DTI, rs-fMRI	3992	6–12 years	2 waves, ongoing
Philadelphia neurodevelopmental cohort	sMRI, DTI, rs-fMRI, fMRI	1445	8–21 years	No
Norwegian Mother-Child Study (MoBa)	sMRI	495	6–21 years	2 waves
School recruitment – convenience				
IMAGEN	sMRI, fMRI	2,223	13–16 years	2 waves
Adolescent Brain Cognitive Development (ABCD) Study	sMRI, DTI, rs-fMRI, fMRI	11,874	9–10 years	1 wave, multiple planned
HealABCD (pilot funding assigned)		>5,000	Fetal life forward	Multiple planned
Healthy volunteers				
PING	sMRI, DTI, rs-fMRI	1,493	3–20	No
NIMH intramural child cohort	sMRI, more added	618 + 800 twins	5–25	Varied, some >4
Lifespan baby connectome project	sMRI, rs-fMRI	500	0–5 years	No

Footnote: See for references in text, except MOBA (Westerhausen et al. 2018)

Normal development. The first large scale population imaging study on normal development was conducted at the Child Psychiatry Branch of the NIMH by Giedd and colleagues who conducted repeated MR scans of typically developing children and adolescents (Giedd and Rapoport 2010). While prior work in the field compared size differences of selected brain area, this longitudinal study examined trajectories of development over time and evaluations of neural circuitry as opposed to structures in isolation. In a series of reports, the group showed that the human brain has a spatially-distinct protracted maturation, with different neural circuits undergoing distinct dynamic changes throughout life. They demonstrated largely linearly increasing white matter volumes across adolescence and an inverted U-shaped trajectory of grey matter volumes, with peak sizes occurring at different ages in different regions. In girls the total cerebral volume peaked at age 10.5, in boys at age 14.5 (Lenroot and Giedd 2006). The repeated neuroimaging design also enabled researchers using the NIMH data to show that the neuroanatomical expression of intelligence in children is dynamic. While in early childhood there was a

predominantly negative correlation between intelligence and cortical thickness, only in adolescence did they find the known positive correlation. Children with higher IQ demonstrated a particularly plastic cortex, with an initial accelerated and prolonged phase of cortical growth, followed by a more rapid cortical thinning in early adolescence (Shaw et al. 2006). While many of these observations have been replicated, the inverted U-shaped trajectories of cortical thickness may have been enhanced by poor quality (e.g., motion artifact) of the images in young children. A study with much more stringent post processing quality control found that cortical thickness across childhood from age 5 onwards was almost exclusively declining linearly, with little evidence for sex difference if corrected for total brain volume (Ducharme et al. 2016).

Etiology. The Saguenay Youth Study takes a largely etiological approach and investigates mainly early life (intrauterine exposure to smoking) and adolescence exposures (sex hormones and substance use) (Pausova et al. 2017). Higher testosterone-related volume of white matter during male adolescence was reported as well as a negative relationship between the extent of drug experimentation and the thickness of the orbitofrontal cortex. The Pediatric Imaging, Neurocognition and Genetics (PING) study advanced our understanding of how indicators of socioeconomic status cross-sectionally related to brain structure (Jernigan et al. 2016). Among children from lower income families, small differences in income were more strongly related to differences in cortical surface area than among children from higher income families (Noble et al. 2015). These relationships were most prominent in regions supporting language, reading, executive functions, and spatial skills and mediated socioeconomic differences in certain neurocognitive abilities. Importantly, analyses were adjusted for ancestral descent based on genotype data. Longitudinal studies beginning earlier in life with assessments of possible intermediates such as parenting, family stress, or nutritional markers are needed to inform public health interventions. Etiological studies were also performed in the Generation R cohort and the ABCD study. For example, the first found prospectively assessed maternal cannabis during pregnancy was related to thicker frontal cortex (El Marroun et al. 2016). Recent work in the same cohort, however, suggested this association may not be causal (El Marroun et al. 2019). Likewise, the association between screen media activity and structural correlation networks in the brain observed in the first release of the ABCD Study cannot easily be interpreted causally (Paulus et al. 2019). While such individual differences may have consequences for psychopathology and cognitive performance, the cross-sectional nature of the study precluded any etiological interpretation given the possibility of reverse causality. Other imaging studies have tested whether brain structural development mediates the relation between adverse exposures and child psychopathology. The effects of peer victimization on depression, generalized anxiety, and hyperactivity symptoms assessed at follow-up were tested in 682 participants from the longitudinal IMAGEN study (Quinlan et al. 2018). Peer victimization was indirectly associated with generalized anxiety via decreases in putamen and left caudate volume. These data suggest that the experience of chronic peer victimization during adolescence might induce psychopathology-relevant deviations from normative brain development.

Other longitudinal etiological studies in Generation R suggested that a thinner cortex in childhood mediated the effect of fetal exposure to air pollution on inhibitory control (Guxens et al. 2018). Although these etiological studies might identify novel risk factors for child psychiatric disorders, their strength is to determine how environmental or genetic factors impact the brain and thus how the brain structural or functional changes may underlie the lasting effects of, for example, socioeconomic status on a range of neurodevelopmental outcomes.

Diagnosis. Several imaging studies embedded in the Philadelphia Neurodevelopmental Cohort have attempted to demonstrate transdiagnostic brain-based phenotypes in individuals with increased susceptibility and symptoms of psychiatric disorders using sophisticated modeling approaches (Kaczkurkin et al. 2018). Dimensionally studied general psychopathology and psychotic experiences were cross-sectionally related to resting-state functional connectivity and white matter microstructure. Results showed shared mechanisms for psychopathology symptoms that cut across clinical diagnostic categories, but these studies are not sufficient to establish the regionally elevated perfusion in the anterior cingulate cortex or any brain morphological parameter as a diagnostic biomarker given the absence of follow-up studies and lack of comparative approaches. A similar approach was used in a white matter imaging study in Generation R (Neumann et al. 2020). The authors showed that higher levels of general psychopathology were associated with less white matter integrity but that externalizing symptoms may display the reversed associations, that is, characterized by more white matter integrity, once co-occurring general psychopathology is accounted for. This complicates research into diagnostic biomarkers as it suggests that clinical presentations of externalizing symptoms may comprise various symptoms or subdimensions each differentially related to brain characteristics which cannot easily be disentangled in an individual. One seminal diagnostic imaging study focused on depression in adults (Drysdale et al. 2017). Resting state functional magnetic resonance imaging was used in a large multisite sample to show that patients with depression can be subdivided into neurophysiological subtypes defined by distinct patterns of dysfunctional connectivity in limbic and frontostriatal networks. The patient clustering corresponded reliably to clinical profiles across data sets and predicted responsiveness to transcranial magnetic stimulation therapy. However, the distinct resting state connectivity-based subtypes of any disorder should be interpreted with caution, unless the correlations of imaging parameters and clustering of groups have been shown to be robust and reproducible (Dinga et al. 2019). However, such disorder subtypes or perhaps more likely, cross-disorder groups, may identify individuals who are most likely to benefit from specific interventions and could be a viable step towards personalized medicine in (child) psychiatry.

Prognosis. The multisite IMAGEN study, unlike other large population neuroimaging studies, also focused on functional in addition to structural imaging measures (Schumann et al. 2010). Quantitative psychological traits were related to functional correlates of reinforcement behaviors such as impulsivity, reward sensitivity, and emotional reactivity in an effort to include biological mechanisms in psychiatric classifications and predictions. Albeit exciting, rigorous diagnostic

evaluation studies are lacking to formally test the claim of personalizing medicine. An elegant prognostic study was performed in IMAGEN using a machine learning approach (Whelan et al. 2014). The authors identified 30 variables from 6 domains including genetic, brain morphological, and cognitive data that predicted future binge drinking. This multivariate prediction profile highlights how brain measures, which were among the best predictors, can improve prediction independently of variables across many other domains. A sparser prediction model with imaging data may stand a chance to be used in practice.

Sensitive periods. One population neuroscience study was conducted in the form of a randomized trial of children reared in an institution in Bucharest, Romania, who were randomly selected to be removed from the center and placed into high-quality foster care during early childhood (Sheridan et al. 2012). The neurodevelopment of these children was compared with that of children who remained in the institution, and non-neglected children. Between 8 and 10 years, researchers found that children exposed to institutional rearing showed decreased cortical grey matter volumes and reduced thickness throughout the cortex. Children placed in foster care did not significantly differ from children who remained in the institution. This relatively small imaging study with about 25 children in each arm of the trial highlights how psychosocial deprivation lastingly affects the brain in the first couple of years of life. Also the observations mirror findings of suppressed growth within institutional care settings that suggest a sensitive period early in life, the adoptees' recovery, in particular of their IQ, within adoptive families was most marked if placement occurred prior to 12 months of age (Johnson et al. 2010; Van IJzendoorn et al. 2007). This relatively small imaging study with about 25 children in each arm of the trial highlights how psychosocial deprivation lastingly affects the brain in a sensitive period in the first couple of years of life (Johnson et al. 2010; Van IJzendoorn et al. 2007).

Using data of the Generation R cohort, investigators tested if sensitive periods of brain development to prenatal maternal thyroid dysfunction could be identified (Jansen et al. 2019b). Maternal thyroid deficiency has repeatedly been associated with poor child neurodevelopmental outcomes. This study examined the association of maternal thyroid function with child brain morphology assessed at 10 years to study whether any association were dependent on the timing of thyroid assessment during pregnancy. Both low and high maternal thyroid function were associated with smaller child total grey matter and cortical volume. However, an association with a neurodevelopmental outcome is most evident when maternal thyroid function is measured early in pregnancy suggesting that embryonic brain development is particularly vulnerable to altered maternal thyroid function. Using the same data set, the association of an exposure to maternal depressive symptoms at different developmental stages from fetal life to preadolescence with child brain development was tested (Zou et al. 2019). This study included volumetric and white matter microstructure data when children were 10 years of age. Single-time-point analyses showed that maternal depressive when children were age 2 months were associated with smaller total grey matter volume and lower global fractional anisotropy, whereas maternal depressive symptoms assessed prenatally or in childhood were

not. The trajectory analyses suggested in particular that children exposed to persistently high levels of maternal depressive symptoms across the perinatal period had smaller grey and white matter volumes as well as alterations in white matter microstructure. These results suggest that the postnatal period is a window of vulnerability for adverse exposures such as maternal depressive symptoms.

Methodological Considerations in Psychiatric Neuroimaging and Population Neuroscience

A substantial portion of the neuroimaging literature has focused on obtaining highly precise measurements of the brain and less attention has been afforded to core epidemiological concepts such as (population) sampling, generalizability, and bias (Kolossa and Kopp 2018). While gaining precision in measurements has clear benefits, the bias and lack of reproducibility are causes for concern (Shrout and Rodgers 2018). Many of the issues likely arise from relatively small sample sizes. However, irrespective of sample size, other issues are clearly at play and will be discussed below. We argue that practicing population neuroscience implies that these challenges are addressed.

Representativeness and Generalizability

Representativeness is sometimes seen as the hallmark of population neuroscience; studies should aim to recruit a subset of a population that reflects the characteristics, such as race and socio-economic status, of the larger group (Garavan et al. 2018). The goal of representativeness is to achieve generalizability of study, although that is a matter of scientific inference (Richiardi et al. 2013). Generalizability largely depends on validity of results, even if often judged just by similarities between the time, place, people, and social contexts (Leung 2015). Actually, there are good reasons for population imaging to deliberately opt for nonrepresentativeness in design: (i) to minimize bias by restricting to a particular population subgroup with less likelihood of lifestyle differences between exposed and nonexposed; and (ii) to deliberately focus on population subgroups, for example, ethnic groups, and (iii) practical considerations, for example, to restrict to living near the imaging facility. The Generation R Study, for example, was situated for practical reasons in Rotterdam. The study is not representative for the Netherlands, for example, it includes a more ethnically diverse population (Jaddoe et al. 2006). Representative studies are not necessarily more heterogeneous in exposure distribution. Nonrepresentativeness may also be "unintentional" (Richiardi et al. 2013). For example, nonrepresentativeness can be due to low baseline response rates or the recruitment of volunteers rather than a sample of a defined population (i.e., a study with a primary population base). The intramural NIMH study, for example, largely recruited from the affluent Bethesda neighborhood. The ABCD study was designed as a representative multisite study but had recruitment rates of less than 15%, similarly the

Saguenay Study included less than 10% of all families (although some were not eligible). On the one hand, such baseline self-selection is likely to create a group of more motivated persons, which may result in a better response to follow-up and thus in decreased selection bias. On the other hand, it is likely that there are factors associated with selection that are also determinants of the outcome, think of family chaos or poverty that have consistently been related to neurodevelopment. Importantly, such selection bias related to baseline recruitment can occur even if the study is representative on indicators such as socio-economic status and race. Indeed, the occurrence of psychiatric problems in studies, such as Generation R or the ABCD study, is lower than in population-based studies with higher baseline response and possibly this will bias etiological associations. A descriptive study of LeWinn et al. showed how sample composition can influence age-related variation in grey matter volume and cortical thickness (LeWinn et al. 2017). The authors applied sample weights from census data to participants with structural brain imaging data from the PING study. Compared to the unweighted sample, earlier maturation of cortical and subcortical structures was found in the weighted sample. For such descriptive studies, low baseline response rates may introduce bias. However, population neuroscience should carefully weigh the advantages of representativeness against those of a well-defined but nonrepresentative population base (e.g., a population register which allows the calculation of response rates and the evaluation of selection bias) or a focus on subgroups which may better reduce bias. Representativeness is typically not needed other than in prevalence studies.

High Dimensional Data and Multiple Testing

Brain images have an immense complexity which grows exponentially with increasingly finer spatial resolution. It is then no surprise that neuroimaging presents a nontrivial dimensionality problem. Often, details of the brain are captured with various neuroimaging modalities by sampling different characteristics (e.g., structure, function). For example, with structural MRI, a grid of 3-dimensional pixels (voxels) is used and can easily surpass 65,000 data points in a single image. Depending on the neuroimaging modality (e.g., structural, functional), each voxel may also contain multiple pieces of information. One common way to simplify this dimensionality problem is to reduce the data into sub-units, often referred to as *regions of interest* (ROIs). In the context of motor ability, one may look preferentially to the precentral gyrus and summarize the information of all voxels in the brain which fall within this region (e.g., calculate the mean cortical thickness across the precentral gyrus). Such a strategy can reduce thousands of data points into a more manageable subset. However, common neuroanatomical atlases consist of more than 30 areas per hemisphere (Desikan et al. 2006), and state-of-the-art multimodal parcellation schemes now include hundreds of areas (Glasser et al. 2016) and thus possible ROIs. Importantly, the brain has a complex architecture with interrelated networks. Thus, for many exposures a plausible hypothesis, which justifies exploring many different ROIs, can be framed. This yields multiple tests of different ROIs,

as an evidence-based a priori choice is typically not possible (like in candidate gene studies). Yet, studies using an ROI approach often do not control for multiple testing at all. Alternatively, "hypothesis free" approaches are employed, where each brain voxel is examined separately rather than aggregating information across anatomical ROIs. One playful, yet concerning, illustration of the problem is made by the famous "dead salmon study," where postmortem functional neuroimaging of a fish showed "significant" neural activation without adjustment for multiple comparisons (Bennett et al. 2009). Though methods are able to adjust for the many thousands of statistical tests (voxels) (Bennett et al. 2009), the field has struggled to adequately control multiple testing (Eklund et al. 2016; Greve and Fischl 2018). This struggle can partly be explained by the correlated nature of the many thousands of voxels in the brain (i.e., nonindependence). Even if the number of statistical tests is accounted for properly across the thousands of brain voxels, researchers often explore several models and contrasts, and they typically do not further adjust for these tests (Alberton et al. 2019). Clearly, adequate control for multiple testing against the background of a myriad of reasonable and feasible association tests with different imaging parameters remains one of the most salient challenges in Population Neuroscience.

Confounding

Neurodevelopmental and neuropsychiatric imaging studies typically adjust statistical models for a basic and limited set of covariates, namely age, sex, and often total brain size. Even if suitable information on other possible confounding factors is available, many studies omit these from statistical models. Sometimes possible confounders are not ascertained or considered, sometimes matching on selected parameters is seen as sufficient, and sometimes analytical software used in imaging analyses does not allow for a complex array of covariates. In a model that includes statistical adjustments for a true confounding factor, the effect estimate of an association will typically attenuate. However, the brain architecture involved in an association is determined by the interplay of many genetic and environmental factors, that several will likely also be associated with a particular exposure or outcome such as ADHD. This has implications for neuroimaging research. The strength of the observed association between an imaging parameter and a given phenotype is often overestimated. In the context of high-dimensional analyses, studies not properly adjusting for confounding factors highlight more brain areas than are actually present. For example, Fig. 1 illustrates how attention symptoms are related to cortical surface area in the general population of 2706 children ages 8–12 years from the Generation R Study (unpublished data). Colors coded from red-to-yellow highlight how the spatial distribution of the association of surface area with attention problems varies across the brain as a function of important confounding factors. In this example, the total surface area of the association was more than 200cm^2 when only adjusting for age, sex, and ethnicity and fell to 85cm^2 (42% of the original size) after adjustment for several confounders such as prenatal

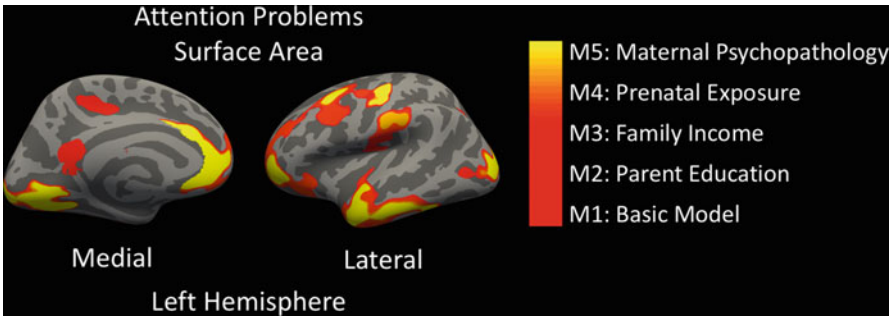

Fig. 1 Spatial changes in associations between surface area and attention problems with adjustment for confounding factors

tobacco exposure and maternal psychopathology. Poor control for confounding leads to invalid results, poor generalizability, and problems with replication of results (Ioannidis 2019). Against this background, the large meta-analyses, such as conducted by the Enigma Network, that typically adjust for few confounders only cannot easily infer causality (Hoogman et al. 2019). Consideration of confounding factors should take place before data collection begins, and population neuroscientists have to accept that more likely than not the associations tested in child psychiatry are confounded by many external factors.

Figure depicts what happens to significant associations between ADHD and surface area with additional adjustment of estimates for confounding effects. M1 = Model 1 and includes age, sex, and ethnicity. M2 = Model 2 and represents Model 1 + parental educational level. M3 = Model 3 and represents Model 2 + family income. M4 = Model 4 and represents M3 + prenatal exposure to tobacco. M5 = Model 5 and represents M4 + maternal psychiatric problems. Red color represents minimally/basic adjusted models and yellow indicates more complete/fully adjusted models.

Reverse Causality and Bidirectionality in Brain-Behavior Studies

Though often implicit, nearly all studies utilizing brain imaging to study psychopathology operate under the assumption that neuroimaging features associated with psychopathology precede the symptomatology, omitting the possibility of downstream effects, or "*behaviors shaping the brain*." Imagine a child with anxiety symptoms, who likely lacks certain social interactions, spends more time in bed sleeping and is more withdrawn than his or her peers; these behavioral and emotional problems very likely alter the course of brain development, though any neuroimaging correlates will misleadingly be interpreted as antecedents of the symptoms. In a study of 480 children participating in a repeated imaging study, it was shown that higher levels of internalizing and externalizing problems measured at age 6 were predictive of reduced (slower) changes in subcortical grey matter and white matter microstructure from ages 6-to-12 years of age (Muetzel et al. 2018). However,

imaging metrics assessed at age 6 were not predictive of changes in externalizing and internalizing problems over time. As of yet, it is unclear how much and at what age behavior impacts the brain most. Nevertheless, this population neuroscience finding has profound implications for the interpretation of cross-sectional studies, the typical inferences, and that emotional or behavioral symptoms are always a consequence of brain alterations. It implies that we need longitudinal studies to demonstrate the associations of brain and behavior, otherwise studies will likely be biased, inconsistent and cannot be accurately interpreted.

Imaging Genetic Studies

The advent of genome wide association studies (GWAS) and modern molecular genetics is of particular relevance for Population Neuroscience, although imaging genetics is in its infancy. First, genetic studies of imaging parameters are conducted that may help better understand brain development. The function and structure of the human brain is strongly shaped by genetic influences. Yet only in the past years have several large consortia studies shed some light on the genetic variants related to imaging parameters, though typically in adults (Hirschhorn and Gajdos 2011). A GWA study of intracranial volume showed a high genetic correlation between adult intracranial volume and child head circumference (Adams et al. 2016). As with most other large genetic imaging studies of various brain structures, some genetic variants identified were related to childhood cognitive functioning. Another large seminal GWA study investigated seven subcortical structures (Hibar et al. 2015). Interestingly, genetic variants related to the putamen were located on genes (e.g., DCC) most highly expressed in the first two trimesters of prenatal development suggesting that this variant may influence brain volumes early in neurodevelopment. More recently, imaging genetic studies in the UK Biobank showed that iron transport and storage genes were related to magnetic susceptibility of subcortical brain tissue, whereas extracellular matrix and epidermal growth factor genes with white matter microstructure and lesions (Elliott et al. 2018). These results may provide some insights into the molecular mechanisms underlying brain development, but the hope that this approach will yield novel candidate genes for neurodevelopmental disorders has not materialized. As the genetic loci discovered in imaging studies are rarely related to psychiatric traits, these MRI parameters cannot be viewed as intermediate endophenotypes helping to unravel the genetic architecture of child psychiatric disorders.

Second, genetic correlation studies are used to better understand the link between psychiatric traits and neurodevelopment. Likewise, polygenic risk scores (aggregates of risk based on genetic information) derived from GWA studies of psychiatric traits have been related to neuroimaging and other neurodevelopmental parameters and vice versa. These studies clearly show widespread pleiotropy between cognitive, mental health traits, and brain parameters although they cannot demonstrate if this reflects mediated or biological pleiotropy, or simply correlated genetic loci (Salinas et al. 2018). Several studies tested whether the polygenic susceptibility for disorders such as schizophrenia, autism spectrum disorders, or ADHD is associated with brain

morphological characteristics in children. Indeed, a higher genetic susceptibility for ADHD, for example, was associated with smaller caudate volume and this explained part of the association with attention problems in boys (Alemany et al. 2019). However, polygenic risk scores of education or intelligence generally showed a stronger signal with child brain morphology, which probably reflects the large statistical power in the GWAs of cognitive traits. In contrast, the genetic loci found in adult neuroimaging studies are not or only very weakly associated with child psychiatric phenotypes. A recent study found no genetic correlation of white matter characteristics and neurodevelopmental disorders, only a positive correlation of white matter characteristics (here fractional anisotropy) with cognition and negatively with depression (Zhao et al. 2019). Similarly, no evidence of shared genetic influences between subcortical brain volumes and schizophrenia was found although improved statistical modeling recently suggests some genetic overlap (Franke et al. 2016; Smeland et al. 2018). Most genetic correlation or polygenetic studies in the neurodevelopmental field are cross-disorder studies which will not be discussed in detail. Consistently, these genetic studies provide evidence for shared genetic effects on different neurodevelopmental disorders (Smoller et al. 2019). For example, SNPs identified the ADHD GWAS strongly predict autism and many other traits (Jansen et al. 2019a). The poorly explained positive genetic correlation between autism and intelligence is arguably one of the most exciting leads for future genetically informed neuroimaging studies (Savage et al. 2018).

Thirdly, modern genetic research offers a perspective of how epidemiological rigor can advance a scientific field. Like imaging studies, early genetic studies were limited by logistical considerations, nominally significant results were interpreted as definitive, and the this was exacerbated by technical artifacts (Hirschhorn and Gajdos 2011). However, stringent control for multiple testing, replication protocols, large scale studies has provided the ability to detect small effects validly. In addition, genetic studies helped advance causal inference. However, methodological advances such as Mendelian randomization have hardly been introduced in Population Neuroscience (Van 't Ent et al. 2017).

In summary, the clinical utility of genetic risk prediction at present is still low; the effect sizes of these aggregate measures remain too small. Imaging genetics studies of neurodevelopmental traits are still in their early stages, also due of the scarce use of multivariate strategies in data analysis. Moreover, the selection effects, observed in particular in the imaging studies, provide an underestimated challenge for risk prediction modeling. Yet, as the ancestral diversity and sample sizes of genome-wide association studies increase, there is real promise for clinical practice.

Clinical and Public Health Relevance of Population Neuroscience

The advance in Population Neurosciences like in most scientific disciplines is incremental and the clinical applications arise less quickly than expected. Landmark neuroimaging studies have provided insights in the development of ADHD and autism. A maturational lag across multiple neural circuits has been demonstrated in

ADHD, but studies also show that this often disappears with age. Sibling studies in children with autism provide evidence that in severe cases autism can also be conceptualized as a syndrome of degeneration, as these children have experienced regression and degeneration probably underlying the loss of neurological function (Constantino 2018; Kern et al. 2013). These highlights illustrate the advance in the understanding of brain development in children with psychiatric disorders, but what insights for etiological, diagnostic, and prognostic understanding can we expect from Population Neuroscience? Epidemiological studies provide evidence for the substantial comorbidity of child psychiatric traits, and population neuroscience confirmed the likely etiological overlap. Imaging markers can serve as a sensitive biomarker of brain developmental effects. Large longitudinal imaging studies could also show that certain brain alterations mediated environmental, intra-uterine, or social exposures; however, we must not turn to Population Neuroscience to discover new risk factors. Arguably, the field most likely to be advanced by population neuroscience is research on diagnostic classifications. While behavioral and molecular genetic studies have cast doubt on the validity of several diagnostic entities, imaging studies may be useful to define more robust subgroups. In particular resting state fMRI is a hopeful approach; the work of the Liston group discussed above suggests that this modality has the sensitivity to reflect change over time and probably environmental effects. The depression subgroups identified by resting-state fMRI profiles predicted outcome well, although much more work is needed to define robust diagnostic categories including neuroimaging data. Other approaches using one or different imaging modalities have shown to predict the onset of substance abuse or recurring delinquency and such applications will increase with more carefully conducted longitudinal studies. Arguably, the lack of clinical utility of neuroimaging for child and adolescent psychiatry does not reflect the limited potential of imaging in this field, but the lack of epidemiological designs, that is, the lack of population neuroscience.

Conclusion

Most developmental neuroimaging studies cannot easily be generalized, with many arguably biased due to poor control for confounding and selection effects. Often the temporal direction of the associations reported remains unclear, for example, is the child behavior such as anxiety a cause or a consequence of the brain morphological differences detected in the basal ganglia? Population neuroscience is an attempt to address these challenges with larger sample sizes, a clear study design and sampling frame, longitudinal data including repeated brain imaging assessments, and a more careful control for multiple testing. Importantly, population neuroscience attempts to integrate different imaging modalities, environmental factors, and genetic data with behavioral phenotypes. It remains to be seen if population neuroscience will result in clinically meaningful diagnostic and prognostic parameters for child psychiatry or even better treatment allocation, but presents us with a clear opportunity and the most sensible way forward.

Cross-References

► Socioeconomic Inequalities and Mental Health Problems in Children and Adolescents

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Part III

Childhood Adversities

Movement of Peoples

8

Urbanization and Migration

Michael Collyer

Contents

Abstract

Migration is now widely seen as a social determinant of health. In addition to access to health, migration affects a range of factors which in turn influence health. Data on migration is unfortunately limited but recent work on migration and wellbeing fits the broader social determinants of health approach. Following a review of data on migration, this chapter reviews recent research on migration and wellbeing. This research highlights that the control that individuals have over migration is an important factor in determining its outcomes. Children and adolescents typically have less control over their migrations than adults. There are also important differences in the impact of migration on wellbeing even within the under 18 age group. The chapter finishes with a review of recent research on urbanization which will be one of the most significant movements of people on a global scale during the twenty-first century. Here again, the agency of migrants matters, although there are clear steps that public authorities can take to support the wellbeing of migrants.

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Introduction

Migration often brings tremendous benefits to the people who move and the places they move to. Yet shifting your life from one place to another can also be a tremendously disturbing event, with long-lasting consequences. This is particularly the case for individuals who do not feel fully in charge of the process of moving, a situation common to many children and adolescents involved in migration. In extreme cases, refugees and other forced migrants, those resorting to smuggling or trafficking, and those attempting to conceal themselves from authorities face the greatest fear, the greatest risks, and the least control. Thankfully, these people represent a small minority of global migrants, albeit a highly mediatized one. Yet choice is a broad spectrum, not a forced/voluntary binary. There are plenty more people who have some agency, yet nonetheless move reluctantly, who leave established homes with regret and fragile hope that they are moving to something better.

For many millions who move, migration does bring something better, from improved educational opportunities to quality of life in retirement. This chapter is written in the firm conviction that migration, including refugee movement, is mostly a good thing, for the individuals concerned, and for the places they move to. Yet, even when it goes well, there are challenges. Migration was recognized as an important social determinant of health in a resolution of the World Health Organisation (WHO) more than 10 years ago (WHA61.17) and this has been followed up by further calls to focus more on migrant health. These global resolutions do not focus specifically on mental health, although this is clearly a significant issue: the isolation, loneliness, and culture shock experienced by migrants may be exacerbated by a hostile reception, xenophobia, or racism, even for those moving within countries. This chapter considers these challenges and migrants' capacity to resist them. It falls into three sections: first an explanation of definitions and data that are used to organize assessments of migration; second, a review of some recent research on migration and wellbeing; and finally a brief review of patterns of urbanization, estimated as the most significant global movement of people between now and 2050.

Definitions and Data

In most cases, migrants are in a minority in the places they leave, the places they arrive and the places they travel through. In each case, they differ from the wider population in important ways which are likely to have important health implications.

Yet data on migration is notoriously poor quality. Migration which attracts most attention is international migration – that is migration crossing an international border. On a global scale, there are 272 million international migrants (in 2019), 3.5% of the global population (UNDESA 2019a). A larger number of migrants do not cross international borders, currently reckoned to be 763 million (IOM 2019). Yet even this most basic data of numbers of international and especially internal migrants is patchy. Countries with regular censuses and robust civil registers have reasonably accurate data, whereas data is much more uncertain or absent in countries experiencing conflict or struggling to maintain accurate administrative records. Even in countries with good data, information on undocumented migrants, the most vulnerable and excluded population, is entirely lacking, though this gap is usually filled in with estimates. Data is therefore skewed in important ways with details of the most marginalized systematically absent: in wealthy countries information is broadly comprehensive (except for those without legal status), whereas migration to and particularly within poorer countries is substantially undercounted. Global data on migration is often modeled to fill in these gaps and is based on estimates or projections.

Refugees are one notable exception to this global trend. The UN Refugee Agency (UNHCR) maintains good data on those populations under its control, chiefly those in refugee camps and those urban refugees registered with the agency. UNHCR also provides regular statistical updates on other groups of forced migrants, mainly internally displaced people. This data confirms the concentration of refugees in poorer countries. In 2018, wealthy countries hosted 16% of the world's refugees while over 30% were hosted by countries officially classified as "least developed" (UNHCR 2019). Yet even here, such an authoritative presentation hides the fact that an unknown number of refugees, particularly in urban areas, are not counted. In this chapter, refugees as a group is subsumed under the category of migrants – by definition refugees are international migrants since they must have left their country of origin. This is not to dismiss the specific difficulties faced by refugees, but a recognition that it is difficult to draw a clear distinction between refugees and many other migrant groups.

Although data on numbers and locations of refugees is often more reliable, than for migrants in general, more detailed information, even on basics such as gender or ages of migrants, is still limited. This paucity of information is widely recognized and there have been several recent international efforts to improve the quality of migration data (Global Migration Group 2017). Since information on who and where migrants are, and even how many of them move in particular ways, is so uncertain, particular health-related information is absent at any aggregate level. Analysis and policy interventions are therefore based upon observed trends and patterns rather than established relationships at anything other than very local levels. This uncertainty has also encouraged a broader focus on the social determinants of health, rather than a narrow, medicalized approach where information is severely lacking. This has involved a very substantial growth in interest in research around wellbeing and migration.

Migration and Wellbeing

There are three ways in which migration may be relevant for health, health-seeking behavior, and wellbeing in general. First, the context of migrants' area of origin may lead to particular patterns of ill health or particular expectations of health provision. In the case of mental health, the poor development of psychiatry and continued stigmatization of mental illness in large parts of the world is likely to reduce the willingness of migrants from those areas to seek professional medical support. Second, the migration process itself has become longer and more dangerous for many people in recent decades creating new health risks and separating migrants from established health providers. The importance of the 2008 WHO resolution (WHA61.17) was to recognize migration itself as a social determinant of health beyond its impact on access to health care. This relates to the third reason why migration may have an impact on health, which concerns its impact on the post-arrival situation. Migration certainly affects direct access to health care, indeed efforts made to restrict migrants' access to health care in wealthy countries have increased substantially in recent years. Yet migration also affects all other aspects of an individual's life. This may include housing, employment, or education and the nature and quality of migrants' relationships with members of their local community and (distant) family. All of these will influence migrants' health and in particular their wellbeing.

Wellbeing takes a much broader definition that offers one way of implementing the WHO's concerns with the social determinants of health. In the UK, the Office for National Statistics (ONS) uses a set of four subjective wellbeing questions which appear in a very wide range of very large n surveys at national and European level and increasingly across the OECD (OECD 2013). These four questions are all measured on a 1–10 scale and concern: 1. life satisfaction ("overall, how satisfied are you with your life nowadays?"), 2. worthwhile ("overall, to what extent do you feel that the things you do in your life are worthwhile"),; 3. happiness ("overall, how happy did you feel yesterday?"), and 4. anxiety ("overall, how anxious did you feel yesterday?"). These questions allow widespread international comparison. The ONS also uses the Warwick-Edinburgh Mental well-being scale on a scale of either 14 or seven items (Warwick 2019).

Possibilities for comparison internationally or with larger populations have made these measurements popular in smaller, bespoke survey work as well. This is illustrated by two research projects with two very different migrant groups. Both projects highlight the value of the social determinants of health approach. The first project involved research with refugees resettled to the UK and second, called "Migrants on the Margins" examined the impacts of migration to slums in Colombo (Sri Lanka), Dhaka (Bangladesh), Harare (Zimbabwe), and Hargeysa (Somaliland). In the first project, the use of this common scale allowed a comparison between refugees resettled to the UK and the general UK population. The most startling conclusion of this project was that even 5 years after arrival, refugees had markedly lower levels of subjective wellbeing than the general population. Refugee's levels of wellbeing correlated with the stability of housing and employment and quality of

contacts with people they met daily in statistically significant ways. Surprisingly, it was also related to the reported quality of contact with refugees' friends and family overseas highlighting the important emotional significance of these transnational connections.

This research was longitudinal with three time-points, 1 year apart. Important generational differences in wellbeing with the group of resettled refugees emerged that were particularly apparent over the 3 years of research. Those under 18 were not included in the survey. Since the first survey was conducted 5 years after arrival, we did not interview anyone who was under the age of 13 when they arrived in the UK. Yet even within this narrower band of childhood, significant differences emerged. At 13, children were able to enter the UK education system with relatively few barriers, particularly if they had some English. By 16 the advantages of education disappeared since, by the time they had reached the necessary level of English, they were over 18, no longer eligible for free education and so finished schooling without basic qualifications. This produced a marked difference in wellbeing between these different groups that became more pronounced over time as those without UK educational qualifications faced much greater barriers in the labor market. These findings around the significance of wellbeing have already begun to inform UK policy around refugee resettlement (Collyer et al. 2018). The findings of the second study on migration to cities are more complex and require some background around what has become the most significant movement of people in the world.

The Growing Significance of Urbanization

The growth of cities is the dominant demographic trend of the twenty-first century. Despite the uncertainties of data, there is no disagreement that a majority of the world's population now lives in cities. The world's population became majority urban sometime in 2009 (UNDESA 2010). Cities grow in three ways. The first is the natural growth of urban populations, although around the world fertility of urban populations is lower than rural populations. Second is through migration to the city, and movement from nearby rural areas is the main driver of this in poorer cities. Given the low fertility of urban populations, migration is now estimated to be the most significant driver of urban growth. Finally, cities grow as rural areas surrounding cities are reclassified as urban. This is simply a mark of official recognition that the first two processes of growth have been going on beyond the official urban boundary but it helps explain sudden jumps in urban population as large areas change classification overnight. It also helps explain why estimates of city populations vary so widely: there is often no clear definition of the extent of the "greater" city beyond the official boundary and data on populations living there may be similarly limited.

This growth is often unplanned. In 2018 more than a billion people in the world lived in slums (UNDESA 2019b). Given the significance of this movement of people on a global scale, it is vital to understand more about how it functions as a social

determinant of health. Many of the factors affecting this are specific to particular urban contexts, but some valid generalizations can be made. Just as migration from a rural to an urban area has a virtually universal impact on reducing fertility, it also appears to reduce subjective wellbeing, certainly for low-income groups who are more likely to move to slum areas. The Migrants on the Margins project used the same four ONS subjective wellbeing questions in surveys of approximately 4,000 households in slums in Colombo, Dhaka, Harare, and Hargeysa. Research has only just concluded, but initial findings indicate that of the many uncertainties facing new urban residents it is the insecurity of tenure that has the most direct impact on their reported wellbeing (RGS 2019). This impacts the entire family.

Many residents reported stigmatization based on the neighborhood in which they lived and children were unwilling or unable to attend schools outside the neighborhood. Insecure tenure reduces residents' willingness to invest in their homes and increases the likelihood of forced evictions. Forced evictions disrupt livelihoods and education, particularly when new residential locations are some distance away, which was particularly common in Dhaka and Harare, given the shortage of housing in desirable locations. Even where access to healthcare is possible evictions cut such connections. Evictions also destabilize relationships with other members of the community and in extreme cases of marginalization prevent such relationships forming in the first place (RGS 2019). The impact on the wellbeing of movement to cities is potentially dramatic. The most straight forward response to this is the legalization and gradual upgrading of squatter areas of housing. Where this is impossible due to the physical danger of particular locations, a movement to nearby accommodation. The greatest barriers to ameliorating these negative health impacts are political and greater access to research that can help here too.

Conclusion: Migration and Urbanization as Social Determinants of Health

The data on migration is not sufficiently good to make any clear generalizations about migration and health, less still about the specificities of mental health as it affects children and adolescents. Nevertheless, some clear patterns are discernible. Migration is now widely recognized as an important social determinant of health, including mental health. Agency is important for migrants. Where they chose to move and do so under circumstances largely of their organization, migration is much more likely to be beneficial. Where migrants have less choice, wellbeing is more likely to be affected. As this short overview has demonstrated, this is particularly the case for refugees, though other groups of forced migrants may be similarly affected. It is also the case for poorer migrants. Those who have little choice about where to live due to limited resources are more likely to end up in exploitative, dangerous, or unsanitary conditions. The movement of people from rural areas to slums is one of the most significant demographic trends that are likely to continue throughout the twenty-first century. Here too, there are ways of ameliorating negative impacts on

migrants' wellbeing, as long as the political will exists to implement them. As data improves and research continues opportunities to support this will increase.

Cross-References

▶ A Public Health Response to Mental Health

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Trauma-Related Mental Illness in Children and Adolescents

9

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Abstract

Traumas are stressful events that involve danger of death, injury, or sexual violation – ranging from accidents and illness to violence and abuse. These experiences are common in young people and are strongly associated with mental illness. In this chapter, we explore evidence that contributes to understanding the mental health burden of trauma in children and adolescents. We also consider evidence that informs the management of this burden, from initial response after trauma to treating trauma-related psychiatric disorders in children and adolescents. This evidence has important implications for current clinical practice and indicates the required direction of future research to further improve assessment, treatment, and prevention of trauma-related mental illness in children and adolescents.

Keywords

Trauma · Post-traumatic stress disorder (PTSD)

Introduction

The link between psychological trauma and mental illness was first recognized well over a century ago by neurologists Jean-Martin Charcot and then Sigmund Freud. Extensive research since this time has confirmed that trauma is an important risk factor for psychopathology. The current definition of a trauma is an event that involves exposure to actual or threatened death, serious injury, or sexual violation, which is either directly experienced, witnessed, learned about happening to a close member of the person's social network, or experienced by enduring repeated or extreme exposure to details of the event (American Psychiatric Association 2013). These experiences occur most commonly in adolescence (Breslau et al. 1998, 2004), leading to concerns about their impact on young people's mental health. Indeed, understanding and managing the mental health burden of trauma poses substantial challenges in child and adolescent mental health care. This chapter explores this important topic.

Understanding the Mental Health Burden of Trauma in Children and Adolescents

Prevalence of Trauma

Traumatic experiences are prevalent in children and adolescents. Population-based studies have found that 21–83% of young people report experiencing a trauma in their lifetimes, with lower rates generally found in European samples (Landolt et al. 2013; Lewis et al. 2019; Perkonigg et al. 2000), and higher rates in US samples

(Breslau et al. 2004, 2006; Copeland et al. 2007; Giaconia et al. 1995; McLaughlin et al. 2013). The majority of these studies have found that the most common types of trauma experienced by young people are network events (learning of a death, injury, or sexual violation to a close member of the young person's social network). However, other trauma types, including directly experiencing or witnessing accidents or interpersonal violence, are also common in young people. Furthermore, trauma-exposed young people have often experienced more than one traumatic event. Few population-based studies of trauma exposure in young people have been conducted in other parts of the world, but it is likely that trauma exposure is common in all populations, and that the prevalence of some trauma types varies by region, as occurs in adults (Benjet et al. 2016). For example, exposure to interpersonal violence may be more common in regions experiencing conflict, and exposure to natural disasters may be more common in regions prone to these events. The high prevalence of trauma exposure in young people highlights the importance of understanding trauma-related mental illness in those affected.

Trauma-Related Mental Illness

Immediately following traumatic events, most children and adolescents experience some psychological symptoms. For example, they may feel very upset, become clingy, be preoccupied with remembering the event, have difficulty concentrating or sleeping, or experience somatic symptoms such as headaches or abdominal pain (Danese and Smith 2018). While these responses usually subside within days to weeks, a proportion of young people who have been exposed to trauma go on to develop psychiatric disorders, with symptoms that are longer lasting and that interfere with their daily lives.

Indeed, trauma exposure is strongly associated with experiencing psychiatric disorders. Population-based studies in the USA and Europe have found that trauma-exposed young people are about twice as likely as their unexposed peers to experience a wide range of psychiatric disorders, including emotional, behavioral, and neurodevelopmental disorders, and psychotic symptoms (Copeland et al. 2007; Lewis et al. 2019; Perkonigg et al. 2000). A recent British study found that over half of trauma-exposed young people experienced a psychiatric disorder within the past year, most commonly depression, conduct disorder, alcohol dependence, and then post-traumatic stress disorder (PTSD) (Lewis et al. 2019). Although few population-based studies of trauma-related disorders have been conducted in other parts of the world, it is likely that trauma-exposed young people from other regions also experience high rates of psychopathology, and there may be cultural variations in how symptoms are experienced and expressed (Schnyder et al. 2016).

PTSD affects up to one in four trauma-exposed young people (Alisic et al. 2014; Lewis et al. 2019) and is a unique disorder because trauma exposure is included in its diagnostic criteria and linked to many of its symptoms. For instance, PTSD is characterized by reexperiencing the traumatic event as repeated, distressing, and

unwanted memories or nightmares; avoiding reminders of the traumatic event, such as places, people, thoughts, or feelings; and experiencing increased arousal, including hypervigilance or heightened startle reactions. This constellation of symptoms has been described and studied for nearly four decades and has been reported across cultures (Hinton and Lewis-Fernández 2011; Koenen et al. 2017).

Current definitions of PTSD in the International Classification of Diseases Eleventh Revision (ICD-11) (World Health Organization 2018) and Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) (American Psychiatric Association 2013) continue to include these key criteria, although PTSD definitions in these two classification systems have distinct features. On the one hand, the ICD-11 defines these PTSD symptom criteria narrowly, without symptoms that could overlap with other disorders (Stein et al. 2014). Additionally, the ICD-11 includes a new diagnosis of complex PTSD, characterized by PTSD as well as severe and persistent difficulties with affect regulation (e.g., heightened emotional reactivity or lack of emotion), self-concept (e.g., belief of being worthless), and relationships (e.g., difficulty feeling close to others). Complex PTSD is associated with complex types of trauma involving repeated interpersonal violence in childhood or adolescence, such as child abuse (Maercker et al. 2013). On the other hand, the DSM-5 defines PTSD symptom criteria more broadly and includes an additional criterion of negative alterations in cognition and mood (e.g., guilt, isolation, or detachment) (Friedman et al. 2011). Furthermore, the DSM-5 includes a separate set of criteria for PTSD in children aged 6 years and younger, which are more appropriate for the developmental stage of this age group (Scheeringa et al. 2011b). Finally, although the DSM-5 does not include a diagnosis of complex PTSD (Resick et al. 2012), it does include a new specifier of PTSD with dissociative features (a type of affect dysregulation), which has been linked to complex trauma exposure (Lanius et al. 2010). These new diagnoses of complex PTSD and PTSD with dissociative features were largely based on evidence in adults, and further research is needed to better understand the validity and utility of these diagnoses in children and adolescents.

Importantly, trauma-exposed young people, and particularly those with PTSD, often experience multiple difficulties. For instance, approximately three-quarters of young people with PTSD also meet the criteria for another psychiatric disorder, most commonly depression (Giaconia et al. 1995; Kilpatrick et al. 2003; Lewis et al. 2019; Rojas et al. 2017). Additionally, compared to unexposed young people, those exposed to trauma, and particularly those with PTSD, are more likely to perform poorly on tests of neuropsychological functioning (Malarbi et al. 2016), be out of education and employment, or harm themselves or others (Giaconia et al. 1995; Lewis et al. 2019). Crucially, if young people with PTSD do not receive treatment, their symptoms often persist: a meta-analysis of longitudinal studies found that children and adolescents with PTSD 6 months after a traumatic event were unlikely to recover without intervention (Hiller et al. 2016). Therefore, trauma-exposed young people are at increased risk of experiencing wide-ranging, co-occurring, impairing, and persistent mental illness and, thus, those affected require comprehensive assessment and treatment.

Despite this, few trauma-exposed young people use health services. In a recent population-based British study, only about one in ten trauma-exposed young people and one in five of those with PTSD had accessed mental health services in the past year (Lewis et al. 2019). Young people with trauma-related disorders from lower-income countries likely have even lower rates of service use, as is the case in adults (Koenen et al. 2017). This highlights that, throughout the world, trauma-exposed young people are likely to have high unmet mental health needs. Therefore, further research is needed to identify and address barriers to care provision for trauma-exposed young people with psychiatric disorders.

Mechanisms Underlying the Relationship Between Trauma and Mental Illness

Several mechanisms may help to explain why trauma is linked to mental illness. Three examples of potential mechanisms are outlined here. First, traumatic experiences may induce biological changes in the body's stress-sensitive systems, including the highly integrated nervous, endocrine, and immune systems. These effects may be long-lasting and detrimental, particularly if traumas occur during sensitive periods in childhood and adolescence when these systems are developing. In turn, abnormalities in these biological systems may lead to mental illness. This possibility is supported by animal experiments and human observational studies, though further research is needed to better understand these mechanisms and how they can be targeted to minimize the effects of childhood trauma (Danese and Lewis 2016; Danese and McEwen 2012).

Second, traumatic experiences may affect psychological processes, including cognitive appraisals, memory, and coping responses. For example, Ehlers and Clark's cognitive model proposes that trauma may result in excessively negative appraisals of the event, self, and future, such as "it was my fault," "I'm going mad," and "my life will never be the same again." Additionally, this model proposes that trauma may result in a disturbance of memory for the traumatic event, including disorganized and fragmented memories. Maladaptive cognitive and behavioral coping strategies intended to control threats, such as avoidance, may prevent change in these negative appraisals and memory disturbances. This may lead to a prolonged sense of serious and current threat, presenting as mental illness (Ehlers and Clark 2000; Meiser-Stedman 2002). These processes are targeted and altered in trauma-focused cognitive behavioral therapies, which has been found to mediate the positive effects of this treatment (Jensen et al. 2018; McLean et al. 2015; Meiser-Stedman et al. 2017; Pfeiffer et al. 2017).

Finally, in addition to these causal mechanisms, trauma may also be associated with mental illness through non-causal mechanisms. For example, preexisting characteristics, such as genetic or early environmental influences, might predispose some young people to experience both trauma and subsequent mental illness. Longitudinal research and twin studies have found evidence to support this possibility, indicating the need for further research to better understand and address the influence of pre-

trauma characteristics on trauma-related mental illness (Danese et al. 2017; Dinkler et al. 2017; Gilbertson et al. 2002).

Risk Factors for Trauma and Related Mental Illness

It is important to identify which children and adolescents are at greatest risk of experiencing trauma and developing related mental illness. Traumas do not tend to occur at random, but rather are more likely to be experienced by young people with certain child and family risk factors. For example, boys are more likely to experience traumas that involve physical assaults outside home and accidents, while girls are more likely to experience traumas that involve sexual assaults and network events (Breslau et al. 2004, 2006; Landolt et al. 2013; McLaughlin et al. 2013; Perkonigg et al. 2000). Additionally, young people with a history of psychopathology and those with a lower pre-trauma IQ are at increased risk of trauma exposure (Breslau et al. 2006; Copeland et al. 2007; McLaughlin et al. 2013; Perkonigg et al. 2000; Storr et al. 2007). Furthermore, those from disadvantaged or disrupted families are also more likely to experience trauma (Breslau et al. 2006; Copeland et al. 2007; Landolt et al. 2013; McLaughlin et al. 2013; Perkonigg et al. 2000).

Similarly, the onset of psychopathology is more common in trauma-exposed young people with certain child, family, and trauma-related risk factors. For example, girls, those who have a history of psychopathology, those with a lower pre-trauma IQ, and those who have experienced previous traumas, particularly victimization, are more likely to develop PTSD after trauma exposure (Breslau et al. 2006; Copeland et al. 2007; Giaconia et al. 1995; Landolt et al. 2013; Lewis et al. 2019; McLaughlin et al. 2013; Perkonigg et al. 2000; Storr et al. 2007). In addition, those from disadvantaged or disrupted families are at increased risk of PTSD following trauma (Breslau et al. 2006; Copeland et al. 2007; Landolt et al. 2013; Lewis et al. 2019; McLaughlin et al. 2013; Perkonigg et al. 2000). Importantly, those who have experienced direct interpersonal index traumas, particularly sexual assaults, are much more likely to develop PTSD than those exposed to other trauma types (Breslau et al. 2004; Copeland et al. 2007; Giaconia et al. 1995; Lewis et al. 2019; McLaughlin et al. 2013; Perkonigg et al. 2000). Furthermore, in line with psychological models mentioned above, young people's negative perceptions of and responses to the trauma (e.g., perceived life threat, thought suppression, and social withdrawal) are associated with the development of PTSD (Trickey et al. 2012). Also, parents' negative appraisals and avoidant coping following trauma are associated with PTSD onset in young people (Hiller et al. 2018).

This research suggests that groups of young people with certain risk factors are, on average, more likely to experience trauma or develop trauma-related psychopathology than other young people without these risk factors. However, there is significant within-group variability so that, for example, not all young people exposed to interpersonal trauma develop PTSD. As such, single risk factors cannot be used to accurately predict trauma-related psychopathology. Initial evidence

suggests that known risk factors can be combined through modern computational approaches to inform individualized PTSD risk prediction (Lewis et al. 2019). Further development of prediction modeling approaches is important to inform screening programs, thereby enabling support to be targeted to trauma-exposed young people with the greatest clinical needs.

Managing the Mental Health Burden of Trauma in Children and Adolescents

Initial Response to Trauma

Immediately following trauma exposure, the priority is to ensure that all involved are safe. In large-scale disasters, this may require a planned and coordinated response to ensure that resources such as healthcare and shelter are prioritized and provided to those in need and that families are reunited. After trauma exposure, it is normal for those exposed to experience some psychological symptoms, and young people and their families should be supported to understand this. To reduce the perception of ongoing threat, young people should spend time with family and friends and return to usual routines if possible, including attending school. To help young people understand the traumatic event and their responses to it, parents and other trusted adults should be available to talk with them. Within these discussions, young people should be given a truthful explanation about what happened, which is age-appropriate and clear. Adults should acknowledge that what happened is very serious, and also recognize that it is very rare. These conversations should be encouraged and should not be avoided. However, young people should not be forced to talk about the trauma if they do not feel able to. If psychological symptoms persist for more than a month, or are very severe, young people and their families should seek support from health professionals, such as primary care doctors, who will consider referring to child and adolescent mental health services. Resources with advice for parents and carers are provided at the end of this chapter (Danese et al. 2016).

Assessment of Trauma-Related Mental Illness

During the child and adolescent mental health service assessment, trauma-exposed young people should be asked sensitively but directly about the traumatic events they have experienced, their reactions to these events, and their current symptoms and impairment. Clinicians should not avoid discussing these topics, because these questions rarely cause substantial distress (Becker-Blease and Freyd 2006; Zajac et al. 2011). Additionally, recognition and normalization of the young person's experience can be therapeutically beneficial, and the information obtained will provide a more accurate understanding of the young person's presentation. Both young people and their parents or carers should be interviewed, as both provide

important and unique information (Meiser-Stedman et al. 2007; Shemesh et al. 2005; Stover et al. 2010). Additionally, clinicians should offer to interview young people separately to their parents or carers, as young people may hide aspects of their experience in front of their parents or carers for fear of upsetting them.

Because trauma-exposed young people can experience wide-ranging and co-occurring mental illness, accurately identifying their difficulties can be challenging. Therefore, the assessment should include a systematic review of possible trauma-related problems highlighted above, including broad psychopathology, impairment, and risk of harm. A comprehensive assessment will reduce the possibility of diagnostic overshadowing of some difficulties and ensure a more complete understanding of the young person's presentation. This understanding should lead to a formulation including diagnoses, developed with the young person and their parents or carers, which should be used to guide treatment recommendations.

To inform the assessment and enable monitoring of progress, clinicians may use assessment tools, including questionnaires and structured interviews. To support the assessment of wide-ranging psychopathology, it can be helpful to use questionnaires that cover broad symptoms. To assess post-traumatic stress symptoms, useful questionnaires include the Children's Revised Impact of Event Scale (CRIES; a brief PTSD screening tool) (Perrin et al. 2005) or the Child PTSD Symptom Scale (CPSS; a more detailed questionnaire used for PTSD assessment and outcome monitoring) (Foa et al. 2001, 2018; Nixon et al. 2013), both of which are completed by the young person and are suitable for those aged 8 years and over. To assess mood and anxiety symptoms, useful questionnaires include the Mood and Feelings Questionnaire (MFQ) (Angold et al. 1995), the Screen for Child Anxiety Related Disorders (SCARED) (Birmaher et al. 1997), and the Revised Child Anxiety and Depression Scale (RCADS) (Chorpita et al. 2000), which can be completed by the young person (from age eight) and their parent. To assess other symptoms, including behavioral symptoms, useful questionnaires include the Strengths and Difficulties Questionnaire (SDQ) (Goodman 2001) or the Development and Well-Being Assessment (DAWBA) (Goodman et al. 2000), which can be completed by the young person (from age 11), their parent, and their teacher. These questionnaires are widely used and have been found to demonstrate good reliability and validity. Many have been translated into multiple languages and are freely available; for example, the CRIES is available in several languages from the Children and War Foundation (http://www.childrenandwar.org). In most clinical settings, it would not be practical to undertake detailed structured interviews to cover all possible trauma-related psychopathology. However, structured interviews could be used to systematically assess symptoms identified as particular difficulties. For example, to assess PTSD diagnosis and symptom severity, the gold standard interview is the Clinician Administered PTSD Scale for Children and Adolescents (CAPS-CA) (Leigh et al. 2015; Nader et al. 1996; Pynoos et al. 2015). For structured interviews for other disorders, please see relevant chapters.

Treatment of Trauma-Related Mental Illness

Treatment recommendations for each trauma-exposed young person should be guided by their formulation and diagnoses identified at assessment. Because trauma-exposed young people can experience wide-ranging and co-occurring mental illness, developing treatment plans can be challenging. In general, young people with psychiatric disorders should be offered treatment based on recommendations for the disorders they experience. When a young person experiences comorbid disorders, if possible, these disorders should be treated in an integrated fashion. However, it may be necessary to prioritize focusing on the primary or most severe problems.

Trauma-focused treatments have mainly been considered for the treatment of PTSD. Psychological interventions that use cognitive and behavioral techniques to target PTSD symptoms have been found to be beneficial for young people with PTSD. These interventions include trauma-focused cognitive behavioral therapy (TF-CBT) (Cohen et al. 2004), cognitive therapy for PTSD (Smith et al. 2007), prolonged exposure (Foa et al. 2013), and narrative exposure therapy (Ruf et al. 2010). These therapies include some common components such as psychoeducation (providing information to young people and their families to help them to understand PTSD symptoms and the rationale for treatment); coping skills training (teaching methods to help manage emotions); gradual exposure to trauma memories and reminders (including supporting the young person to recount the trauma to develop a coherent narrative of the event and reducing avoidance); and cognitive restructuring (addressing misappraisals to develop a more realistic and updated meaning that is integrated into the trauma memory). These interventions aim to address cognitive and behavioral factors that contribute to the development and maintenance of PTSD. Several randomized-controlled trials conducted in multiple countries have found that these treatments improve PTSD and reduce PTSD symptoms (medium to large effects) in children and adolescents exposed to a range of traumatic events, compared to active control conditions, treatment as usual, or waitlist, and benefits remain at follow-up (Gillies et al. 2012; Gutermann et al. 2016; Mavranezouli et al. 2020; Morina et al. 2016; NICE 2018a; Smith et al. 2018). Very few studies included pre-school children, and therefore there is a need to adapt and evaluate treatments for this age group (Dalgleish et al. 2015; Scheeringa et al. 2011a). Additionally, there is limited but growing evidence that eye movement desensitization and reprocessing (EMDR), which involves recalling traumatic events whilst performing tasks that generate bilateral sensory stimulation, may be beneficial for young people with PTSD (Gillies et al. 2012; Gutermann et al. 2016; Mavranezouli et al. 2020; Morina et al. 2016; NICE 2018a; Smith et al. 2018). Finally, there is minimal evidence for pharmacological treatments for PTSD in young people (Cohen 2010; Danese 2018; NICE 2018b). Based on this evidence, the recently updated English National Institute for Health and Care Excellence (NICE) guideline for treating PTSD in children and adolescents recommends offering trauma-focused cognitive behavioral therapies as first-line treatment, considering EMDR only if there is no response to or engagement with trauma-focused cognitive

behavioral therapies, and recommends against routinely offering medication to treat PTSD (NICE 2018c).

Because young people with PTSD often experience co-occurring mental illness, it is important to consider whether trauma-focused psychological interventions also reduce other symptoms in young people with PTSD. Indeed, some studies have found that psychological interventions reduce depression and anxiety symptoms, and emotional and behavioral problems, in young people with PTSD, compared to treatment as usual or waitlist (Gillies et al. 2012; Gutermann et al. 2016; Morina et al. 2016; NICE 2018a). Furthermore, because young people with PTSD may experience complex PTSD, it is important to consider whether trauma-focused psychological interventions also reduce additional complex symptoms in young people with complex PTSD. Preliminary evidence from one study found that TF-CBT was associated with a pre-post reduction in additional complex symptoms in young people with complex PTSD (Sachser et al. 2017). Further research is needed to better understand which treatments are most effective for young people with PTSD and co-occurring or complex symptoms. Currently, expert recommendations for the treatment of complex PTSD symptoms in young people suggest an extended phase-based approach, including a longer initial stabilization phase focused on teaching coping skills (Cohen et al. 2012), in line with guidelines for treating complex PTSD in adults (Cloitre et al. 2012).

Given that few trauma-exposed young people with psychiatric disorders use mental health services and that resources are often limited, innovative approaches are needed to improve access to treatment. One possibility is computerized trauma-focused cognitive behavioral therapies, which have shown some promise in adults with PTSD as they have led to reduced symptoms while having a low cost of delivery (NICE 2018d). Research is needed to consider whether similar approaches could be suitable and effective for young people with trauma-related psychiatric disorders.

Prevention of Trauma-Related Mental Illness

There has been substantial interest in the potential for interventions delivered after trauma exposure and before the development of trauma-related psychiatric disorders to prevent the onset of these disorders. Although single-session debriefing has not been found to be beneficial in young people (Stallard et al. 2006; Zehnder et al. 2010), evidence suggests that other early psychological interventions, particularly CBT-based approaches, may be effective at reducing PTSD symptoms and preventing the onset of PTSD in trauma-exposed young people (Gillies et al. 2016; NICE 2018e). Additionally, evidence specifically from low-resource humanitarian settings suggests that psychosocial interventions may reduce PTSD symptoms in trauma-exposed young people living in these settings (Purgato et al. 2018). Further research is needed to develop and implement effective approaches to prevent the onset of trauma-related psychiatric disorders in young people.

Conclusions

Trauma exposure is common in children and adolescents worldwide, and those affected are at increased risk of wide-ranging, co-occurring, impairing, and persistent mental illness. Therefore, trauma is associated with a large global mental health burden in young people. Because trauma-exposed young people often have multiple difficulties, those presenting to mental health services require comprehensive assessment and treatment. However, they also struggle to access mental health services and so need support to overcome barriers to care provision. Further research is needed to develop strategies to better identify trauma-exposed young people at greatest risk of developing mental illness and to prevent the onset of disorders in these young people.

Resources

Advice for parents and carers on supporting children and adolescents after trauma:

- Danese A, Crombie T, Leigh E, et al. (2016) Trauma and coping. MindEd: https://mindedforfamilies.org.uk/Content/trauma_and_coping/#/id/59e1004665803a4b6b51446b

Introductory information on PTSD in children and adolescents:

- Danese, A, Smith, P (2018) Trauma. ACAMH: https://www.acamh.org/topic/trauma/
- Smith P, Leigh E, Richardson J, Danese A (2015) Single-Event Post-Traumatic Stress Disorder (PTSD). MindEd: https://www.minded.org.uk/Component/Details/448012
- Danese A, Leigh E, Richardson J, Smith P (2015) Complex Trauma and Post Traumatic Stress Disorder. MindEd: https://www.minded.org.uk/Component/Details/447972

Detailed practitioner reviews and guidelines for managing PTSD in children and adolescents:

- Smith P, Dalgleish T, Meiser-Stedman R (2018) Practitioner review: post-traumatic stress disorder and its treatment in children and adolescents. J Child Psychol Psychiatry. https://doi.org/10.1111/jcpp.12983
- Cohen JA (2010) Practice parameter for the assessment and treatment of children and adolescents with posttraumatic stress disorder. J Am Acad Child Adolesc Psychiatry 49:414–30. https://doi.org/10.1016/j.jaac.2009.12.020
- NICE (2018) Post-traumatic stress disorder: recommendations. National Institute for Health and Care Excellence (NICE): https://www.nice.org.uk/guidance/ng116/chapter/Recommendations

Review of tools to assess PTSD in children and adolescents:

- Leigh E, Yule W, Smith P (2015) Measurement issues: measurement of post-traumatic stress disorder in children and young people – lessons from research and practice. Child Adolesc Ment Health 21:124–35. https://doi.org/10.1111/camh.12124

Screening tool for PTSD symptoms in children and adolescents, the Children's Revised Impact of Event Scale (available in several languages):

- Children and War Foundation (accessed 2019) Children's Revised Impact of Event Scale. Children and War Foundation: https://www.childrenandwar.org/projectsresources/measures/

Cross-References

- ▶ Burden and Cost Associated with Childhood Bullying Victimization
- ▶ Child Abuse and Neglect in Multiproblem Families
- ▶ Family Issues in Child Mental Health
- ▶ Street Children, Exploitation, and Slavery

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Child Abuse and Neglect in Multiproblem Families

10

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Contents

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Abstract

Our understanding of child abuse and neglect took a big step with the recognition of the "Battered-Child Syndrome," while the United Nations and World Health Organisation have played key roles in improving its recognition internationally.

This chapter considers child abuse and neglect as it occurs in multiproblem families.

It seems likely that at least 1 in 4 children experience abuse and/or neglect before their 18th birthday, but complex barriers to detection result in only 1 in 5 affected children being recognized by child protection services.

Child abuse and neglect kill around 2 in 100,000 children per year. For those that survive, there is a dose-response relationship between exposure to abuse and neglect and big jumps in risk to developmental delay, damaging behaviors, diminished life chances, poor health, reduced life expectancy, and increased economic burden on society.

However, protective factors can mitigate the harmful effects of child abuse.

The author proposes an explanatory model for resilience, pathogenesis, and treatment. The availability of a "containing" parental figure, incremental and manageable doses of distress, and the development of symbolic thinking all help to build resilience. Abused and neglected children face "unbearable distress," which acts as a "pathogen" that first shuts down thinking and creates "mindlessness" and second opens the door to re-enactments or "repetitions" which potentially "infect" others with the same pathogen. Treatment involves helping children to establish emotional connections with a trustworthy adult, build a mind so that they are capable of sitting with and thinking about distress, and diverting the impulse for repetition away from action and towards thinking.

Prevention is important, and more work is needed to integrate mental health services into child protection efforts.

Keywords

Child · Abuse · Neglect · Multiproblem families · Detection · Treatment · Prevention

Introduction

It seems likely that child abuse and neglect has existed in all human communities throughout time, but recognition and definition of what constitutes maltreatment have evolved across world history.

Definitions of maltreatment are greatly affected by economic development. For instance, in eighteenth- and nineteenth-century Britain, the majority of children were unskilled workers. Child labor disappeared from Britain by the end of the nineteenth century and was replaced by compulsory education. But child labor persists in less developed parts of the world. In Sub-Saharan Africa child labor affects 29% of children aged 5–17 years (UNICEF 2018 p185) and millions of school-aged children are not in education (UNESCO eAtlas).

Similarly, the definition of maltreatment is affected by the status of women and girls. In contemporary China and the Indian Subcontinent, girls are more likely to be subjected to abortion and infanticide. Female Genital Mutilation continues to affect millions of girls in Sub-Saharan Africa, parts of the Middle East and Southeast Asia, and the diaspora of those communities (WHO 2008). Girl's access to education still lags significantly behind boys in Sub-Saharan Africa and Pakistan (UNESCO eAtlas). While in the "least developed countries" 40% of women are married by the age of 18 years and 12% by 15 years (UNICEF 2018 p185).

Child abuse and neglect first came to the attention of health professionals in the latter half of the twentieth century with the "discovery" of the "Battered-Child Syndrome." Nowadays, when we talk about child abuse and neglect, we include physical, emotional, and sexual abuse and physical and emotional neglect.

Ratification of the United Nations Convention on the Rights of the Child (UNCRC) in the 1990s, obligated governments to

> ". . .do all they can to ensure that children are protected from all forms of violence, abuse, neglect and bad treatment by their parents or anyone else who looks after them." (Article 19 UNICEF)

The World Health Organisation subsequently developed definitions of abuse and neglect (WHO 1999 p15).

Most national governments only began to define, record, and legislate for child abuse and neglect in the post UNCRC period (regular audits are carried out by the International Society for the Prevention of Child Abuse & Neglect, Dubowitz et al. 2018 p364–367). As a result, there is now considerable international agreement about what constitutes abuse and neglect especially concerning sexual abuse and severe physical punishment (ibid).

This chapter will consider child abuse and neglect as it occurs in multiproblem families.

Risk Factors

Very few parents consciously set out to harm their children. Child abuse and neglect occur because parents have problems, especially problems involving intimate partner abuse, substance misuse, and/or mental illness. Furthermore, these problems are

usually complicated by poverty. It seems likely that the greater the build-up of risk factors in the same parent and/or combination of parents, the greater the cumulative risk of child abuse and neglect. In other words, children living in multiproblem families are most at risk.

Being young is the most important child risk factor for abuse and neglect, with the fetus particularly susceptible. Girls are more vulnerable to sexual abuse and boys are slightly more likely to die from abuse and neglect (see below) otherwise there are no obvious differences based on gender.

Lifetime Prevalence

Stoltenborgh and colleagues have conducted a series of meta-analyses on the "lifetime prevalence" (occurring at any time from the ages of 0–18 years) of child abuse and neglect (as recounted once they are adults). The latest iteration (Prevoo et al. 2017) applied "best-evidence criteria" (1. random sample, 2. validated instrument, 3. response rate in the upper quartile, and 4. large enough sample size based on power analysis) to their previous meta-analyses. On this basis they calculated the lifetime prevalence of childhood abuse and neglect to be:

Sexual abuse 9.8% (Females only 13.8%)
Physical abuse 21.6%
Emotional abuse 34.0%
Emotional neglect 26.1%

Only one study of physical neglect met the "best-evidence criteria," but a previous meta-analysis using less rigorous criteria calculated the lifetime prevalence of childhood physical neglect to be 16.3%.

But what about the lifetime prevalence of suffering any form of child abuse and neglect or more than one form of abuse and neglect? For this, we turn to another type of research, of which the "ACE study" is the best known.

In the "Adverse Childhood Experiences study," over 17,000 middle-class Americans responded to a short questionnaire about exposure to 10 different kinds of "Adverse Childhood Experiences" or "ACEs" before the age of 18 years (see Felitti and Anda 2010 for an overview). The ACEs included 3 types of "abuse" (emotional, physical, and sexual), 2 types of "neglect" (emotional and physical), and 5 types of "household challenges" (mother treated violently, parental substance misuse, parental mental illness, loss of a parent, and a family member in prison). Each ACE was scored 1 if present or 0 if absent, which generated a potential "ACE score" from 0 to 10. A summary of the findings are set out in Tables 1 and 2.

The results show that combinations of ACEs are not unusual, with 41% of women and 34.1% of men having an ACE score of 2 or more, and 15.2% of women and 9.2% of men having an ACE score of 4 or more. These findings have since been replicated many times across the world.

Table 1 Prevalence of ACEs by category (Centers for Disease Control and Prevention 2016)

ACE category	Women Percent ($N = 9,367$) (%)	Men Percent ($N = 7,970$) (%)	Total Percent ($N = 17,337$) (%)
Abuse			
Emotional abuse	13.1	7.6	10.6
Physical abuse	27	29.9	28.3
Sexual abuse	24.7	16	20.7
Household challenges			
Mother treated violently	13.7	11.5	12.7
Household substance abuse	29.5	23.8	26.9
Household mental illness	23.3	14.8	19.4
Parental separation or divorce	24.5	21.8	23.3
Incarcerated household member	5.2	4.1	4.7
Neglect			
Emotional Neglect[a]	16.7	12.4	14.8
Physical Neglect[a]	9.2	10.7	9.9

[a]Collected during Wave 2 only ($N = 8,629$). Research papers that use Wave 1 and/or Wave 2 data may contain slightly different prevalence estimates

Table 2 ACE score prevalence (ibid)

Number of Adverse Childhood Experiences (ACE Score)	Women Percent ($N = 9,367$) (%)	Men Percent ($N = 7,970$) (%)	Total Percent ($N = 17,337$) (%)
0	34.5	38.0	36.1
1	24.5	27.9	26.0
2	15.5	16.4	15.9
3	10.3	8.5	9.5
4 or more	15.2	9.2	12.5

Research papers that use Wave 1 and/or Wave 2 data may contain slightly different prevalence estimates

It seems reasonable to conclude from this review that at least 1 in 4 children suffer some form of abuse and/or neglect before their 18th birthday.

Detection in Childhood

In comparison to the high rates of child abuse and neglect reported retrospectively by adults, it is rare for the statutory child protection agencies to identify abuse and neglect during childhood. For instance, the United Kingdom Department for Education collects statistics from each English local authority on the numbers of child protection interventions initiated in a year (Department for Education 2017). Table 3

Table 3 Children in England referred to, or receiving an intervention from, children's social care, which started during the year ending 31st March 2017

Category of intervention in increasing level of concern	Absolute number	Percentage of children under 18 years (%)
Children referred to children's social care (any "request for services to be provided by children's social care services") (DfE).	571,000	5
Children starting an episode of "need" ("in need of social care services") (DfE)	374,640	3
Children subject to "section 47 enquiries" (assessed further because they are "suspected of or likely to be suffering significant harm") (Children Act 1989)	167,670	1
Children on "child protection plans" (found to be "suffering or likely to suffer significant harm") (Children Act 1989)	66,180	0.6
Children subject to "care proceedings" (the local authority believes it is in the "best interests" of the child for the court to make a care or supervision order) (Children Act 1989)	24,094	0.1

Table 4 Children born in England in the financial year 2009–2010 referred to, or receiving an intervention from, children's social care before their 5th birthday

Category of intervention	Absolute number	Percentage of all children (%)
Children referred to children's social care	115,735	22.5
Children starting an episode of "need"	72,181	14.3
Children subject to "section 47 enquiries"	27,794	5.4
Children on "child protection plans"	17,823	3.5

shows that each year, only a very small proportion of children are identified as suffering or likely to be suffering "significant harm" (Children Act 1989).

International comparisons are limited by differences in definitions and the way the information is collected. However, surveys of child protection agencies in the USA, Canada, and the Netherlands produce broadly similar results.

Nevertheless, annual statistics greatly underestimate the number of children for whom abuse and/or neglect is detected at some point in their childhood. Bison and Martin (2016) used a Freedom of Information request to gather data from three-quarters of the local authorities in England. They targeted children born in the financial year 2009–2010, asking whether they had ever been referred to, or receiving intervention from children's social care services before their 5th birthday. Their findings are set out in Table 4. They show rates that are around 5 times the annual rates in Table 3, but still a long way short of what we would expect from the lifetime prevalence figures.

Cohort studies like this one are rare. The same research group (Bilson et al. 2015) found that 3.8% of children born in 1990 in the state of Western Australia had "substantiated" abuse or neglect by the time they reached their 18th birthday. A similar study in the state of South Australia found that 5% of children born in 1999

had "substantiated" abuse or neglect before their 10th birthday, while 1.8% had experienced "out of home care" (BetterStart 2017).

It seems reasonable to conclude from this review that only 1 in 5 children who suffer childhood abuse and neglect will be recognized by the child protection services before their 18th birthday.

Barriers to Detection

It is important to understand why children, families, and even professionals fail to identify child abuse and neglect at the time when it is occurring.

Younger children are limited by their powers of communication, while older children are reluctant to speak up because they blame themselves and/or feel ashamed and/or are too loyal and/or intimidated to complain about the people they love and depend on most. As we see later in the chap. 10, "Child Abuse and Neglect in Multiproblem Families" children are particularly likely to be missed.

Parents are deterred from seeking help because they are understandably ashamed and/or afraid of the scrutiny, penalties, and losses exacted by the criminal and family justice systems.

Professionals sometimes fail to appreciate the seriousness of the situation because they only have part of the picture. For example, a missed appointment for a 5-year-old with recurrent ear infections seems much more significant when set alongside his severe dental decay and poor school attendance. Alternatively, professionals fail to act on their concerns out of loyalty to the parent and/or misplaced fears about breaking confidentiality and/or fears about getting it wrong and/or perceptions that child protection services are overwhelmed and/or clumsy and/or unhelpful.

Child protection services are usually struggling with high caseloads, tight timescales, and complicated administrative procedures. Without proper support, social workers can become emotionally cut off, which leads to mistakes and/or problems with retention and recruitment of staff, which in turn disrupts relationships with children and families and puts additional pressure on the service. Furthermore, social workers and their managers are under enormous public and political pressure to prevent children from dying and this diverts resources away from detecting and responding to other types of suffering.

While press coverage can help to raise public awareness of child abuse and neglect, too often an appetite for titillation, outrage, and public humiliation drown out a thoughtful enquiry.

Outcomes

Death

In the United States deaths from child abuse and neglect have been running at 2.09–2.36 per 100,000 children per year over the last 5 years (U.S. Department of Health, and Human Services, Administration for Children and Families, Administration on

Children, Youth and Families, Children's Bureau 2018). Rates are consistently highest among younger children, with 20.63 deaths per 100,000 children under 1 year, and 70% of all deaths occurring in children under 3 years (figures for 2016 ibid). Nearly 60% of the children who died were boys, while 74.6% had suffered neglect and 44.2% had suffered physical abuse either exclusively or in combination with some other form of abuse or neglect (ibid). More than three-quarters (78.0%) of child fatalities involved parents acting alone, together, or with other individuals (ibid).

International comparisons are not straightforward because of variations in the way the information is collected but European rates tend to be lower than the USA and appear to be falling (WHO 2013 p11; WHO 2018 Fig. 5 p14).

Nonfatal Outcomes

Immediate outcomes of nonfatal child abuse and neglect include the physical and emotional injury. Long-term outcomes tend to be cumulative with a dose-response relationship between an individual's ACE score and the likelihood that they will suffer a variety of negative outcomes. First, developmental delay and damaging behaviors, second, diminished life chances, poor health, and reduced life expectancy, and third, an increased economic burden on society (Felitti and Anda 2010).

However, protective factors can mitigate the harmful effects of child abuse and neglect, so poor outcomes are not inevitable.

Developmental Delay

The poor developmental outcomes made more likely by child abuse and neglect include self-esteem, language, cognitive, play, and social development (Maguire et al. 2015).

Risky and Damaging Behavior

The damaging behaviors related to child abuse and neglect include over-eating, smoking, risky sexual behavior (Gilbert et al. 2009), poor parenting, perpetrating and being a victim of interpersonal violence (Butchart and Harvey 2006), drug and alcohol abuse (Anda et al. 2006; Felitti et al. 1998), suicide attempts (Felitti et al. 1998), and criminal behavior (Craig et al. 2017).

These behaviors damage not only the individual performing them but also other people, particularly intimate partners, and children. They tend to emerge in adolescence and early adulthood and the dose-effect can be huge, for example;

- Compared to children with no ACEs, children with ≥7 ACEs are 51 times more likely to attempt suicide during childhood or adolescence and 30 times more likely to attempt suicide as adults (Dube et al. 2001).
- Compared to boys with no ACEs, boys with ≥6 ACEs are 46 times more likely to become intravenous drug users (Felitti and Anda 2010).
- Compared to girls with no ACEs, girls with ≥7 ACEs are 10 times more likely to have a teenage pregnancy (Hillis et al. 2004).

Diminished Life Chances

The life chances diminished by child abuse and neglect include being more likely to have poor school attendance and performance and fail to finish school or attend university (Bellis et al. 2018), to be employed in menial or semi-skilled jobs, and to experience absenteeism, poor work performance, unemployment and financial difficulties (Gilbert et al. 2009), and finally to be arrested (Sethi et al. 2010) incarcerated (Roos et al. 2016), and homeless.

Poor Mental and Physical Health

The poor health outcomes made more likely by child abuse and neglect include attachment disorders and other emotional and behavioral disorders of childhood (Maguire et al. 2015; Oh et al. 2018). It also increased lifetime risk of anxiety, depression, posttraumatic stress disorder, eating disorders, and psychosis (Bebbington et al. 2011; Jonas et al. 2011), with 29.8% of all mental health disorders attributable to adverse childhood experiences (Kessler et al. 2010). Similarly, there is an increased lifetime risk to cancer, heart disease, stroke, diabetes, liver disease, lung disease (Felitti et al. 1998; Hughes et al. 2017). Compared to young adults with no ACEs young adults with ≥4 ACEs are 2–4 times more likely to have these physical health conditions (Sonu et al. 2019).

Reduced Life Expectancy

Compared to individuals with no ACEs, individuals with ≥6 ACEs have a lifespan which is 2 decades shorter (Brown et al. 2009).

Economic Burden

The economic burden created by child abuse and neglect includes massive productivity loss and demands on the health, education, and justice systems (Fang et al. 2012; Koball et al. 2019).

Resilience

We describe children as "resilient" when they achieve better developmental outcomes than predicted by their "dose" of child abuse and neglect.

A wide range of protective factors has been found to promote positive adaptation to and/or mitigate the injurious effects of child abuse and neglect. These include genes (Belsky and van IJzendoorn 2017), at least average intelligence, good self-esteem, internal locus of control, a capacity for emotional regulation, problem-solving skills, planning, communication skills, sociability (Werner 1989) access to a trusted adult, having someone to look up to, supportive childhood friends, supportive spouse, being treated fairly, being given opportunities to use your abilities, and a belief system by which to live (Bellis et al. 2018).

Explanatory Models for Resilience, Pathogenesis, and Treatment

Explanatory models for resilience and pathogenesis help us make sense of the observable phenomena and provide clues for how to intervene. Most current research in this area is looking at epigenetics and brain development. However, these efforts are still at a preliminary stage, so I am going to discuss a psychoanalytically informed model. The challenge has been to create something complex enough to cover the facts but simple enough to be easy to remember and use.

Acquisition of Resilience through "Containing," "Inoculation," and Symbolic Thinking

Distressing experiences are an unavoidable part of life, but babies start with very little capacity to tolerate distress. So parents have to protect them while at the same time promoting the development of "resilience."

In well-functioning families distressed babies seek help automatically, and parents respond not only by empathizing, but also by letting babies know that they can tolerate and make sense of the baby's experience. The psychoanalyst Wilfred Bion described these helpful intersubjective conversations as "containing." In psychoanalytic terms, the baby "projects" unbearable experiences into the mother, then "introjects" a "digestible" version of his experiences, which have been made bearable through the working of the mother's mind. The baby gets relief from feeling, first understood, and second that the world is a bit more bearable and understandable. At the same time, the baby introjects a "good internal object" capable of tolerating and making sense of his world.

Young babies get rid of distress through projection and/or actions such as tantrums and/or simply giving up. But slightly older babies are more robust, a combination of containing, maturation, and a natural urge for autonomy embolden older babies to "sit with" some degree of physical and/or mental distress.

Waddell (1998 p31-2) gives the charming example of a young child who is struggling with a puzzle. The child is already anxious and frustrated and on the verge of giving up. Sensing her child's distress the mother is containing, but she also encourages the child to keep going and provides a little hint. "By thus holding the emotional state and neither acting prematurely nor excessively prolonging the frustration, this mother enables her child to 'see' what had been impossible only a few moments earlier." The child solves the puzzle and Waddell concludes by describing the child's sense of accomplishment and feeling of being understood.

I think it is important to add that Waddell's child is learning from experience that distress can be relieved by persevering in the face of adversity. This ability to sit with distress long enough to "see" a solution is how resilience begins. This foundation will be greatly strengthened by the mother encouraging the child to sit with countless everyday discomforts, frustrations, disappointments, failures, and losses. In the "school of soft knocks," each "dose" of distress is carefully judged to extend but not over-reach the child's tolerance. Through this process of distress "inoculation," the child not only becomes more resilient but also accepts adversity as part of life.

Resilience is further enhanced by the emergence of symbolic thinking which allows the child to represent and transform distress through words, play, and humor. Symbolic thinking takes the sting out of distress, gives it meaning, and promotes creativity and communication, all of which assist problem solving and learning from experience.

Pathogens Model

Children growing up in abusive and neglectful multiproblem families are unlikely to experience "good enough" containing, instead they feel utterly alone. Nor are they given a chance to learn that distress can be sat with and relieved by perseverance, and in the absence of an inoculation program everyday adversities will feel intolerable. They remain stuck at a very early stage of development where distress has to be jettisoned through projection and/or actions such as tantrums and/or simply giving up.

At the same time, these highly vulnerable children are being exposed to levels of distress that would test even the most resilient child. Abuse and neglect leave children with terrible memories, excruciating feelings of helplessness, terror, rage, and humiliation, and distorted beliefs that they are unlovable deserve to be mistreated and that no one can be trusted and/or respected. When abuse and neglect are repetitive and sustained; "undigestible" memories, feelings, and beliefs accumulate to a point where they become unbearable. I contend that beyond a certain "dose" these "unbearable distresses" become powerful "pathogens" which have a tendency to persist and not only damage and disable the individual, but also infect others. I will go on to suggest these pathogens act in two ways: first causing "mindlessness" and second triggering "repetitions."

Mindlessness

In the face of large doses of pathogens, children shut down their minds. While this provides enormous relief, it also creates a disabling and ultimately dangerous state of "mindlessness," where children no longer struggle to have their needs met. Mindlessness is a form of giving up, a turning away from life and development, and part of what psychoanalysts call the "death instinct."

> Take a 6-year-old girl whose language is delayed, her play lacks imagination, and she fails to seek comfort when distressed. When scolded by her mother she appears to fall asleep. These deficits mean she is behind educationally, on the periphery with her peers and less able to make her predicament known to potentially protective adults such as relatives, teachers, and social workers. What she needs is one or more people who can connect with just how helpless and hopeless she is feeling, help her sit with ordinary distress and gradually build her tolerance through inoculation. Following these foundations, she will be ready to start reworking her previously unbearable distresses through stories, play, and humor. The outcomes will be better if a parent or carer can be co-opted into the therapeutic work.

Unfortunately, mindless children rarely get the right help. At the most basic level, they are easily overlooked because they do not complain or display disruptive behavior. The uncomplaining child may even be wrongly labeled as resilient. More fundamentally, child protection services are not designed to detect and treat pathogens. Their job is to detect abuse and neglect and stop it recurring, if necessary by removing children from their families. But these interventions do not alter the long-term outcomes in cases, like this one, where pathogens are already active. For instance, one systematic review showed that removing children from multiproblem families makes no appreciable difference to their long-term outcomes (WHO 2013 p72–73). Furthermore, a quarter of women who have children removed by the court return within a few years to have another child removed for the same reasons (Broadhurst et al. 2015).

Mindlessness is more typical of preadolescent children, with repetitions coming into their own after puberty.

Repetitions

Repetitions are a category of action where distress gets acted out. Actions, such as swallowing excessive quantities of food or alcohol, are straightforward attempts to self-comfort. Such actions can lead to repetitions because the opportunity to feel understood by another and/or to sit with distress and build and maintain resilience is not pursued. So, in the absence of more adaptive strategies, the action has to be repeated over and over.

There are also more complex actions, which result in unbearable distresses being passed on to others through a combination of projection and acting out. An everyday example is bullying, where the bully evacuates feelings of helplessness, fear, and humiliation into his victim. The bully gets momentary relief, but as with the previous example there is no opportunity for development, so bullying is likely to be repeated.

Furthermore, the same unbearable distress get acted out, again and again, adding to the tendency for repetition.

> For example, a boy who has been known to the child protection services all his life starts to go missing and get mixed up with gangs after he turns 14. His chronically self-absorbed and rejecting mother changes her door locks and refuses to speak to him. In foster care, his acting out increases, and each time he goes missing his carer is made to feel helpless, frightened, and hopeless. The foster carer's feelings are a repetition of what the boy experienced growing up with his mother, and by swapping roles the boy feels a godlike power, control, and triumph.

This is a situation which is very easy to make worse and much more difficult to make better. It will be very tempting for the foster carer to feel attacked and withdraw emotionally and/or reject the boy. Furthermore, there is a modest chance that the boy's repetitions will cause his or someone else's death, which creates a tremendous pressure on the professional network to respond with their own show of power and control. In other words, professionals could easily be drawn into repeating the mother's behavior, at a huge emotional and financial cost.

If instead, we wanted the foster carer to tolerate the boy's unbearable distress and begin to make sense of them, she is going to need a lot of support. By containing the boy, his carer, and the wider professional network, the repetitions become an opportunity for communication, understanding, and growth.

Infectious Phase

Finally, when older children and adults repeatedly expose intimate partners and children to repetitions, they pass on the pathogens. In other words, they are "infectious."

> For example, a man who as a young boy was abandoned while his mother went out on the town. She would return in the early hours to tearfully tell him about drinking, fighting, and having sex with strangers. He grew up to have a series of relationships with vulnerable single mothers. As he systematically made these women feel helpless and inadequate it was as if he were telling his mother "look what you did to me." With the right help, he might have been able to think these terrible thoughts rather than endlessly act them out. As it was he passed his pathogens on to many women and their children.

Treatment

Introduction

I'm going to suggest that most treatments for child abuse and neglect share three common elements: first establishing an emotional connection with a trustworthy adult, second, building a mind capable of sitting with and thinking about distress, and third, diverting repetition away from the action and towards thinking.

Furthermore, in my experience, there is value in working with more than one generation. First, because abuse and neglect have often been a feature of the parent's childhoods and their lack of treatment is part of why they are passing their pathogens on to their children. Second, because by co-opting parents and/or carers into the therapeutic team we can increase children's exposure to the therapeutic elements.

Emotional Connection

Establishing an emotional connection with abused and neglected children and/or parents is immensely difficult because they are emotionally disconnected from themselves and/or find it difficult to trust anyone. Patience and persistence are required and connecting with the unbearable distresses should be postponed to later in the recovery process. It is much safer to establish connections around areas of strength. The important thing is that the child and/or parent feels they are not alone.

A range of parent-child psychotherapies has been shown to promote sensitively attuned interaction and improve child outcomes in multiproblem families. There are brief treatments, more prolonged and complex interventions, and tiered approaches (Valentino 2017).

A subset of effective parent-child psychotherapies uses video feedback (Fukkink 2008), an example of which is Video Interaction Guidance or VIG (Kennedy et al. 2017). The VIG therapist captures 10–20 minutes of video where parents and children at their most relaxed and animated. Later the therapist reviews the film looking for 2 or 3 short clips where parents show attunement. The therapist and parent then watch each clip multiple times, discuss what the parent was thinking and feeling, and try to imagine what was in the child's mind. Most parents get tremendous pleasure and satisfaction from seeing themselves connecting emotionally with their children and sharing these moments with a therapist. When things go well, parents become more aware, confident, and able to make these connections.

A typical VIG treatment would be 6–10 cycles of filming and review, while the response to 2–3 cycles can be used as an assessment tool.

Building a Mind

Building a mind capable of sitting with and thinking about distress requires a good enough connection with a containing adult and a stop to the damaging repetitions (see below). It is usually necessary to start the inoculation program at a very low level of distress. The confidence grows whenever children and/or parents feel better after persevering in the face of adversity. The aim is to build a capacity to tolerate distress and think symbolically to a point where they are readier to accept the world as it is and begin to rework the previously unbearable distress.

In psychoanalytically informed psychotherapy, the therapist works directly with the abused and neglected patient (Music 2019). In other approaches, the therapist works with young children and foster carers (Wakelyn 2020), or with children and the wider professional network (Mawson 1994).

Mindfulness, mentalization-based treatments, and narrative exposure therapy have been shown to increase function and reduce symptoms in traumatized adults. It seems likely they can be adapted to help abused and neglected children and parents.

Diverting the Repetitions

The third element is diverting repetition away from action and towards thinking.

The first step is to work on cessation of destructive repetitions such as substance misuse, risky sexual behavior, intimate partner abuse, and/or child abuse and neglect, and this needs to start as soon as possible in the intervention sequence. The work requires a compassionate, nonjudgmental outlook and an emphasis on openness and honesty. Motivational interviewing is a helpful framework for understanding the barriers to change. Psychoeducation, working in groups, and modest measurable goals all help to ground the work and challenge attempts to retreat from reality. There needs to be a lot of encouragement when progress has been evidenced.

Cessation of destructive repetitions accelerates the whole treatment proceed, for example, it is much easier to establish emotional connections and building a mind if you are sober and have stopped beating your partner. Furthermore, it allows the urge for repetition to be thought about rather than acted on or acted on only briefly and then thought about.

Cognitive behavioral therapy and cognitive analytic therapy provide frameworks for thinking about destructive repetitive thoughts and actions, while Eye Movement Desensitization and Reprocessing address intrusive repetitive memories.

But some multiproblem families require a more comprehensive approach. The Family Drug and Alcohol Court or FDAC is a problem-solving approach to family justice, where families work intensively with a specially trained judge and therapeutic team. The model gives parents the best possible chance to overcome their problems while testing whether they can meet their children's needs in a timescale compatible with those needs. Treatment focuses on helping parents stop the destructive repetitions, treating any underlying trauma, improving parent child relationships using VIG, and promoting a "child centered lifestyle." Setbacks are an inevitable part of the process, but by the later stages FDAC looks for evidence of communicating and thinking rather than acting out.

Preliminary evidence suggests that FDAC delivers a better experience of justice for families and professionals, significantly better outcomes for children and families, and better use of public money (Harwin et al. 2018; Reeder and Whitehead 2016).

Prevention

Given the devastating effects of child abuse and neglect and the challenges with detection and treatment, prevention needs to be part of every country's child protection strategy (WHO 2013; 2018).

It seems likely we can prevent abuse and neglect by supporting multiproblem families to address problems with substance misuse, intimate partner abuse, mental illness, and poverty while improving their parenting skills.

There is some evidence that restricting access to alcohol reduces child abuse and neglect and violence more generally including intimate partner abuse (WHO 2010).

The "Period of PURPLE Crying" program teaches parents to expect and tolerate crying in young babies and has been linked to fewer infant deaths from Abusive Head Trauma when implementing communities are compared to baseline rates and neighboring communities (WHO 2013).

Home-visiting programs involve specially trained nurses providing parenting, health, and social support to "at risk" new mothers in their own homes. Two such programs, the "Nurse Family Partnership" in the United States and "Early Start" program in New Zealand have been shown to reduce the occurrence of child abuse and neglect (WHO 2013).

The "Safe Environment for Every Kid" (SEEK) program trains inner-city primary care and pediatric health professionals to identify and address parental risk factors for child maltreatment and has been found to reduce the occurrence of child abuse and neglect (ibid).

The Chicago Child-Parent Centers programs provide preschool education, parenting programs and family support to families living in deprived communities and have been shown to reduce lifetime occurrence of child abuse and neglect (ibid).

Parenting programs aim to improve parents' knowledge of child development, increase their parenting skills, and strengthen relationships with their children. The research suggests that while it is unlikely that parenting programs prevent child abuse and neglect in the first instance, but they produce modest reductions in the recurrence of physical abuse (Vlahovicova et al. 2017).

Conclusions

Awareness of child abuse and neglect is growing and benefits from international guidelines (WHO), governmental obligations (UNCRC), and regular audits (ISPCAN).

The scale of the problem is immense affecting a quarter of the child population. Moreover, the consequences are devastating, with a dose-response relationship between exposure to abuse and neglect and big jumps in risk to developmental delay, damaging behaviors, diminished life chances, poor health, reduced life expectancy, and increased economic burden on society.

Given the scale and gravity of the problem, detection rates are inadequate, with only 20% of cases being identified in childhood. The barriers to detection are

complex. We need to consider whether a less punitive approach would allow us to reach more children and we also need to raise awareness about "mindless" children. In developed countries death rates are low, yet child protection services are under enormous pressure to prevent children from dying and this diverts resources away from detecting and responding to other types of suffering. More thought is needed on how to get the best return on our investment.

Interventions need to be informed by a deeper understanding of the problem. While we must try to stop abuse and neglect, stopping it is not enough. When abuse and neglect is sustained, distress accumulates to a point where it becomes unbearable. Beyond a certain "dose," this "unbearable distress" become powerful "pathogens" capable of generating "mindlessness" and "repetitions," and ultimately "infecting" others. I advocate an ambitious approach to treatment that includes establishing emotional connections, building a mind capable of sitting with and thinking about distress, and diverting repetition away from the action and towards thinking. I believe real breakthroughs are possible, but we must have mental health professionals working in the engine room of child protection system.

Finally, prevention needs to be part of every country's child protection strategy.

Cross-References

- ▶ Parents with Psychiatric Conditions
- ▶ Trauma-Related Mental Illness in Children and Adolescents

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Street Children, Exploitation, and Slavery

11

Daniel Fekadu and Anula Nikapota

Contents

Abstract

This chapter is about childhood adversities and the problems and mental health of street children, child laborers, and child slaves and soldiers. It describes intolerable and worse distressing aspects of child deprivation that are complex, social, cultural, political, and economical in nature; that often overlap as the different categories or types can be mutually inclusive and difficult to differentiate; or they are hard to understand the constraints of the constructs thereof; are controversial in terms of their impact on child development and mental health; and more importantly, to anybody they stimulate evoke variable responses and a range of thresholds of emotive issues such as degrees of acceptability, child rights, ethics,

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and morals (ILO 2015; Geneva 2015; Liebel 2015; Munthali 2018; Myers 2001). These constructs in this chapter referring to street children, child laborers, child slaves, and soldiers are dealt with separately in more detail. Finally, this chapter cites some examples of what works in improving the lives of child laborers, street children, and child slaves and soldiers.

Keywords

Street children · Child labor · Child slavery · Child soldier · Health · Mental disorder

Introduction

This chapter is about childhood adversities and the problems and mental health of street children, child laborers, child slaves and soldiers. It describes intolerable and distressing aspects of child deprivation that are complex, social, cultural, political, and economical in nature; that often overlap as the different categories or types can be mutually inclusive and difficult to differentiate; are controversial in terms of their impact on child development and mental health; and more importantly, to any reader they evoke variable responses and a range of thresholds of emotive issues such as degrees of acceptability, child rights, ethics, and morals (ILO 2015; Liebel 2015; Munthali 2018; Myers 2001). The constructs in this chapter referring to street children, child laborers, child slaves and soldiers are dealt with separately in more detail. Finally, this chapter cites some examples of what works in improving the lives of child laborers, street children, and child slaves and soldiers.

Street Children

The term *street children* refers to those children who spend their time daily working on the streets instead of living with their family and attending compulsory school (Aptekar 1994; Lalor 1999; Williams 1993). Street children are visible in slums but also in the highstreets, near busy traffic lights, and in central market areas of towns and cities all over the world (Cosgrove 1990). Due to a lack of consensus among researchers, governmental and nongovernmental intervention agencies, as well as policy makers, the description of street children has been incorrectly based their visibility in the streets only. UNICEF (United Nations Children's Fund) introduced a helpful and simple classification of street children, based on the degree of family ties, the extent of time and activity spent in the streets. The following three groups could be differentiated (Harfst 2013; Williams 1993). Children *on* the street, the largest group, are those who spend the majority of their time selling small items or working as laborers in the streets (e.g., peddlers, drug-handlers, and retailers), who have a home to go to at night, and who contribute financially to their families. The second group, children *of* the street are children who actually live in the streets, who are runaways and alienated from their poor families, who lack full parental supervision,

and have less family ties, but come home every so often as they wish. The smallest group are the children *in* the street are associated with beggars, child prostitutes, drug users and handlers, and pickpockets, who have no other option as to live and work in the streets all the time, some with their families who also live in the streets or else without their families because they are abandoned or orphaned.

Street children are inextricably linked to the wide gaps of wealth distribution and the uncontrolled expansion of towns and cities (Williams 1993). Historically, they emerged gradually with urbanization, breaking up of families and society, and the spread of poverty, as beautifully described by a number of Dickensian characters (Dutta 2014). They could be indigenous to the towns, cities, and suburbs, but also be part of internally displaced people fleeing away from regional or ethnic conflicts, due to economic reasons, or migrants in any country.

Accurate census of street children is not simple to obtain, but multiple estimates from surveys in different countries and international organizations indicate that there are about 100 million street children globally, with the majority in low and middle income countries (ILO 2017).

Even in high-income countries, such as the UK, where primary and secondary education are compulsory, and a range of government policies and laws with a priority to protect children through Social Services are in place, there are an estimated 120,000 homeless children, most of whom are in the streets at any given time, therefore challenging the assumption that street children are endemic to developing countries only (ILO 2017).

Many view street children are disadvantaged as they are prone to abuse, exploitation, poor mental and physical health, and cannot achieve their potentials compared to non-street children. Others argue that the evidence to support the above argument is very limited, and that child labor, or being a street child, actually helps children individuate early, be more resilient, and learn life skills much earlier. This leads to independence, autonomy, responsibility, and entrepreneurship of these children, who financially contribute to their families and eventually become responsible citizens (Aptekar 1994; Glauser 2015; ILO 2015).

Epidemiological studies on the prevalence of mental health disorders among street children are hampered by the inability to estimate the size of this population. By their very nature, this group is characterized by instability and constant movement from place to place, which makes it a difficult target for epidemiological studies (Harfst 2013; Parveen 2014). That aside, at a conservative estimate of 10–21%, the prevalence of mental health problems in street children is higher than in non-street children (Aptekar and CianoFederoff 1999; Ayaya and Esamai 2001; Fekadu and Alem 2001; Fekadu et al. 2006; Harfst 2013; Lalor 1999). Street children are also more vulnerable to all forms of abuse, bullying, and exploitation.

Successful programs for improving the lives of street children include microfinancing, orphanages, support to access education in Ethiopia, small business networks in street food restaurant stalls, health access, and handicraft enterprises in Cambodia (Alem and Laha 2016; Riverbank et al. 2018). The impact of such innovative and locally applicable interventions on changing the future of street children is significant, especially in reducing the risks of developing different

forms of mental health disorders such as substance use and avoiding vulnerability that leads to sexual exploitation, getting trapped in the complex underground scenes of gangs, illicit drug-dealing, and other types of crimes.

Child Slavery

Child Slavery is the bondage, subjugation, and exploitation of children for their labor or body. It has a wide range and can take many forms from unpaid and harsh labor to using child slaves for online markets of pornography images and selling them for sex with adults or forced recruitment as child soldiers (McKinney et al. 2015; O'Brien 2014).

The hostage news headlines of the 276 school girls in West Africa and the international outrage and campaigns to get them back to their loving families are recent examples of the gravity of this problem about child slavery on a larger scale. The impact on the mental health of the survivors is difficult to quantify and ranges from depression and post-traumatic stress disorder (PTSD) to psychosis (Miller et al. 2016; Moore et al. 2017). The scars these child slaves bear can be lifelong and may continue into the next generation as a result of the negative effects on their parenting practices and the attachment with their children.

The ILO (International Labour Organization) estimates that 4.3 million children out of the 152 million child laborers are in forced labor, and 18% of the total forced labor globally, including one million in commercial sexual exploitation (ILO 2017). Even in the UK, one of the top developed countries, 40% of an estimated 10,000–13,000 modern slaves are minors, mainly from Albania, Vietnam, and the UK (Bales et al. 2015; Craig 2017; Nichol and Skipper 2013). Child slaves in the UK and other countries are often found in underground and illegal consumer businesses such as restaurants, drug dealing, or commercial sex work (Hounmenou 2016).

Successful programs in regulating or helping child slaves include the international campaigns led by the former First Lady of the USA, Michelle Obama, to get the school girls released and returned back to their families such as #BringBackOurGirls. Other programs in Europe, Asia, and Latin America include random checks of businesses by local council authorities and police to enforce compliance with the law, as well as education programs that are aimed at the identification, intervention, and referral in case of suspected child sex-trafficking (Miller et al. 2016; Moore et al. 2017; Stoklosa et al. 2017).

Child Soldiers

Child Soldiers are under 18-year-old children in war zones that are groomed and exploited to fight, cook, spy, run messages, or used for sex. The extent of exposure and witnessing violence, atrocities, and cruelty is difficult to quantify, and understandably, the impact of these on child development and mental health is extensive. One familiar and main controversial ethical and legal matter is the child victim and

soldier who continues to be an adult perpetrator of violence against humanity, and later asks for forgiveness in national or international war crime trials in Hague. It is a well-known pattern that the abused is likely to become an abuser in adult life. According to the 2018 UN Children and Armed Conflict Report, there are at least 14 countries implicated in the extensive exploitation of child soldiers and around 54 countries that in one way or another use child soldiers (Child Soldiers World Index (https://childsoldiersworldindex.org/).

Child soldiers are considered cheap and efficient armed forces because they are free and easy to recruit, cheap to feed and maintained with limited favors, quick to follow orders, and easy to indoctrinate. They are also forcibly recruited as volunteers to fight, and directly targeted to sensationalize perceived and politically motivated injustices in armed conflicts for political gains, or used as covers to apportion blame of cruelty or savagery on the assailants. Child soldiers are specifically targeted to create terror and subdue local populations through creating a sense of incompetence and cowardice on the opposing forces (Poulatova 2013). Child soldiers are therefore easy victims of collateral civilian deaths and injuries with numbers well-known to be much higher than the number of deaths and injuries of adult combatants. Child soldiers are exposed to traumatic experiences and diversion from their normal child development, to violation or undermining of their basic rights to have education and live with their families. As a consequence, they show high rates of alcohol and drug use, glorification of cruelty, antisocial behavior, and violence towards others (Betancourt et al. 2015; Poulatova 2013).

Good examples of interventions for child soldiers, in addition to national and international courts of justice, truth and reconciliation, victim empathy, and rehabilitation, include evidence-based behavioral interventions in Sierra Leone (Betancourt et al. 2014; Lenz and Hollenbaugh 2015) for emotional regulation and PTSD using elements of Cognitive Behavioral Therapy (CBT).

Child Labor

Child labor is the exploitation of children under minimum or no pay and subjecting them to poor working conditions and no employment rights.

The ILO (International Labour Organization) estimates there are 152 million child laborers globally, of which 73 million are in hazardous work (ILO 2017). These are mainly found in low and middle-income countries of Africa, Asia, and South America (Khakshour et al. 2015).

According to the ILO Convention 138 (Minimum Age Convention 1973) and ILO Convention 1999 (Worst Forms of Child Labour Convention 1999), children under 16 years of age should be in full-time education, and children under 14 years of age should not be involved in paid jobs. In reality, in Western countries, let alone in poor countries, it is not uncommon to notice children as young as 12 years in some form of child labor, either publicly or in hidden form, such as child prostitution or domestic labor (Abdullahi et al. 2016; Bhukuth 2008; Gamlin et al. 2015; Hadi 2000; ILO 1973, 1999; McKinney et al. 2015; Robson 2004).

Successful examples of improving the lives of child laborers or enforcement of the restricting laws include hotels and consumer establishments in Nepal declaring that there is no child labor on their site by affixing a notice in Nepalese and English visible at the main entrance, the training and apprenticeship opportunities tied with compulsory education in South America and Africa, or the legal frameworks advocated by the barefoot lawyers in India (Agarwal 2004).

Analysis of health indicator data from a global representative panel of 83 developing countries showed a significant correlation between child labor and adolescent mortality, population nutrition level, and presence of infectious diseases (Roggero et al. 2007). A cross-sectional study in rural Ethiopia among 289 child laborers, reported a prevalence rate of abuse of more than 83.3% in total, with emotional abuse of 49.6%, physical abuse of 27.2%, sexual abuse of 2.2%, and work related injuries of 31.7% (in 1.8% resulting in disabilities) and 14.2% of school dropouts (Aberra et al. 2003). In Nigeria, a study among child laborers reported 55% school dropout, and 68.4% left home due to parental inability to meet their needs and expectations (Aderinto 2000). This paper further examined the role of family factors that increased the vulnerability of these children, such as polygamy, large family size, poor education status, and unskilled occupations (Aderinto 2000). A study of 8–15-year-old children in Ibadan, Nigeria, comparing 223 child laborers with 230 controls did not find a difference in the pattern of diseases reported, such as fever, visual problems, muscle or joint pain, although 33% of the child laborers were found to be underweight and 34% had stunted growth (Omokhodion and Omokhodion 2004). Another study comparing 400 street child laborers with 200 controls in urban Nigeria demonstrated that the cases were more anemic and malnourished than the controls (Asogwa 1986).

A study from Ankara, Turkey, comparing 532 child laborers aged 13–18 years, with 451 controls, showed low indices of physical growth such as height and weight for age among the child laborers (Duyar and Ozener 2005). A qualitative study of a convenience sample of 41 children from Jordan showed various risk exposures, such as inhaling chemicals and physical injuries (Gharaibeh and Hoeman 2003). A cross-sectional survey comparing 78 child laborer boys aged 10–17 years with 60 nonlaborers in Lebanon showed that the cases had poorer physical health as noted by higher self-reports of skin, ear, and eye complaints; more changes in skin and nails; and high-lead concentration (Nuwayhid et al. 2005). A cross-sectional study of 150 child laborers in Calcutta, India, reported that 88% had a range of morbidities comprising of anemia in 49.3%, lice infestation in 48%, abdominal worms in 20.6%, and dental caries in 28.6% (Mallik et al. 2004). Most of the 100 child laborers studied in Andhra Pradesh, India, described symptoms such as headaches, dizziness, and skin and eye irritation after pesticides spraying in a cottonseed production (Mathews et al. 2003). A cross-sectional study of 73 child laborers in Dharavi, India, found no evidence of malnutrition, but anemia in 10%, vitamin deficiency in 10% and work-related illness in 7%. Of this sample, 16% were able to continue school. Two-third of the cases were hotel boys who were entirely dependent on their employers for food (Mehta et al. 1985).

A study based on a database of 289,000 children between the ages of 10–15 years old obtained through three survey waves in Indonesia showed child labor was negatively associated with health status (Wolff and Maliki 2008). Health status was measured through self-reports of pain, cough, fever, diarrhea, breathing difficulties, and whether these symptoms were persistent, had impact on work or schooling, and required medical intervention. About 4.7–8.4% of the sample reported fever, and 6.6–7.4% had other health problems in the last month of the interview. In a cross-sectional survey of 3269 children aged 10–17 in Pelotas, Brazil, domestic laborers had more muscle and joint pain and back pain compared to controls (Fassa et al. 2000). According to a cross-sectional household survey of 4940 people between 18 and 65 years of age covering urban and rural areas of Brazil, self-reported poor health in adulthood was associated with earlier history of starting work as children (Kassouf et al. 2001).

There is a scarcity of studies with regard to mental health of child laborers (Gamlin et al. 2015; ILO 2015; Sturrock and Hodes 2016). A cross-sectional study of 3139 children and adolescents in Pelotas, Brazil, using the Child Behavior Checklist (CBCL) showed that child laborers were 2.7 times more likely to have behavioral problems compared with controls (Benvegnú et al. 2005). This was marked among domestic laborers and those with early onset of work. A cross-sectional population study using the Diagnostic Interview for Children and Adolescents (DICA) compared 528 child laborers with 472 controls in Ethiopia and reported a prevalence of psychiatric disorders of 20.1% among the cases compared with 12.5% in the control group (Fekadu et al. 2006). In contrast, a study from Lebanon, comparing 78 child laborers with 50 controls did not report differences on measures of anxiety, self-esteem, and hopelessness (Nuwayhid et al. 2005).

Conclusion

In summary, this chapter attempted to address the impact of the worst forms of child labor and exploitation, such as street children, child slaves and soldiers on child development and mental health, as well as examples of good interventions ranging from awareness raising and law enforcement to rehabilitation and education. In addition to poverty alleviation, the future role of all mental health professionals and educators in meeting the challenges specific to childhood adversities globally might be in the development of school mental health programs, and in local and national labor programs to break the cycle that perpetuates these adversities (Kutcher et al. 2015).

Cross-References

- ▶ Child Abuse and Neglect in Multiproblem Families
- ▶ Education in Mental Health
- ▶ Mental Health in Schools

- ▶ Mental Health Strategy and Policy
- ▶ Movement of Peoples
- ▶ Screening Methods and When to Use Them
- ▶ Trends in Child and Adolescent Mental Health Prevalence, Outcomes, and Inequalities

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Family Issues in Child Mental Health

12

A Cross- cultural Perspective

Savita Malhotra and Deepak Kumar

Contents

Abstract

Family is the microcosm of culture, and child mental health needs to be contextualized within the framework of the family and the culture, for overall comprehension and care. Family can have an etiological or a causative role, perpetuating

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or a maintenance role, and a therapeutic or an ameliorative role, in children's mental disorders. Our environment and sociocultural canvas are changing rapidly and so are the experiences, causing strain and dysregulation of various neurobiological systems, with potential for psychological malfunctioning. The brain and nervous system constantly adapt and change according to the environment wherein the newer systems and mechanisms develop and others are replaced or modified, in favor of survival. A series of adaptations bring about the evolutionary change in the structure and functions of the brain. Most psychopathologies in children and adolescents develop in the backdrop of family and the sociocultural system, necessitating need for advancing cross-cultural research with a specific focus on family issues. Findings from the western studies from the high-income countries may not be directly applicable in the Indian context or for that matter in the other low- and middle-income countries. The onus is on the experts, to be aware and also sensitive to both the family issues as well as the cross-cultural perspectives in the child and adolescent mental health care. Many countries are multicultural, and cultures by itself are dynamic and constantly evolving. The following text is a prelude to this sensitization. The discussion attempts to focus more on the low- and middle-income countries (LAMIC) alongside research from the Western world.

Keywords

Child mental health · Family · Culture · Child Development · Psychosocial · Psychological development · Child mental disorders

Introduction

Family is the key and a primary social institution that transforms the human newborn from a biological being into a "human" being. Family is the first social community in the life of an individual where he/she finds fulfillment of basic needs; gains competence in various linguistic and cognitive skills; learns social and emotional behavior and its regulation; and imbibes social values, customs, code of conduct and morality, acculturation, and humanism. Family is both simple and a complex social unit, where each member is a unique individual and also a member of a whole family group. Members of the family share lifelong relationships by birth, marriage, kinship, or adoption and are guided by a common way of life, common social, psychological, emotional, moral, ethical, and legal relationships. Family is not chosen; one is born in it. It also provides maximum informal contact and emotional gratification to its members. The function of a family is to nurture each member and promote development in the areas of physical, emotional, social, moral, and cognitive domains. A family is also a unit connected to the society wherein it has the cultural functions of primary socialization, social behavior, and social control and norms thus promoting individuality for its members within the broad context of sociocultural reality. The family has multiple functions i.e., marital function,

parenting functions, educational functions, emotional functions, social control functions, economic functions, and intimate and reproductive functions.

Family is a universal social group found in some form or the other in all societies whether primitive or modern. With the rise of civilization, it became necessary to have a family name to know the ancestry and descent primarily for inheritance purposes. Family helps in the propagation of human species and the human race. It legitimizes the act of reproduction, regulates and controls sexual functions within a society, and provides an individual with an identity.

A human child needs care and protection for its survival for the longest time as compared to that necessary for any other animal species. For this reason, the relationship between the offspring and its father and mother is prolonged and expanded during which the effort is made to impart to the child the cumulative knowledge available at that time. Unlike animals, humans are not endowed with an instinct for adjustment to environment and lack reflexes sufficient for survival. The child has to learn from the family, culture, and accumulated knowledge, self-protection and self-preservation that have led to the launching of systematic efforts towards their education and training, to teach what nature has not taught.

A family is a unit where great emphasis is placed upon one's dependency and reliance upon others. Family can be seen as a unity of interacting personalities, who cohere in an ongoing structure that is both sustained and altered through interaction (Burgess 1926). There is a sense of obligation among family members, reverence for the elderly, and responsibility to care for all members, especially children (Zayas 1992). Familism is a commitment to provide an emotional support system for family members, and it emphasizes the importance of the family, as opposed to the importance of the individual (Cuellar et al. 1995).

Family regulates the majority of child-environment interactions and helps to shape children's adaptation. Family is the first and the foremost arena within which the child experiences and experiments with expressions and control of emotions and impulses; learns norms and morality; accepts and is exposed to graded responsibility for self and others in the filial group and the larger society; develops social bonds and relationships. Most of the young children's cognitive, emotional, and social repertoire stems directly from the experience they have had within the framework of the family. Family plays a key part in the process of shaping and guide children's development and thus, contributes to overall child mental health. However, the structure and composition of family vary across countries, regions, and time. Emerging social realities and dynamics have brought about major changes in the family's definition, structure, and functions.

Culture

Culture constitutes learned meanings and shared information transmitted from one generation to the next. Culture consists of distinctive patterns of norms, ideas, values, conventions, behaviors, and symbolic representations about life that are commonly held by a collection of people, persist over time, guide and regulate

daily living, and constitute valued competencies that are communicated to new members of the group. Each society prescribes certain characteristic "cultural scripts" in child-rearing. Variations in culture make for subtle as well as manifest, but always impressive and meaningful, differences in child-rearing patterns and mental health.

Much of culture is acquired unconsciously through interaction with others in the cultural group, and also consciously enforced by rules and norms especially within the family, peer group, and school system.

Concept of culture refers to and incorporates three aspects:

1. Progressive human achievements or civilization: It describes the whole sum of achievements by a man to protect itself against nature and making the planet serviceable, and to accommodate mutual relations. It also involves the intellectual, scientific, and artistic achievements of man and the leading role it assigns to the higher mental activities and ideas assigned to human life.
2. Level of individual refinement: It refers to the level of the individual's refinement in terms of assimilated knowledge and experience, sophistication, a personality that has assimilated the cultural ideals, attention to needs of others, and a peaceful and gratifying ways of life. There was a view of culture as "high culture" meaning refinement, knowledge, and educated taste.
3. Culture as values, symbols, ideals, meanings, and ways of living: It is manifested in rituals, customs, laws, literature, art, diet, costume, religion, preferences, child-rearing practices, entertainment, recreation, philosophical thought, and the government (Sadock and Sadock 2007). This is the most commonly ascribed and general usage of the term culture.

Culture is imbibed and internalized through the process of development, early in life, and gets hardwired in the brain. Brain and nervous system constantly adapt and change according to the environment wherein the newer systems and mechanisms develop and others are replaced or modified, in favor of survival. A series of adaptations bring about the evolutionary change in the structure and functions of the brain. To fit into the civilized society, children are conditioned from birth to learn the art of meeting external demands, assume the socially adjusted roles, and accept the constraints of reality, even at the cost of their inner strivings. This can cause stress and conflicts. If these conflicts remain unresolved or these patterns are not adequately internalized, it may lead to brewing/simmering discontent ready to erupt into disease or aggression. The process of development can proceed optimally if the environment in which children are raised in safe, nurturing, repetitive, predictable, and attuned to the child's developmental level or state. Our environment has changed and is changing rapidly, and the experiences encountered are more chaotic, overwhelming, and often abusive. Most of the mental health problems signify dysregulated internal systems.

Family, Culture, and Development

Family is integral to the development of an integrated personality and internalization of societal norms and culture through a primary process of socialization. The family acts as a conduit or a vehicle for transmission of culture into the individual's personality, thus, keeping the culture alive. Family provides an opportunity for the sexual gratification of spouses and lays down prescriptive and proscriptive rules for sexual relationships within the society. Social control and regulation of sexual function is extremely important for maintaining social order. Members of a family live by and transmit the social and cultural values and norms to its offspring; thereby, shaping their personality and stabilizing the social system.

The family itself is shaped and afforded meaning by "culture" (Bornstein and Lansford 2010). Human beings do not grow up, nor do the adults carry out parenting in isolation, but in fact, all this happens in the context of culture. Just as cultural variation dictates the language which the children eventually speak; cultural variation also exerts significant and differential influences over the mental, emotional, and social development of children. It is the culture that influences how the family cares for children, what it expects of children, and which behaviors are appreciated, emphasized and rewarded, or discouraged and punished. Every culture is characterized and distinguished from other cultures, by deep-rooted and widely acknowledged ideas about how one needs to feel, think, and act as a functioning member of the culture. These beliefs and behaviors shape how the family rears their offsprings. Culturally universal or specific systems are required to be in place, to ensure that each new generation acquires culturally appropriate and normative patterns of beliefs and behaviors.

The goals of development vary with culture and social norms. In India, for example, emphasis is placed on values such as dependence and dependability, high frustration tolerance, patience, acceptance of pain (physical and psychological), forgiveness, and equanimity. In Japan, passive love or dependence, obedience, politeness, acceptance, and harmony are valued more. In Chinese culture, children are taught to cultivate politeness, collectivism, filial love, and respect towards parents and authority. In the psychoanalytic theory, dependence is considered as the continuation of the early essentially sexual bonds with the parents throughout life, wherein, libido attaches itself to the satisfaction of the great vital needs and chooses as its first objects the people who have a share in that process. Dependence versus independence has been regarded as the nuclear conflict in personality development where dependence is considered as a negative trait with pejorative connotations in the West. In the Indian and other eastern cultures, personal independence is not a cherished value. Ideal value in Indian society is "dependability" and "interdependence" and not independence.

In India, unlike in the West, there is a strong belief in the doctrine of reincarnation and transmigration of the soul, and that the child is born with the innate psychic dispositions from the previous life. Parents traditionally would accept this and would

have little urgency or pressure to mold the child into any contrary patterns. Therefore, in traditional families, child-rearing is more relaxed, indulgent, and flexible. Alan Roland (1982), while discussing the inner development of personality in urban India, wrote that Indian child-rearing and social relationships emphasize more symbiotic modes of development, on one hand, and inhibiting the process of separation-individuation, on the other. There are extraordinarily close ties between the child and the mother, and ego boundaries are less sharply delineated; identification is more with the "we" of the family, leading to the development of a "familial self" rather than an "individual self," which is quite unlike the west. There is a strong identification with the all sacrificing mother, and there is considerable regard for the feelings of others and an equally strong expectation of reciprocity. This tends to inhibit the development of a highly individualized autonomous self, which Erikson has viewed as underdeveloped, immature, and incomplete personalities; whereas, Alan Roland (1982) considers it a "richness of individuality" exhibiting close emotional ties, strong identifications, and collectivist orientation.

The definition of normalcy and abnormality also has cultural overtones. Designating behaviors as maladaptive will need to be contextualized in the given culture and interpreted accordingly. What may be considered normal in one culture may be considered abnormal in another. For example, sleeping in parent's bed throughout childhood is not considered abnormal in India whereas it would be considered abnormal in the West.

Culture has a major influence on identity formation, and culture gets incorporated into our identity. Epigenesis in neuroscience informs that environment and culture get wired into the developing brain, much like software, most of which is established by the end of childhood. It is well known that children growing up in different cultures will grow up being different, acquiring the characteristics of that particular culture in its core. Once someone has grown up in a particular culture, he/she cannot acquire a full understanding of other cultures since the brain has gone through the process of culturization (Pinker 2003). Once established, this identity is ingrained in the deepest layers of the psyche and is not fluid or changeable. Despite apparent differences among people within a culture, there remain considerable similarities that set them apart from other cultures.

Culture shapes the programming of the mind (Heine 2008) and also influences the way mental distress is handled ranging from idioms of expression to the meaning of symptoms (Weisz et al. 1997, 2006; Canino and Alegria 2008).

Indian culture has been majorly influenced by the Vedas and the Indus or the Hindu civilization. There are certain core features of Indian identity which have profound influence on child development and personality formation such as the supremacy of family over the individual; collectivist thinking as opposed to individualistic thinking; social hierarchy; pursuit of "Dharma" (moral duty/obligation); ideas of health and disease in accordance with the tenets of Ayurveda; deep faith in religion and spirituality; belief in the theory of "Karma" (or action); belief in theory of rebirth and continuity of life after death; and pursuit of "Moksha" (salvation). Average majority of people would follow and live by

these beliefs which will guide their behaviors, responses, and coping in varying situations and circumstances of life.

> The strong family system in India is a source of tremendous strength to its members, and this should be (a) strengthened further to act as a fertile ground for healthy personality development; (b) protected and supported as a sanctuary for containment and resolution of emotional problems and interpersonal conflicts; and (c) guarded against influences favouring its disintegration and erosion, which are a serious threat as a result of globalization and westernization. (Malhotra 1998)

Cultural Context of Psychopathology in Children

The interface of culture and psychiatric disorders among children and adolescents occurs at several levels. Culture determines the conceptualization of normalcy or abnormality; varied risk and protective factors; and nature and expression of psychopathology.

There is enough literature available to suggest that presentation, experience, classification, attribution, prevalence, and outcome of mental disorders varies between cultures (Kleinman 1995). Rates of behavior and conduct disorders are reported to be lower among children of Chinese origin than those of American (Chang et al. 1995).

Community-based epidemiological studies from the developed countries report rates of mental disorders among children and adolescents being higher (between 15% and 20%), whereas those from India are lower (about 6%) (Malhotra and Patra 2014). Also, there are relatively lower rates of depression, substance use disorders, and disruptive behavior disorders and greater prevalence of subsyndromal disorders and monosymptomatic conditions like enuresis, and habit disorders in the Indian population (Malhotra et al. 2002, 2009). Depression, somatization, PTSD, and ADHD are some of the conditions where social-cultural factors play a significant role in their causation, presentation, and treatment.

The utilization of child mental health services in UK and USA is much less among people of Asian origin as compared to those of natives (Sue and Mc Kinney 1975; Stern et al. 1990).

Keren and Tyano (2003) described how Israeli-Arab conflict impacted the psychopathology among children and adolescents in Israel. “The Israeli prototype of the father is very much influenced by the place the army has in daily life: potential hero, potential death and the legitimate use of power and killing, are all internalized by the young child who seas, every year, his father wear the army uniform and leave home for several weeks, and his older brother comes home on leave from the regular army” (Keren and Tyano 2003). The change from civil clothes to army uniforms symbolizes the switch from one ethical code to another. In the former, violence is forbidden; in the latter, it is legitimate. In this scenario, children fail to learn sublimated ways to express aggression as parents and teachers find direct aggression as the only way to solve conflicts. Play themes of children in preschool nurseries involve killing. The

stress and tensions associated with the process of acculturation following immigration of Jews from Morocco to Israel has led to several types of psychopathologies: e. g., syndrome of regression, such as acute dissociative states, brief psychoses, psychosomatic psychopathology; borderline psychopathology and problems in identity formation; cognitive dysfunction; and delinquency, suicidal, and homicidal behaviors (Keren and Tyano 2003, p. 107).

Up to 80% of the world's children and youth live in low- and middle-income countries (LAMIC), whereas most of the child psychiatry research is done and reported from the west, on 20% children and adolescents living in the West. The industrialized countries of the West have already set the direction for CAMH research, based on their own appreciation and understanding of the subject, and the LAMIC tend to follow the global or universal trends for the sake of remaining contemporary and publishable. There is a need to use culturally sensitive approaches, tools, and methodologies without which there is a serious risk of decontextualizing the meaning and interpretation of distress and disorder, getting erroneous data sets and enacting misplaced policies. While most developed countries of the West (example Europe, Canada, the USA, Great Britain, and Australia) share the values of individualism, secularism, and internal locus of control; the LAMIC (of Africa, South Asia, South America, and Middle East) follow external locus of control, strong family ties, deference to authority, and strong religious beliefs (Inglehart and Welzel 2011).

The pathway towards a culturally nuanced CAMH research in LAMIC will require a contextualized understanding of the concept of childhood in such regions relative to the high-income countries of the West (Atilola 2015). Similarly, service delivery needs to be culturally nuanced where the families have to be invariably involved in the treatment; culturally adapted psychotherapeutic approaches are utilized; and alternative/cultural remedies such as spiritual healing, faith healing, herbal and ayurvedic remedies, yoga, meditation, etc. are acknowledged, and scientifically studied and validated. It is amply clear that mental health as a construct is not independent of society, culture, or situation, and that the Western definitions and solutions cannot be applied routinely to people in the developing countries (Summerfield 2008).

Family Context and CAMH

Mental disorders can develop as a result of family pathology or faulty communication or impaired interpersonal relationships. Although the individual is affected, yet the whole family is sick because of inter or intrapsychic problems. The possible role of the family in relation to the psychiatric disorder/psychopathology has been described broadly as:

1. The causative role of the family (etiological)
2. Maintenance role of the family (perpetuating)
3. Therapeutic role of the family

The traditional joint households remain the primary social force in the lives of most Indians. Loyalty to family is a deeply held ideal for almost everyone. However. in the late twentieth century, the joint family in India has undergone some changes. Now the joint families are more flexible and well-suited to modern life. Actual living arrangements vary with social status, region, and economic circumstances like in cities, where ties are crucial for obtaining financial assistance or scarce jobs. Even though the ideal joint family set up is rare, there are strong networks of kinship helping in economic assistance and other benefits. Relatives live very near each other with easy availability for "give and take" of kinship obligations. When relatives cannot live nearby, they maintain strong bonds of kinship and provide each other with emotional support, economic help, and other benefits.

Family members have an important role in fostering and the care of young children and children's positive development (Garcia Coll 1990; McAdoo 1978; Egeland and Stroufe 1981). In joint families, parents are helped by extended family members in nurturing and caring for children including teaching them disciplinary practices. Therefore, parents might be using lesser of physical punishment methods as their responsibilities get shared. But the frequency and quality of nurturing behaviors by parents is also low as there are other caretakers for the child also. Hence, it is said that the strength of joint families is decided by the number of caregivers apart from parents rather than the total number of members. For example, the presence of grandmothers is considered beneficial for children, and not of the uncle, cousin, or family friend (Furstenberg et al. 1987). The presence of a grandmother in African American and Hispanic families is associated with a responsive and less punitive parenting style, irrespective of ethnic identification or sex. The use of physical and verbal punishment is less, while reasoning and nurturance are more in joint family set-up.

One of the other ways of family living is Machismo where there are rigid sex roles, sex discrimination; male members are dominant, aggressive, authoritarian; attitudes towards women is callous; and there is inhibiting nurturing tendency (Deyoung and Zigler 1994). In these families, if the father is authoritarian, he inflicts punishment upon children (Bird and Canino 1982) which is accepted and seen as a way of assuring children's proper behavior.

It is important to emphasize that children are valued for their economic utility, cultural heritage, as a means of perpetuating family lines, as sources of emotional satisfaction, and pleasure to decrease child maltreatment (D'Antonio et al. 1993). Studies have shown that who live within proximity to their families report greater life satisfaction (Ellison 1990),

Many parenting strategies, developmental milestones, and family processes are similar across cultures also. An evolutionary basis can be explained by the presence of species-common genome, shared historical and economic forces, and biological heritage of psychological processes. For example, it is expected in all societies that parents must nurture and protect their children (Zayas 1992), and that they must help children in achieving similar developmental tasks. All parents are expected to take care of physical health, educational achievement, social adjustment, and the economic security of their children. Furthermore, the mechanisms through which

parents influence their children are universal. For example, culturally constructed selves in children are acquired through conditioning and modelling in a family. Children develop internal working models of social relationships through interactions with their families and that these models shape children's growth and development.

Culture-based expectations about developmental norms and milestones affect parents' appraisals of their child's development. Hopkins and Westra surveyed English, Jamaican, and Indian mothers living in the same city and found that Jamaican mothers expected their children to sit and to walk earlier, whereas Indian mothers expected their children to crawl later. In each case, children's actual attainment of developmental milestones accorded with their mothers' expectations (Hopkins and Westra 1989).

A child's interaction with the parents has an evolutionary bias. The child behaves in ways that enhance proximity to their caregivers. These early attachments provide an "internal working model" of the self; these form the basis of development of autonomy, personal competency, of control over the environment, and of mastery in the child (Ainsworth et al. 1978). But parental over-control and rejection limit the development of autonomy. High negative feedback from early attachment figures, usually parents, and poorly productive family environment leads to negative perceptions of the self and environment. High punishing and rejecting behavior of a mother is associated with significant internalizing and externalizing problems in a child. (Barling et al. 1993). A child sees the environment as hostile and threatening. He sees the self as less competent than others. These insecure attachments form the basis for anxiety and other psychopathology in children, which might continue later in adulthood (Eastburg and Johnson 1990; Krohne and Hock 1991).

Retrospective studies show that clinically depressed subjects perceive their parents to be more rejecting and controlling than do nondepressed controls (Bifulco et al. 1987; Gaszner et al. 1988).

First model of a one-to-one relationship for a newborn mostly is the mothers. They are the primary caregivers. A secure attachment with mother protects from separation anxiety. On the other hand, fathers introduce children to the world, to society, to people other than family. As such, a secure father-child attachment helps in protecting against social fears. A feeling of security in the relationship helps in socializing with strangers.

Also, the quality of mother and father relationships impacts child growth. Mutual understanding and support between the parents ensure a higher quality of mother–child interaction and more engagement of fathers with their child. However, mothers are more controlling and aggravating to their children when they have poor support of their partner. (Brunelli et al. 1995). Conversely, fathers who were/felt not supported by their partner have been seen to withdraw from their child (Lamb 1980). Because of the lack of support to each other, a child has feelings of insecurity.

Marital turmoil is a predisposing factor to childhood disorders. Poor conflict resolution styles (e.g., anxiety and withdrawal) are modelled. There are inconsistent disciplinary actions that are associated with internalizing problems in children. In the

presence of marital turmoil between parents, children may experience uncontrollability which leads to anxiety. Parental conflict leads to poor bonding with children and serves as a constant stressor to a child's environment. The child develops a poor sense of security.

In a study by Kaslow et al. (1984), maternal control and rejection at age 5 was later associated with self-criticism in girls at age 12. Similarly, paternal control and rejection predicted self-criticism in boys at age 12. These results held true even when child temperament was statistically controlled as reported by mothers. Also, clinically anxious parents have clinically anxious children. This might be due to exposure to children, learned behaviors, modelling of a parent figure. There is an intergenerational transmission of anxiety disorders. If both parents have insecure attachment patterns in their childhood, they provide a less warm, less structured, and less conducive environment to their children, resulting in insecure attachment patterns in children also predisposing them to various maladaptive behavior patterns (Cohn et al. 1992; Emery 1982).

Also, it is important to note that children's perspective of parental relationship quality is more important than changes in the family, like divorce, in determining children's functioning (Cummings 1994). Mechanic and Hansell (1989) studied that adolescent mental health problems were significantly associated with reported conflict in the family. Moreover, problems increased with increasing conflict over time; whereas the same could not be predicted by recent or earlier divorce. Another longitudinal study conducted by Jekielek (1998) demonstrates that, although initial levels of anxiety in a child might be controlled, even then, both marital conflict and divorce predict anxiety even 6 years later. Moreover, though the effects of parental divorce fade with time, if children remain in high conflict environments the children's anxiety remains maintained across time.

Literature has shown that poor family interactions disengaged family members, and negative conflict leads to the development of anxiety/depression, aggression, conduct and other behavioral problems in children. In the background of poor family adaptability, communication and lack of family encouragement, a sense of self-autonomy is not fully developed, which again forms the reason for fear of strangers, anxiety, and other problems in children (Peleg-Popko 2002).

Mental health problems are more common in children of poor families. Persistent poverty impacts children's mental growth and is a reason for internalizing and externalizing behaviors. Persistent poverty, like in immigrants, is more of a risk factor than transient poverty, for various problems faced in childhood like a social disadvantage, familial discord, material deprivation, financial stress, and parental depression. The disciplinary practices adopted in such families are often reported as harsh. Poverty is a complex interaction between economic pressures, the pressure on lower-income groups, and the emotional and social problems of families. About one-third of poor children have families headed by single mothers. It was seen that in poverty-affected children, 55% are reared by single mothers compared with 10% in two-parent families. In the absence of one parent, usually fathers, the earning capacity of family is decreased, child support judgments tend to be poor (Wadsworth and Achenbach 2005).

Problems of mental illness and substance abuse in parents drive families towards poverty worsening the problems and deficits experienced by children. The clinical depression rates are two to four times higher than in general female population in female parent with low income (Larsson and Frisk 1999).

Child Rearing Practices and Mental Health

Child-rearing is the most important influential factor in pushing the developmental trajectory of children toward healthy or unhealthy patterns of emotions, behaviors, or cognition. There is literature to suggest that infant development is important in personality formation and psychopathology (Rutter 1997; Bowlby 1969). However, many social, emotional, and behavioral problems occur in the context of the suboptimal environment that are transient, temporary, or reactive. These are not disorders per se but may mimic psychopathology and can be regarded as forerunners of psychiatric disorders (Hong 2016). In recent years, a sharp increase in the rates of child abuse and neglect, ADHD, autistic spectrum disorder, violence, bullying, substance use, Internet addiction, juvenile crimes, and sexual violence may not represent a true increase in the incidence of these disorders. Rather it points towards the possibility of reactive, transient, developmental, emotional, and behavioral problems arising as a result of rapid social change and unrest.

Culture pervasively influences when and how family care for children, the extent to which parents permit children freedom to explore, how nurturing or restrictive parents are, which behaviors parents emphasize, and so forth. Japan and the United States maintain reasonably similar levels of modernity and living standards and both are highly child-centered societies, but the two differ in terms of childrearing with quite contrasting styles. Japanese mothers expect an early mastery of emotional maturity, self-control, and social courtesy in their children, whereas American mothers expect an early mastery of verbal competence and self-actualization in theirs. American mothers promote autonomy and organize social interactions with their children to foster physical and verbal assertiveness and independence. By contrast, Japanese mothers organize social interactions with children to consolidate and strengthen closeness and dependency within the dyad, and they tend to indulge young children.

On average, mothers spend between 65% and 80% more time than fathers do in direct one-to-one interaction with young children in Japan. Most fathers are either inept or uninterested in child caregiving. However, mothers and fathers tend to divide the labor of caregiving and engage children emphasizing different types of interactions, mothers providing direct care and fathers serving as playmates and support. Research involving both traditional and nontraditional (father as the primary caregiver) families show that parental gender exerts a greater influence than parental role or employment status. Western industrialized nations have witnessed an increase in the amount of time fathers spend with their children; in reality, however,

most fathers are still primarily helpers. Notably, different cultures sometimes distribute the responsibilities of parenting in different ways. In most, the mother is the principal caregiver; in others, multiple caregiving may be the norm. Thus, in some cultures, children spend much or even most of their time with significant other caregivers, including siblings, nonparental relatives, or nonfamilial adults. Various modes of child caregiving, like nurturance, social interaction, and didactics, are distributed across diverse members of a group.

Lansford et al. (2005) studied samples from Italy, China, India, Kenya, Thailand, and the Philippines. Across all six cultures, he showed that higher the corporal punishment used by mothers, higher is the number of aggressive and anxious/depressed syndromes in children. Also, children who reported that parents used corporal punishment, rated themselves high on the aggressive behavior syndrome, regardless of their own mother's report.

The Changing Family Systems

There is a pervasive and growing impact of urbanization, westernization, and globalization, all over the world, with rapid changes in the socio-political-economic systems, with huge implications for child development and mental health. Many of the Asian countries and oriental cultures are undergoing "modernization" including the adoption of capitalism, democracy, gender equality, human rights, individualism, sexual liberalism, and so on. These changes have many positives like the increased standard of living, opportunities for better education, health and employment, awareness of rights, and communication; however, there are many negatives associated. This transition has led to changes in the structure and functioning of the family units, alteration in child-rearing practices, redefining the goals of development, diminution of social support systems, and increasing levels of stress and trauma. How percolation of Western ideology and lifestyle in South Korea and other eastern cultures has negatively affected child mental health and caused a crisis of parenting and child-rearing is amply brought out by Hong (2016). The pursuit of materialism, competitiveness, social success, having become dominant values in Korea, have replaced the traditionally cherished higher values such as integrity of personality, harmony, good interpersonal relationships, control of emotions, family cohesion, respect for, and acceptance of authority and age. There is a consequent increase in rates of children's emotional and conduct disorders, violence and sex-related crimes, drug abuse, divorce, and broken families (Hong 2016).

The sociocultural milieu of India is also changing at a tremendous pace in social, economic, political, religious, and occupational spheres, including familial changes in marital dyadic equations, the role of women and power distribution. A review of the national census data and the National Family Health Survey (NFHS) data suggest that nuclear families are gradually becoming the predominant form of Indian family

institution, at least in urban areas. The 1991 census, for the first-time reported household growth to be higher than the population growth, suggesting household fragmentation; a trend that gathered further momentum in the 2001 and the 2010 census. Other important trends include a decrease in the age of the house-head, reflecting a change in the power structure and an increase in households headed by females, suggesting a change in traditional gender roles.

Single-parent families, working couples, in the absence of a good alternative or support system, would risk optimal care of children. Grandparents or the hired domestic labor provided by young girls is the substitute care often. It is an irony that one class of children, especially the girls, have to take care of another class of children, compromising their own health. Then, there is the phenomenon of live-in relationships, wherein without the formal solemnization of marriage and the inbuilt commitment, the couple maintains all the other aspects of a conjugal unit. A child born out of such a relationship of parents is likely to have a relatively unsure future.

Effects of Societal and Familial Change on Mental Health

Social and cultural changes have altered entire lifestyles, interpersonal relationship patterns, power structures, and familial relationship arrangements in current times. These changes, which include a shift from joint/extended to nuclear family, along with problems of urbanization, changes of role, status and power with increased employment of women, migratory movements among the younger generation, and loss of the experience advantage of elderly members in the family, have increased the stress and pressure on such families, leading to an increased vulnerability to emotional problems and disorders. The families are frequently subject to these pressures.

Countries within the developing world are impatient and intend to achieve within a generation, what countries in the developed world took centuries. Hence, societal changes here are not step by step or gradual, but rapid, the process inevitably involving "temporal compression." Additionally, the sequences of these societal changes are haphazard and often chaotic, producing a condition that is highly unsettling and stressful. For example, in a household where a woman is the chief breadwinner but has minimal standing in decision-making, the situation leads to role resentment and disorganized power structure in the family. Indeed, studies do show that the nuclear family structure is more prone to mental disorders than joint families. Fewer patients with mental illness from rural families have been reported to be hospitalized when compared to urban families because of the existing joint family structure, which provides additional support. Children from large families have been found to report significantly lower behavioral problems like eating and sleeping disorders, aggressiveness, dissocial behavior, and delinquency than those from nuclear families. Even the large-scale international collaborative studies conducted by WHO – the International Pilot Study on Schizophrenia, the Determinants of Outcome of Severe Mental Disorders and the International Study of Schizophrenia – reported that persons with schizophrenia did better in India and other developing

countries when compared to their Western counterparts largely due to the increased family support and integration they received in the developing world.

Although a bulk of Indian studies indicates that the traditional family is a better source for psychological support and is more resilient to stress, one should not, however, universalize. In reality, arrangements in large traditional families are frequently unjust in its distribution of income and allocation of resources to different members. Indian ethos of maintaining "family harmony" and absolute "obedience to elderly" is often used to suppress the younger members. The resentment, however, passive and silent it may be, simmers, and in the absence of harmonious resolution often manifests as psychiatric disorders. Somatoform and dissociative disorders, which show a definite increased prevalence in traditional Indian society compared to the West, may be viewed as manifestations of such unexpressed stress.

Resilience

All children exposed to adverse circumstances do not develop mental health problems. Majority are able to negotiate their lives safely and remain unscathed and they would be considered as resilient children. Resilience is a positive attribute that denotes the capacity of the individual to withstand stress and adversity and emerge stronger. Several individual factors (like genetic, hormonal, intellectual, and temperamental) and environmental factors (like a close relationship with caregivers, education, secure attachment and bonding, appropriate demands and expectations, optimal ecosystem, fulfillment of basic needs, safe and secure environment, etc.) contribute to resilience. Resilience is to be viewed as a product of an interaction between the individual and the environmental factors and can be fostered and promoted through developmental years of childhood by strengthening the individual strengths and promoting the positive environment and mitigating negativities. Several temperamental or personality traits enable children to overcome stress and develop a sense of competence and control in their lives. In a study on street children using case vignettes in Philippines, Banaag (2016) reported that traits in the individual that enhanced resilience in his sample included a sense of direction or mission, self-efficacy, social problem-solving skills and survival skills, adaptive distancing, having a hobby or a creative talent, a realistic view of the environment, self-monitoring skills and self-control, better intellectual capacity, easy temperament, disposition, capacity to recognize mistakes, sense of humor, leadership skills, sense of morality, and faith in religion or God. In the same study, several environmental protective factors were having family responsibilities, observing family rituals and traditions, positive family environment and bonding, positive relationship with at least one parent, families being morally supportive, and high expectations and supportive school climate. Mental health experts have not given much importance to resilience in production and mitigation of psychopathology; whereas, resilience as a developmental concept and attribute could, for its most meaningful interpretation, be better incorporated in all preventive and promotive mental health interventions, and in the definition of mental health.

Cyberage and Child Mental Health

Most children these days have access to computers, smartphones, iPad, and Internet and are spending hours on it for chatting, socializing, gaming, pornography, and sex. Internet addiction is a new behavioral addiction causing serious concern for parents and professionals. The more they spend time in this virtual world lacking in actual human contact, the more socially isolated they become, unable to fulfil their primary instinctual needs of attachment, aggression, and sexuality. This is impacting their development and contributes to increasing levels of social, emotional, and behavioral pathologies seen in the current times. Psychiatric disorders are a reflection of our current times and sociocultural milieu in which children are born and grow up.

Key Challenges for Mental Health Professionals/Services

The Challenges for the professionals working in the CAMH field is twofold:

- In assessment (of family issues of CAMH in culture-specific context)
- In management (of CAMH in cross-cultural perspective)

Children and families constitute an ever-increasing culturally diverse group in the clinical practice of CAMH services. Families and their children vary in their level of acculturation and developmentally may vary in their level of ethnic identification. Child-rearing patterns and parenting approaches are constantly in flux, as are gender roles. Clinicians are often challenged to treat such families and often find the cultural dissonance with their own native culture and theoretical frameworks as barriers for the appropriate assessment and treatment interventions. As the field of psychological interventions has developed, so have culturally sensitive and competent approaches in the field of mental health including CAMH. These approaches must be integrated into the multiplicity of other factors that define normality and psychopathology and be studied further in the context of their relevance and efficacy for special groups of children and families who suffer from specific psychiatric disorders. Cultural awareness and competence will help clinicians understand better the impact of values and patterns in the family, family organization, child-rearing practices, and the expression of symptoms in family systems in an index case.

Researchers have also recognized persistent ethnic differences in terms of utilization of services and unmet needs. The mental health needs of minority youth are not well served: They are treated less frequently, and when they are treated, the services they receive are less frequently adequate. Also, when ethnic minority youth do receive child and adolescent mental health care, the services that they receive may differ from those given to the White patients. The reasons for these discrepancies have been examined in numerous studies, and have included contextual variables (economics, availability, and accessibility of services), patient variables (differences in prevalence or manifestation of the disorder, cultural beliefs and attitudes, preferential use of alternative or informal services, health literacy, and adherence), and

provider variables (referral bias and patient-provider communication). Awareness on the part of the practitioner of the cultural variables that influence help-seeking and ongoing utilization of mental health services may aid in the engagement, effective treatment, and retention of ethnic minority children and adolescents with depression. However, given the great heterogeneity that exists within any cultural grouping, clinicians will need to integrate information about cultural patterns with that obtained from the individual patient and family to inform optimal practices for each patient. Some aspects of culture that are likely to influence service utilization include increasing awareness; altering health beliefs, particularly regarding models of mental illness; and lowering the level of stigma toward mental health treatment.

Conclusion

Experiences in the family setting impact children's vulnerability to various psychiatric disorders. Early-onset disorders become chronic or relapsing, predisposes to vocational and psychosocial impairments that have long-lasting deleterious effects. But even then, especially for young people, professional help-seeking rates remain low. Some factors like ethnicity, family history of psychopathology, and poverty cannot be changed. Hence, it is important to work on modifiable factors at the familial or individual level, e.g., on parenting patterns.

Preventive strategies include improving child relationship quality, positive parental involvement and skill encouragement, warmth, authoritative parenting, effective and consistent discipline, parental monitoring, good family communication, and problem-solving and reduced inter-parental conflict. Increased parental warmth decreases internalizing problems in young.

The changing family structure and parenting roles in the contemporary socioeconomic canvas is a stark reality. The child and adolescent mental health professionals need to take cognizance of the same. The Western studies from the high-income countries may not be directly applicable in the Indian context or for that matter in the other Low- and middle-income countries. This is because most of the LAMICs are multicultural and there is an imminent need for the culturally nuanced CAMH research (Atilola 2015). An understanding of the CAMH-associated risk and protective factors, which can be quite diverse and contextualized, along with the childhood psychopathology and the culturally nuanced intervention strategies, would be desirable. However, one must be aware of the fact that the cultural milieu in itself also continues to be dynamic (Draguns and Tanaka-matsumi 2003), and the society is in a constant state of flux and evolution.

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Burden and Cost Associated with Childhood Bullying Victimization

13

Implications for Intervention

Louise Arseneault

Contents

Abstract

Being bullied can be an important contributing factor for the development of mental health problems in childhood and adolescence, and it is becoming clear that there are additional longer-term negative outcomes. Anti-bullying programs show promise in tackling bullying behaviors. However, the chances of eradicating bullying completely are minimal, and we need to acknowledge that despite such programs, a considerable proportion of young people will not escape this

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form of abuse in their youth. This leaves some children and adolescents vulnerable to the harm associated with being bullied in childhood and adolescence. One idea to minimize the harmful consequences associated with being bullied is to increase the focus of interventions on victims and potential victims, in parallel with existing programs to stop bullying. Intervention efforts should focus on limiting distress among young victims and possibly by the same token, preventing long-lasting difficulties in later life. A new innovative strategy could aim at preventing children from becoming the targets of bullying in the first place. Such a public health approach might be a more effective way to reduce the bullying-related burden and considerable costs for society. Further research is needed to better understand the mechanisms explaining the emergence and persistence of these poor outcomes. In the meantime, efforts focusing on stopping bullying behaviors should not only be supported but also be widened to provide appropriate help to the young victims and prevent children and adolescents from becoming the target of bullying.

Keywords

Bullying victimization · Mental health · Economic impact · Development · Children · Adolescents · Life course · Intervention

Introduction

There is little doubt that being bullied in childhood is a stressful experience that casts a shadow on young people's mental health and well-being. After several decades of general skepticism about the true impact of bullying victimization, robust evidence demonstrates a detrimental effect on children's and adolescents' mental health and reveals other poor outcomes including low self-esteem, self-harm, and academic failure. Emerging findings have also pointed toward a possible long-lasting effect of bullying beyond the childhood and adolescent periods. The impact of bullying on young victims may therefore persist once the bullying has long stopped. This conclusion raises the important question whether interventions would benefit from a greater focus on the victims of bullying if we aim to reduce the burden and the costs associated with bullying victimization for individuals and society.

This chapter aims to summarize findings on the harmful impact of being bullied from population-based samples with prospective measures of bullying victimization in childhood or early adolescence. It emphasizes longitudinal studies that examined mental health and other outcomes up to adulthood, and considers how these findings may influence policy and practice. This chapter considers bullying as a global form of abuse and does not distinguish specific types of bullying victimization. It summarizes the body of evidence on one of the most prevalent risk factors for mental health problems in childhood and adolescence. It also builds on review papers published recently on the long-term outcomes of being bullied (Brunstein Klomek et al. 2015; Wolke and Lereya 2015; McDougall and Vaillancourt 2015; Arseneault 2017, 2018).

Bullying

Bullying involves repeated hurtful actions between peers where an imbalance of power exists (Olweus 1993, 1994). Bullying is distinct from other forms of aggressive behaviors by encompassing three elements. First, bullying occurs between individuals of the same age group. Bullying can take place between youths or between adults. It is maltreatment or abuse, and not bullying, when hurtful actions are perpetrated by adults toward children or adolescents. Second, the hurtful actions are repeated over time so a pattern of interactions is established between the children who bully and a victim. One-off incidents involving hurtful actions do not represent bullying behavior. Third, the relationship between children who bully others and their victim is characterized by a power imbalance whereby it is difficult for the victims to defend themselves. Physical strength, popularity, and age are factors that can characterize power imbalance.

Bullying can take various forms: It can be verbal such as threatening, taunting, spreading rumors, or it can refer to physical actions including pushing and kicking. It can be direct (e.g., verbal and physical behaviors conducted in the context of face-to-face interactions) or indirect (e.g., actions that do not necessarily require the bullies and the victims to be present, like spreading rumors and excluding others). Bullying has evolved with time. New technologies and social media platforms, easily accessible via mobile phones or the Internet, provide easy and countless opportunities for young people to bully and damage the reputations of their victims, in front of large crowds of witnesses who may exacerbate the abuse. Cyberbullying has been documented as a new and harmful form of bullying, especially among adolescents (Smith et al. 2008; Dooley et al. 2009; John et al. 2018).

Three groups of young people are directly involved in bullying: children who bully others, their victims, and bully-victims who are those who are involved in bullying both as bullies and as victims. Bully-victims represent a small but distinct group of individuals. They have the highest level of adjustment problems among all children involved in bullying, showing symptoms of both internalizing and externalizing problems (Arseneault et al. 2006; Nansel et al. 2001; Juvonen et al. 2003; Veenstra et al. 2005). Because it is relatively difficult to assess the overlap between bullying behaviors and victimization, bully-victims have not been extensively studied and are often imbedded in groups of victims.

Prevalence and Developmental Trends

Bullying is common worldwide during the school years. A survey of children and adolescents from nearly 40 countries indicated that approximately 13% of 11-year-olds reported being the victims of bullying (World Health Organisation 2012). Prevalence rates vary greatly across countries, are commonly higher for boys compared to girls, and decline with age. Rates across 11 European countries revealed a similar pattern: 20% of youth from 8 to 18 reported being bullied (Analitis et al. 2009); bullying victimization was more prevalent among boys and tended to decline

with age. In the UK and in the USA, bullying – including peer and sibling victimization – is the most prevalent form of abuse across all age groups up to 24 years (Radford et al. 2013; Finkelhor et al. 2007). These prevalence rates reflect an increase in bullying awareness which contrasts with early research when bullying was studied almost exclusively in Scandinavian countries (Olweus 1993). Rates of bullying victimization are comparable to rates of children maltreated by adults (15% – Dodge et al. 1990, 12% – Jaffee et al. 2004).

Bullying is widespread across different environments. It takes place most commonly in schools, but bullying can also occur in other contexts, including in the neighborhood or at home between siblings (Wolke and Skew 2012). It can be persistent across time and across settings (Sourander et al. 2000). Chronic victimization is not infrequent, even despite the transition to secondary school during the early teenage years: of the children who were frequently bullied during primary school in the UK, 43.1% of boys and 40.1% of girls remained frequently bullied during secondary school (Bowes et al. 2013). These findings are in line with a previous study showing that nearly half of age-11 young victims of bullying (43%) were still victims 3 years later (Scholte et al. 2007). Of the children who were not involved in bullying at the first assessment, only 7% became victims later on. Lower stability in bullying victimization has also been reported (Schäfer et al. 2005). These contrasting findings are possibly accounted for by the relatively short reporting periods covered by the assessments.

Does Bullying Victimization Contribute to the Development of Mental Health Problems in Childhood and Adolescence?

The extent to which being the victim of bullying contributes to the development of mental health problems in childhood and adolescence has critical implications for prevention and intervention efforts. While these strategies are important to safeguard the human rights of children, reducing bullying behavior could be an expensive and ineffective way of decreasing children's early symptoms of poor mental health if being bullied is spuriously associated with poor outcomes. Strong and robust tests supporting the assumption that being bullied in childhood truly contributes to mental health problems remain sparse.

The discordant monozygotic (MZ) twin design offers a rigorous control for confounders by contrasting genetically identical individuals drawn from the same family environment but who are exposed to distinct experiences (Pingault et al. 2018). Because several early family experiences are the same within pairs of twins who grow up together, shared environmental factors such as poverty, domestic violence, or maternal depression cannot account for the differences in the outcome variables. Furthermore, because MZ twins are genetically identical, variation in outcomes cannot be the result of genetic variations between the two twins either. Therefore, the discordant MZ twin design can be used to test whether being bullied in childhood has an environmentally mediated impact on the development of mental health symptoms at a young age, over and above shared environmental and genetic

factors. When applied to longitudinal data, the discordant MZ twin design is a powerful methodological tool for investigating the pathway from bullying victimization to children's poor developmental outcomes by additionally testing for temporal priority. Indeed, it is crucial to test that the association between bullying victimization and mental health problems in young people is not completely explained by prior symptoms of poor mental health.

Three longitudinal studies have used the discordant MZ twin design to test the robustness of the impact of being bullied in childhood on mental health outcomes. A first study from the Environmental Risk (E-Risk) Longitudinal Twin Study (Moffitt and The E-Risk Study Team 2002) showed that MZ twins who had been bullied by the age of 7 had more emotional problems at age 10 years compared to their co-twins who had not been bullied (Arseneault et al. 2008). This difference remained significant even after controlling for emotional problems assessed when the twins were 5 years of age, prior to being bullied. A second study from the Twins Early Development Study (TEDS; Trouton et al. 2002) found similar findings using a measure of peer victimization in early adolescence with a larger sample of twins: MZ twin differences in peer victimization were associated with differences in anxiety over the course of two years, even after controlling for prior anxiety, but became non-significant over 5 years (Singham et al. 2017). Differences remained significant, however, for measures of paranoid thoughts and cognitive disorganization (without control for prior measures). These findings may be taken to suggest that the contribution of bullying victimization to mental health problems is not long-lasting. However, the Virginia Twin Study of Adolescent Behavioral Development (Eaves et al. 1997) indicated otherwise, and extended others' findings by examining mental health outcomes both in childhood and in young adulthood. Results revealed that compared to their non-bullied co-twins, bullied MZ twins were nearly twice as likely to have social anxiety and separation anxiety in childhood and three times more likely to report suicidal ideation in young adulthood (Silberg et al. 2016). Psychiatric disturbances prior to being bullied did not differ between the bullied and non-bullied twins in this sample, and therefore, could not account for differences in outcomes. These three studies robustly demonstrate that bullying victimization contributes to later mental health outcomes: overall, associations were not explained by prior symptoms or difficulties, and the associations survived strict controls for confounders, including both family background and genetic factors. This evidence suggests that if we eliminate bullying behaviors, we should be successful at reducing mental health problems in youths.

Can the Effect of Childhood Bullying Victimization on Mental Health Problems Persist into the Adult Years?

To date, relatively little is known about the long-term impact of bullying, as only a few longitudinal studies with prospective measures of bullying victimization in childhood have followed participants into adult life. "Long-term" is characterized here not only by the age of the participants when outcomes were assessed but also by

the time lag between exposure to bullying victimization and mental health problems. So far, four longitudinal cohorts have documented the adult outcomes of bullying victimization in childhood. These studies indicated that young victims of bullying have higher rates of agoraphobia, depression, anxiety, panic disorders, and suicidality in their early to mid-20s, compared to those who have not been bullied in childhood (Brunsten Klomek et al. 2009; Sourander et al. 2007; Copeland et al. 2013; Gibb et al. 2011). Child victims of bullying also have an increased risk of receiving psychiatric hospital treatment and using psychiatric medications in young adulthood (Sourander et al. 2009). Supporting these findings, another longitudinal cohort provided data for a study that showed that victims of bullying in childhood report high levels of psychological distress at age 23 but, and most importantly, also at age 50 (Takizawa et al. 2014). Adults who were victims of frequent bullying in childhood had an increased prevalence of poor psychiatric outcomes at midlife, including depression and anxiety disorders, and suicidality. The effects were small but similar to those of other adverse childhood exposures measured in this cohort study such as placement in public or substitute care or exposure to multiple adversities within the family. These longitudinal findings are based on observational data and thus do not allow causal inferences. However, the consistency across five separate cohorts is compelling. The four longitudinal cohorts (1) used prospective measures of bullying victimization in childhood and later outcomes in adulthood; (2) controlled for mental health problems in childhood, indicating that bullying victimization contributes either to new or to additional mental health problems in later years; (3) accounted for a range of potential confounders that might also explain poor later outcomes in young victims of bullying including childhood IQ, parental SES and gender; and (4) are representative of the population of four different countries. Conclusions from these studies cannot be ignored.

Individual and Societal Costs of Childhood Bullying Victimization

A few longitudinal studies have pointed out the consequences of childhood bullying victimization on the health care system. The Finnish birth cohort showed that participants who were frequently bullied in childhood were more likely to have received psychiatric hospital treatment and used psychiatric medications at age 24, over and above psychopathology prior to bullying (Sourander et al. 2009). These effects on service use were shown to be persistent: being frequently bullied in childhood was associated with treatment for psychiatric disorders at age 29, over and above family factors and childhood psychiatric symptoms (Sourander et al. 2016). Using data from NCDS, a study reported that compared to participants who were not bullied in childhood, those who were frequently bullied were more likely to use mental health services in childhood, adolescence, and also in midlife (Evans-Lacko et al. 2017). This disparity in service use associated with childhood bullying victimization was explained both by new use of mental health services up to age 33 by a sub-group of participants, and also by persistent use up to midlife. A further study showed substantial and durable economic impacts of being bullied in

childhood, four decades after it occurred (Brimblecombe et al. 2018). Both men and women who were bullied in childhood were less likely to be in employment and had accumulated less wealth in the form of home-ownership or savings than participants who were not bullied. Frequent bullying in childhood was also associated with higher societal employment-related costs for men and higher health service costs for women. Together, these findings on the burden and cost of bullying victimization underline the importance of preventing bullying in childhood and, as the consequences are long-lasting and pervasive, supporting people still experiencing the negative consequences in the decades that follow.

Anti-bullying Interventions

Numerous school-based prevention and intervention programs have emerged in recent years with the aim of reducing bullying behaviors. Such programs vary widely about their focus and methods of delivery. For example, some interventions target the implementation of new curriculum. They commonly include videotapes, lectures, and discussions around the topic of bullying intending to promote attitudes against bullying and prosocial behaviors. They are usually limited in time and outreach by involving mostly classrooms for a few weeks. Instead, a whole-school approach implements rules and sanctions schoolwide, trains teachers in methods for handling bullying, teaches conflict resolution strategies, and offers counselling support. They also involve a wide range of people including all pupils, teachers, school staff, families, and when possible, communities. Examples of such programs are the well-known Olweus Bullying Prevention Program (Olweus 1994) and the KiVa Anti-bullying Program (Salmivalli et al. 2005). The KiVa program, a whole-school intervention based on social-cognitive theory, is one of the most widely implemented interventions and one that combines several elements offered by other programs.

KiVa was built from two lines of research, one on aggressive and bullying behaviors and one on the participant roles of bullying (Kärnä et al. 2011). This intervention program includes a combination of universal and indicated actions to prevent and stop the occurrences of bullying incidents. The universal actions focus at influencing youth's reaction when witnessing bullying instances (bystanders). The idea here is to change the attitude of the classmates to reduce the reward and the motivation of those who bully others. The emphasis is on empathy, self-efficacy, and anti-bullying attitudes. The indicated actions focus on the victims and the bullies more specifically. This program is not limited to implementing a school ethos and goes beyond by providing staff practical tools such as video films, computer games, and Internet forums. This program has been shown to be effective at reducing all forms of bullying, such as exclusion, cyber, and threats, between 21% up to 63% in older pupils (Salmivalli et al. 2011) and also with younger pupils, both self- and peer-reported (Kärnä et al. 2011).

Systematic reviews have evaluated the effectiveness of anti-bullying programs more generally and provide encouraging findings with slightly greater reduction in bullying behaviors than bullying victimization and associated poor outcomes

(Vreeman and Carroll 2007; Ttofi and Farrington 2009a, 2011). Overall, school-based anti-bullying programs reduced victimization on average by 17–20% (Ttofi and Farrington 2011). Greater reduction in victimization was found for intensive and holistic approaches involving multiple groups of people and environments. Factors associated with better results included parent training, improved playground supervision, disciplinary methods, school conferences, videos, information for parents, work with peers, classroom rules, and management (Ttofi and Farrington 2009b). Efficient anti-bullying programs are important and should be developed and supported as widely as possible. However, these programs are likely to be costly and challenging for schools from deprived areas which deal with several other important educational challenges. Furthermore, evaluations of anti-bullying policies and school programs tend to suggest that the likelihood of eradicating bullying behavior is small, and despite such invaluable programs, a considerable proportion of young people will not escape this form of abuse in their youth. While rigorous study designs and methodology are needed to advance the examination of the efficiency of these important programs (Bradshaw 2015), efforts and funds should also be invested in interventions focused on limiting distress and adjustment difficulties among young victims and possibly by the same token, preventing long-lasting problems in later life.

Is It Valuable, Feasible, and Acceptable to Strengthen Interventions Focusing on Victims and Potential Victims of Bullying?

It is a truism to emphasize that further work is needed to understand why and how young people's aspirations are often damaged by this too common adverse social experience. In the meantime, strengthening and implementing interventions that focus on victims and potential victims of bullying could be a valuable strategy to reduce and prevent mental health problems. However, the economic case for investment needs to be strongly made to policymakers from any country due to increasing financial pressures on all government departments and competing for policy priorities. For example, a recent study illustrated the potential economic benefits of investing in schoolwide anti bullying interventions, concluding that the costs averted far outweigh the costs of the program, with both benefits for the individual and cost-savings to the public sector (McDaid et al. 2017). Demonstrating short-term benefits (i.e., within a political cycle), while keeping in mind most important outcomes will be observable in the longterm, may increase political traction. Furthermore, future intervention research should be co-designed and produced in partnership with schools and families to strengthen it – which may also help in engaging "hard-to-reach" children.

What kinds of interventions might be effective?

- Whole-school culture change by learning from those with experience of building resilience
- Student-led research on bullying, co-produced with "influencers" to shift mindsets of peers

- Training teachers with third sector providers based on user-generated content
- Building universal relational capabilities among children (e.g., school-taught programs such as "Building Learning Power" or using forthcoming changes in relationships and sex education in primary and secondary schools to elevate the importance of relational capabilities)
- Working with parents of youth considered "at risk" to develop the parents' relationship skills (through online skills programs which help with accessibility or via family support workers, social workers, and other practitioners)

Another idea to gain backing for the value of intervention is to integrate action on bullying into the existing mental health and well-being agenda for children and young people. This "whole child" approach may be both more effective and easier to implement as an expansion of already established practices. Considering the mental health impacts of bullying in this way could potentially be incorporated into the Ofsted framework on performance. A universal approach – for example, a whole-school program – can also provide opportunities to enhance the feasibility of strengthening the focus of interventions on victims and potential victims of bullying. Programs that focus on empathy and resilience could benefit all youth while targeted interventions could be more effective at reducing mental health impacts among young victims. A blended approach that begins with a universal program but then enables providers to target and "escalate" support for some young people could be most effective. This is a similar approach to that used in the KiVa program. A blended intervention approach would be most feasible when backed by cross-government support. Further considerations should be given to the necessity of co-producing interventions to encourage involvement and being sensitive to language and the definitions of "victims" and "bullies" to avoid misapprehensions or prejudice from forming a barrier to uptake. Finally, it will be important to develop a compelling narrative around the links between bullying victimization and long-term mental health consequences to make addressing the negative outcomes a priority for policymakers, professionals, and the public.

Conclusions

Based on existing evidence thus far, bullying is harmful for young people's mental health and should be considered as another form of adverse childhood experiences (ACEs) alongside physical maltreatment, neglect, and domestic violence. Several rigorous studies reviewed above provide strong and robust support for an independent contribution of childhood bullying victimization to the development of poor mental health outcomes throughout the life span. Further research is needed to better understand the mechanisms explaining the emergence and the persistence of these poor outcomes. In the meantime, efforts focusing on stopping bullying behaviors should not only be supported but also be widened to provide appropriate help to the young victims and prevent children and adolescents from becoming the target of bullying.

Cross-References

- ▶ Child Abuse and Neglect in Multiproblem Families
- ▶ Epidemiology of Child Psychopathology
- ▶ Education in Mental Health
- ▶ Family Issues in Child Mental Health
- ▶ Mental Health in Schools
- ▶ Self-harm and Suicidality in Children and Adolescents
- ▶ Trends in Child and Adolescent Mental Health Prevalence, Outcomes, and Inequalities

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Stigmatization and Society's Inclusiveness Across Cultures

14

Petra C. Gronholm and Julian Eaton

Contents

Abstract

There is apparently no country, society, or culture where people with mental illnesses are treated equally to those without such conditions. Mental health stigma, or the devaluation and discrimination expressed towards, and experienced by, people affected by mental health problems, constitutes a global, multifaceted concern.

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The importance of recognizing and addressing stigmatization is evident in the negative outcomes it can have on people affected by it. Stigmatization has been shown to have negative impacts on social inclusion and well-being. This can manifest, for example, as an increased risk of victimization and contact with the criminal justice system, abandoning life goals, exclusion from education and employment, and poor access to health care for problems related to both physical and mental health. It may well contribute to the increased risk of sexual and physical abuse experienced by children with disabilities, particularly those with intellectual or mental disabilities.

This chapter addresses stigmatization, exploring theoretical definitions, reviewing the significant public health impacts, and outlining evidence-based approaches to reducing stigma and discrimination in services and policy frameworks.

Keywords

Stigma · Discrimination · Child mental health · Global mental health

Introduction

Mental health stigma refers to the devaluation and discrimination expressed toward, and experienced by, people affected by mental health problems. Issues around stigmatization constitute a global, multifaceted concern, where there is apparently no country, society, or culture where people with mental illnesses are treated equally to those without such conditions (Thornicroft 2006).

The importance of recognizing stigmatization is evident in the negative outcomes it can have on people affected by it. Stigmatization has been shown to have negative impacts on social inclusion and well-being. This can manifest, for example, as an increased risk of victimization and contact with the criminal justice system (Clement et al. 2011), abandoning life goals (Corrigan et al. 2009), exclusion from education (Lee et al. 2009; Suhrcke and de Paz Nieves 2011) and employment (Social Exclusion Unit 2004), and poor access to health care for problems related to both physical (Mai et al. 2011) and mental (Corrigan et al. 2014; Clement et al. 2015) health. Stigmatization is also recognized as one factor underpinning the premature mortality reported among people with severe mental illness (Laursen et al. 2007; Gissler et al. 2013; Thornicroft 2013) and may well contribute to the increased risk of sexual and physical abuse experienced by children with disabilities, particularly those with intellectual or mental disabilities (Maclean et al. 2017).

Stigmatization is, as such, recognized as a significant public health concern, and reducing it and facilitating participation in life free from stigmatization is reflected in national policies (Department of Health 2011) as well as internationally recognized recommendations from groups such as the World Health Organization (2013).

What Is Stigma? Definitions and Concepts Related to Stigma and Discrimination

Multiple definitions and conceptualizations have been proposed to capture stigma. A seminal definition proposes stigma as the situation where a person is disqualified from social acceptance due to carrying a deeply discredited attribute that separates them from others, defining them as a tainted and discounted person rather than a whole and usual one (Goffman 1963). In relation to mental illness, such deeply discrediting attributes could be possessing a diagnosis or label associating a person with mental illness or a person being associated with mental health services. The association with the process of diagnosis itself is problematic as this may create a barrier to help-seeking on the part of people affected or parents, who may quite rightly worry that there are risks of harm associated with linking to services.

Theoretical frameworks provide a structure for how stigmatization might operate, and subsequently how it might be assessed, and what processes could be targeted by anti-stigma interventions.

One key conceptualization driving the current work in the field is the social-cognitive perspective, proposing that stigma can be understood in terms of stereotypes (negative beliefs regarding a given group), prejudice (conforming with negative stereotypes and/or negative reactions toward a person thought of in these terms), and discrimination (derogatory behaviors due to the prejudice) (Corrigan 2000). This conceptualization has also been described as reflecting problems in three domains: knowledge (misconceptions and a lack of accurate information about mental illness), attitudes (negative thoughts, beliefs, and emotions), and behavior (displayed and/or experienced discriminatory actions toward people with mental illness) (Thornicroft 2006; Thornicroft et al. 2007).

Another framework is the sociological perspective, recognizing stigma as a wider societal force as well as an interpersonal exchange. This position outlines stigma as the co-occurrence of processes relating to labeling human differences, stereotyping and separating people according to these, emotional reactions to these differences, devaluing and rejecting those possessing characteristics considered undesirable, and subsequent discrimination and devaluation of these individuals, all this occurring within a context where a power balance favors the stigmatizer over the stigmatized (Link and Phelan 2001; Link et al. 2004).

One helpful way of categorizing stigmas is as either experiential or action-orientated (Pescosolido and Martin 2015). The experiential perspective considers whether stigma is *perceived* (a belief "most people" are considered to hold), *endorsed* (expressing agreement with stereotypes/prejudice/discrimination), *anticipated* (expecting an experience of prejudice/discrimination), *received* (experiences of rejection or devaluation), or *enacted* (exhibiting discriminatory behaviors). In terms of action-orientated stigmas, this perspective distinguishes between who (or what) enacts and who experiences the stigma, namely, whether an experience reflects *public stigma* (stereotypes, prejudice, and discrimination endorsed by the general population), *structural stigma* (prejudice and discrimination enacted through laws,

policies, and constitutional practices), *courtesy stigma* (stereotypes, prejudice, and discrimination experienced through a connection with a stigmatized group/person), *provider-based stigma* (prejudice/discrimination exhibited by occupational groups designated to provide mental health care), and *self-stigma* (when people affiliated with a stigmatized group accept perceived public stigma and internalize it by applying its stereotypes and prejudice to themselves).

Stigma and Culture

Stigma takes place within both interpersonal and social spaces. Culture is central to framing the beliefs, attitudes, and actions of populations. As such, local explanatory models of changes in behaviors (which may be called symptoms and associated with mental illness in Western models of psychiatric illness) are key to any understanding of how people with mental conditions are treated, both in terms of support and care and in terms of stigmatization and discriminatory behaviors (Kleinman 1980).

As the ultimate outcome of stigma that affects quality of life, *discrimination* has been argued to be the key practical outcome that should be the focus of attention. Taking a cultural perspective (whether within the concerned country or in a migrant population in another country) can give important insights into the cause of behavior toward people affected and might give clues to approaches that might change negative behaviors and structural discrimination.

One practical example might be in parts of West Africa, where epilepsy is believed to be contagious and so it is common for schools to exclude children affected. In order to fully reintegrate children, teachers and parents need to be engaged and persuaded that other children are not at risk. In this approach, it is important to both understand and appropriately acknowledge, rather than dismiss, the basis of prevailing beliefs in populations, which are often deeply held and can take time to change. Addressing population beliefs around childhood mental illness or intellectual disability being linked to divine punishment, possession, or witchcraft is often an essential step in reducing stigma and shame for whole families, preventing disabled children from being hidden from public view, and allowing access to appropriate treatment, care, and support. In order to do this, it is often helpful to engage with the local holders of traditional power and those recognized as having a role in religious of traditional healing.

The important question of the cultural validity and universality of Western models of mental illness when applied globally is central to the growing field of global mental health (Patel et al. 2018). Within this debate there is an important critique that an overdependence on biomedical approaches, at the expense of recognizing either local cultural beliefs or social determinants of mental ill health in general, might itself feed into negative stereotypes and stigma. In this process, akin to medicalization, people whose behavior might have previously been accepted or accommodated in one culture are labeled as ill and in need of medical treatment, potentially to their detriment, especially in the case of enforced treatment under mental health

legislation. This perverse outcome must be guarded against and the established principle of "first do no harm" taken seriously.

One helpful approach can be to work within the framework of human rights, where a person experiencing discrimination is identified as having their access to rights negatively affected, for example, in terms of right to attend school or work, to have housing, to family life, or to access health care. The Convention on the Rights of Persons with Disabilities, the Convention on the Rights of the Child, and other similar instruments provide a legal framework under which discrimination arising from stigma can be challenged (Eaton 2018). An important central pillar which can guard against labeling, stigma, and discrimination is the empowerment of people affected themselves to determine how they are identified and want to be defined as.

In many languages, words describing mental illness are inherently insulting, and efforts have been made to change words to those that are more positive or neutral to discuss the issue. For example, in 2011, a new Chinese word was developed to more accurately describe epilepsy (Lau et al. 2011), which had previously been associated with madness, animals, and spirits. Similarly the name for schizophrenia has been changed in Japan and Korea, from names that described split minds to names that are less stigmatizing (Sartorius et al. 2014). The positive impact of this renaming has been discussed particularly in view of the cultural importance of personal honor in these settings (Lee et al. 2013).

Anti-stigma Strategies

Direct efforts to reduce and eliminate stigmatization have been characterized in terms of three main approaches to be used in isolation or jointly: education, contact, and protest (Corrigan et al. 2001):

- The **education approach** builds on providing accurate knowledge regarding mental illness, to replace myths and misconceptions regarding the mental health problems, those affected by them, and how they should be treated.
- **Contact-based approaches** use direct or indirect interactions with people who have mental health problems as a means of challenging and reducing negative attitudes, prejudice, and discrimination.
- The last approach uses **protest and social activism** to challenge, diminish, suppress, and eliminate negative depictions of mental illness.

Education and contact-based approaches appear to be the most commonly used approaches, whereas there is less evidence regarding the effectiveness of protest-based approaches (Corrigan et al. 2012), particularly in terms of whether these can serve to diminish people's prejudices (Rüsch et al. 2005). Education has been noted to perhaps work best among people who already know someone who has a mental health problem, who have some prior knowledge regarding mental illness (Rüsch et al. 2005), and among younger age groups (Corrigan et al. 2012).

Reducing stigma and social exclusion can itself be impactful substantially on the quality of life, even without substantial change in impairment of affected children. This is the basis of the social theory of disability, which holds that it is the social and practical barriers to inclusion and participation that constitute disability, not merely physical or mental impairment (Oliver 2013). The long-term impact of education-based anti-stigma efforts has, however, been questioned (Mehta et al. 2015). Overall, contact-based approaches are recognized as the most effective means to combat stigma (Corrigan et al. 2012; Evans-Lacko et al. 2012) and are the focus of much current research and practice.

The positive impact of contact-based anti-stigma efforts can be understood in terms of intergroup contact theory and the "contact hypothesis" it builds on (Allport 1954). When considering the effectiveness of intergroup contact, it is also important to understand the kind of contact that is required for effective change (Pettigrew et al. 2011). For contact to be effective, there should be *equal status* between the groups that are interacting, *common goals* established for the interaction, and active intergroup *cooperation*, rather than simply contact. Furthermore, intergroup contact is found to be more successful in reducing prejudice and improving attitudes when it involves opportunities to get to know the out-group members as a part of the interaction, participation of more than one out-group member, activities specifically aimed at disproving negative stereotypes, and a guiding structure informing the interaction (Desforges et al. 1991). Contact that meets these conditions can help people to disconfirm false prejudices and negative stereotypes (Pettigrew and Tropp 2006), and it can serve to reduce anxiety and increase empathy between the group members (Couture and Penn 2003).

Beyond these specific mechanisms of anti-stigma efforts, some broader principles for strategic stigma change have also been proposed (Corrigan 2011). As would be expected based on the evidence outlined above, *contact* and interactions between people with and without mental illness are recommended as a key component underpinning the best practice in strategies for reducing stigmatization. Furthermore, it is recommended that these efforts are *local* (i.e., considering local factors, such as the geographic region and sociodemographic context), *credible* (i.e., demonstrate principles of recovery and represent the aims of the intervention), *continuous* (i.e., ongoing efforts are more impactful that one-off interventions), and *targeted* (i.e., focused on a particular population).

These principles could be effectively realized, for example, through anti-stigma strategies building on contextually adapted multilevel media campaigns implemented alongside contact-based interventions. Patient, family, and community education are also often an element of more comprehensive treatment interventions, especially those that employ stepped care, for example, the WHO's Caregiver Skills Training, employed in an example in Pakistan, FaNs for Kids (Hamdani et al. 2017).

Case Study: Time to Change

Time to Change is an anti-stigma campaign based in England and Wales, which is now also working at a global level in low- and middle-income countries, in a pilot program in Ghana, Nigeria, Kenya, Uganda, and India. Their Children and Young

People's program began in 2011, with a target audience of 11–18-year-olds and parents of 11–18-year-olds. They have supported over 2000 secondary schools and colleges in England, trained thousands of youth workers and teachers, and run social marketing campaigns reaching both young people and parents. Much of their work is based on the principles of using contact to change attitudes and social marketing using principles adopted from the advertising industry.

The program includes:

1. Supporting Young Champions with lived experience of mental health problems to share their experiences in schools, at events and conferences, and in the media.
2. Networks and resources for school leaders – Time to Change supports local schools to come together to share information and knowledge, to ensure that local school leaders are equipped to address stigma and discrimination, and to create more open cultures in their schools and communities.
3. Initiatives for secondary school and colleges, featuring free ready-to-run sessions which schools and colleges deliver themselves, like Time to Talk Day. Resources have been created, including lessons, assemblies, films, and toolkits for teachers, school leaders, and young campaigners. These resources are free and downloadable.
4. Social marketing campaigns aimed directly at young people and parents.

The lessons learned from this work has been applied in the establishment of Time to Change Global, which is seeking to address stigma by working with local groups across countries.

Anti-stigma Strategies as Applied to Youth

As outlined within the principles of strategic stigma change, targeted anti-stigma efforts are recognized as a powerful approach of achieving improved life opportunities among people affected by mental illness stigma (Corrigan 2004; Thornicroft 2006). Children and young people are recognized as one such key target population for anti-stigma work, reflecting the wider global prioritization of prevention approaches, particularly those focused on young people (Patel et al. 2018).

It is argued that the fears, avoidance behaviors, and exhibited disrespect that constitute the foundations of stigma and discrimination in adults can often already be observed at an earlier age (Weiss 1986; Adler and Wahl 1998; Wahl 2003). In particular, the period of adolescence, with identity formation and associated concerns over peer acceptance and image, is likely to lend itself to an increased vulnerability to stigma and discriminatory behavior against those who are not seen as conforming to a normative ideal. This is exemplified in the increasingly strong evidence of the negative mental health consequences for users of social media, particularly on girls (Liu et al. 2016).

Consequently, children, adolescents, and student populations constitute a key target group for anti-stigma efforts (Wahl 2002; Hinshaw 2005), as improved

attitudes and reduced prejudice and discrimination among this age group can hold the potential of changing the future (Corrigan 2004). Specifically, through challenging and limiting stigmatization toward people with mental illness among young people, it might be possible to nurture future adults who hold less stigmatized views regarding mental illness than previous generations (Corrigan and Watson 2007; Gale 2007). Indeed, attempts to shape emphatic and sensitive attitudes among young people toward people with mental health problems might be easier than attempting to challenge and/or modify long-standing, well-formed derogatory attitudes and behaviors exhibited in adulthood (Wahl 2002). Also, as children are in the process of shaping their understanding of the world around them, they might be particularly vulnerable to being influenced by the negative stigmatized attitudes and behaviors they perceive in the society and those around them (Wahl 2003). As such the provision of anti-stigma strategies targeted at this age group is key.

Anti-stigma strategies targeting younger age groups need to be provided through platforms outside of the health system, for example, in youth clubs or more commonly schools. Such strategies have been delivered, for example, via the medium of puppetry (Pitre et al. 2007) or through storybooks (Shah 2004) for younger children. Older students have been targeted by interventions built around games, quizzes, and drama (Essler et al. 2006) and approaches like inclusive dialogue (i.e., discussion encouraging young people to share their understandings and consider the complexities of mental illness, with an emphasis on personal narratives over abstract concepts) (Lindley 2012). Internet- and application-based platforms are likely to have the most impact in the future, given the extremely high levels of Internet penetration and smart device ownership among younger populations. Social media provides an increasingly important route for communication and information exchange in most countries, with disproportionately high levels of use in young people. The Internet and social media are the most important source of information beyond peers. As such, they can both reinforce negative stereotypes and stigmatizing views and provide an opportunity to share accurate and positive information (education) and expose people to the real lives of people with mental conditions (contact).

The overall effect of student-focused interventions has been examined in a systematic review by Yamaguchi and colleagues (Yamaguchi et al. 2013). This review examined the impact of 35 studies, delivered via multiple means including social contact, text-based education strategies, lecture-based delivery, film, and role-play. In line with evidence from adult populations, it was concluded that interventions based on contact (either in-person contact or para-social contact, e.g., via video) were most effective in reducing participants' desire for social distance and for improving attitudes.

Suicide remains highly a taboo in many cultures, often reinforced by religious perspectives of suicide being sinful. Indeed, suicide remains illegal in many countries (World Health Organization 2014). Management of media following suicide is an important intervention not only in preventing "copycat" suicides but also in changing attitudes toward self-harm, increasing the likelihood that people will seek help rather than harming themselves and potentially changing legal and religious environments.

Placing Stigma at the Center of Improved Population Well-Being

As we have said above, new approaches to public mental health providing treatment to people identified as having mental health problems, but also recognize the importance of creating environments in which good mental health is fostered, and social and structural determinants that tend to provoke mental illness are minimized. As such, acting early on issues such as nutrition, early parent/infant relationships, and positive educational experience is crucial. There is a clear place for addressing stigma in such a process of reduction of negative risk factors for mental ill health at the population level.

A clear priority in the way that anti-stigma work is carried out is to consider children and adolescents as leading such strategies for reducing stigmatization. This age group is greatly impacted by mental illness, with around half of the lifetime cases of mental illness having their onset by the age of 14 years and three-quarters by the age of 23 years (Kessler et al. 2005). Issues around mental health, and the associated stigmatization, are as such of key relevance to youth. Many young people therefore intuitively understand the need for anti-stigma efforts, recognize the importance of such work, and have skills in communicating to their peers that older professionals do not have. Youth-driven leadership and activism have achieved changes in the knowledge of, for instance, HIV/AIDS (Maticka-Tyndale and Barnett 2010), a social movement with issues around negative attitudes comparable to that of stigma linked to mental illness. Engaging young people in efforts to combat stigmatization in relation to mental health can as such constitute a powerful approach to drive social change in this area.

Conclusion

Evidence-based and locally appropriate anti-stigma efforts are an essential component of any public mental health strategy. It complements other service components by addressing the crucial issue of social inclusion and ability to be accepted and participates in society on a par with others. Examples of successful work in this area are increasing, and positive results of their impact are a demonstration of the importance of putting people affected at the center of efforts to reduce stigmatization.

Cross-References

- ▶ Burden and Cost Associated with Childhood Bullying Victimization
- ▶ Child Abuse and Neglect in Multiproblem Families
- ▶ Diagnoses
- ▶ Education and Training
- ▶ Education in Mental Health
- ▶ Epilepsy

► Parents with Psychiatric Conditions
► Street Children, Exploitation, and Slavery

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Parents with Psychiatric Conditions

15

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Contents

Abstract

Parental psychiatric disorders, which are not uncommon, affect various aspects of family functions and child development. The heightened risk for development of psychopathology in offspring is associated with the effects of inherited genetic susceptibility and environmental influences. Parental psychopathology could limit their ability of synchrony, responsivity, and affect expression so that it is

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difficult for them to provide an optimal support for their offspring's emotional and physiological development.

Some children experience disturbances of their psychological function in response to parental psychiatric disorder, while other children of mentally ill parents show resilience against parental psychopathology or negative outcomes of their own. From a viewpoint of developmental psychopathology, child psychopathology may emerge as a result of complex and dynamic interactions between risk and resilience factors associating with emotional, behavioral, and social outcomes.

The aim of this chapter focuses on the impact of parental psychiatric disorders including mood disorders, alcohol and substance misuse, and psychotic disorders on child psychopathology. Mechanism of intergenerational transmission, risk factors for developing psychopathology, neurobiological processes, and importance of interventions are also discussed. Illuminating the influence of parental psychiatric disorders and interventions targeting both parental psychiatric conditions and parent-child interactions are important for mitigating the risk of intergenerational transmission of psychopathology.

Keywords

Parental psychopathology · Gene-environment interaction · Parent-child interaction · Intergenerational transmission · Neurobiological process · Child development

Introduction

Psychiatric disorders of parents can have adverse effects on their children and family. Their children are at increased risk of developing emotional and behavioral problems. The negative effects of parental psychiatric disorders are partly mediated by the children's exposure to poor parenting, including parental hostility and marital discord. Sharing genetic background and environment among mentally ill parents and children, some children experience psychological problems by exposure to their parents, while other children show resilience to transferring psychopathology. Elucidating a complex and multifaceted process of such intergenerational transmission of parental psychiatric conditions and available evidence may contribute to identifying points to support the family.

Parents with Psychiatric Conditions

Psychiatric disorders affecting parents are associated with risks for a broad range of negative child outcomes, which can have persisting effects on child development. In the following section, we argue the effect of depression, anxiety disorders, alcohol and substance misuse, schizophrenia, bipolar disorder, and postpartum psychosis on

child psychopathology. These disorders are common among parents in the child-bearing period and can cause serious impact on parental and family functioning.

Becoming parents can be not only a rewarding experience but also a demanding task. The responsibility of parenthood can be stressful especially during infancy and early childhood of their children. Early parenthood is considered to be a period of vulnerability and has been intensively researched. The variability in the estimated prevalence among perinatal studies in parents is partly explained by other risk factors, such as socioeconomic disadvantages, unplanned pregnancies, and lower empathy and social support from the family and/or environment (Fisher et al. 2012). In addition, parental psychiatric disorders can be also a risk factor for childhood maltreatment which constitutes a lifelong risk for child psychopathology. Illuminating the influence of parental mental illness and environmental interrelationship is of predominant importance.

Depression

Depression is a common psychiatric condition among women of child-bearing age as well as one of the frequent complications of pregnancy. Having a depressed parent is a major predictor of developing depression oneself. Hence, depression is the most extensively studied psychiatric disorder for its impact on offspring. In a 10–20-year longitudinal study, the offspring of depressed parents developed psychiatric disorders – including depression, anxiety disorder, and substance dependence – three to four times more often than the offspring of nondepressed parents (Weissman et al. 2006). Besides genetic heritability, a variety of modifiable psychosocial and environmental factors contribute to the elevated risk of depression in offspring through parental negative attributional style, parental affect, and inconsistent parenting behavior (Goodman et al. 2011).

Depressed mothers were observed to be less responsive and/or less sensitive to signals from their children than mothers without depression. Depressed mothers also display more neutral and less positive affect during their interactions with their child. A recent meta-analytic study illuminated that maternal depression was significantly associated with higher levels of internalizing, externalizing, and general psychopathology and negative affect or behavior, and to lower levels of positive affect or behavior (Goodman et al. 2011). The children at most risk for psychopathology are those whose parents are socioeconomically disadvantaged or those where the mother's depression persists (Goodman et al. 2011). Longitudinal studies have indicated associations between maternal postnatal depression (PND) and adverse child outcomes, including delayed cognitive and language development, higher rates of emotional and behavioral problems, lower school grades, and higher rates of depression at adolescence. Persistence of severe PND was particularly important to child development, substantially increasing the risk for behavioral problems at 3.5 years of age, lower mathematics grades at 16 years of age, and higher prevalence of depression at 18 years of age (Netsi et al. 2018). Their study supports the evidence that the risks of adverse outcomes are increased when PND is severe and persistent.

There are some valuable researches regarding the effects of depression in fathers on child development. The Avon Longitudinal Study of Parents and Children (ALSPAC) study showed that paternal depression in the postnatal period could adversely affect emotional and behavioral outcomes in children aged 3.5 years and was associated with increased risk of conduct problems in especially boys (Ramchandani et al. 2005). Based on two other large longitudinal studies, paternal depressive symptoms during childhood were associated with depressive symptoms in their adolescent offspring, independent of the association between maternal and adolescent depressive symptoms (Lewis et al. 2017). There is an association between depression in fathers during the postnatal period and subsequent depression in girls at age 18 years, and conduct problems in childhood seem to be a pathway for risk transmission between paternal depression and subsequent depression in adolescent offspring (Gutierrez-Galve et al. 2019). These findings emphasize the importance of recognizing and treating depression in fathers during the postnatal period and considering both parents especially when one parent presents with depression.

Given the relevant evidence mentioned above, depressive symptoms from parents can cause difficulties in their children. It is important to highlight early intervention and effective treatment of parental depression as well as preventive approach of their offspring.

Anxiety Disorders

Anxiety disorders, including generalized anxiety disorder (GAD) and social anxiety disorder, are also common similar to depression. Children whose parents have anxiety disorders have an increased risk of developing anxiety disorders. One longitudinal research on anxiety and child developmental outcomes has found that poorer child outcomes are associated with more persistent maternal anxiety (Spence et al. 2002). Antenatal anxiety has been reported to be associated with various offspring problems, including both emotional and behavioral problems (Glover 2011). Postnatal anxiety has been suggested to cause both psychological and somatic problems (Murray et al. 2009). Another study examining the role of PND and GAD that symptom chronicity on children's emotional and behavioral functioning at 24 months showed that maternal PND and GAD symptom severity were related to maternal report of child behavior problems and higher levels of emotional negativity (Prenoveau et al. 2017).

There have been reported a couple of factors in the development of child anxiety (Murray et al. 2009). Vulnerability factors include biological characteristics (genetic, temperamental) and information processing styles. Such vulnerability may be manifest in terms of behavioral inhibition, and it is possible that particular information processing biases also represent genetically mediated vulnerability. Parental anxiety may also increase risk for offspring anxiety disorder through exposure to adverse life events, which may indirectly increase the risk through diminishing the child's sense of control. In addition, anxious parents may, as a function of their own disorder, place narrow limits on their children's wider experiences, thereby restricting their opportunities to encounter challenging environment. If such parents usually respond to strangers and novel

situations in an anxious manner, such as catastrophizing and overresponse to threat, children may show avoidant behavior by mimicking parental anxious behavior. In addition, as an example of transferring information processing biases through parental cognitions, children can learn in conversations, in which, for example, parents express fear of threat about the future or the failure of challenges. These experiences can affect the child's behaviors and cognitions leading to the susceptibility to anxiety disorders.

Alcohol and Substance Misuse

Parental substance misuse including alcohol is not uncommon and has been shown to be one of the greatest consistent risk factors for child behavioral and emotional problems (Loukas et al. 2001). Alcohol and substance misuse can often coexist with depressive disorders and impact more severely on child psychopathology. Inappropriate alcohol consumption during pregnancy could be harmful to the fetus and may lead to fetal alcohol syndrome, which is the most severe form of fetal alcohol spectrum disorder (FASD). These disabilities range from abnormal appearance and intellectual disabilities as seen in fetal alcohol syndrome, to cognitive and behavioral problems that characterize Alcohol-Related Neurodevelopmental Disorder (May et al. 2014). In the United States, where fetal alcohol syndrome is believed to occur in between 2 and 7 per 1000 live births, FASD affects approximately 2–5% of young children. FASD are preventable by avoiding alcohol and, although the condition of FASD is permanent, significant efforts from the health care system could be important, since treatment can improve outcomes.

Alcohol and substance misuse are more common in men than in women although scarce research exists directly comparing the effect of paternal versus maternal problems (Ramchandani and Psychogiou 2009). A longitudinal study found that sons of father with alcoholism, rather than daughters, had an increased risk of conduct disorder and substance misuse (Loukas et al. 2001). Parental alcoholism is also associated with an increased risk of mood disorders, depressive symptoms, academic underachievement, and lower self-esteem of offspring (Chen and Weitzman 2005). There are important differences between parental alcohol and substance misuse, which might lead to different effects on children. It is reported that families in which parents use illegal drugs are more likely to live in poverty than families of alcohol users (Hogan 1998). In addition, since opiates and cocaine are illegal drugs, secrecy might exist around their use, which could result in isolation, decreased social support, and interventions of their families.

Schizophrenia and Bipolar Disorder

More than half of the offspring of parents with schizophrenia manifest a variety of other psychiatric disorders including autism spectrum disorders, ADHD, anxiety disorders, and depressive disorders, and approximately 10% will develop psychosis (Liu et al. 2015). It seems difficult and challenging for children of parents with

schizophrenia to cope with not only incoherent variations in parental mood and behavior, but also providing substantial care for their parents. A systematic review regarding offspring of parents with schizophrenia indicated that these children show distinct developmental patterns characterized by higher rates of obstetric complications, neurodevelopmental features such as motor, cognitive deficits, and distinctive social behaviors (Hameed and Lewis 2016). Offspring of parents with schizophrenia are at high risk not only for schizophrenia but also for poor developmental and general mental health outcomes. Early reviews pointed to smooth pursuit eye-movement dysfunction and impaired performance on measures of sustained attention. Recent studies consistently indicated that motor, cognitive, and social deficits were present in early childhood and relatively stable across development rather than deteriorating over time. Cognitive deficits – for example, poor executive function, deficits in working memory, and in the capacity to sustain and shift attention – are well described characteristics of schizophrenia, but it is challenging to distinguish those deficits from specific learning disorders or ADHD. Initiation of early psychosocial interventions for parents with schizophrenia and infants can improve the developmental risk trajectory and intergenerational transmission of psychosis, and promote healthy families (Liu et al. 2015).

It is well known that bipolar disorder (BD) is highly heritable from parents to offspring and early intervention and prevention efforts are recommended. Offspring of parents with BD showed a 14-fold increase in the rates of bipolar spectrum disorders and two- to threefold in any mood and anxiety disorder. In addition, high rates of disruptive behavior disorders and ADHD have been identified in offspring of parents with BD when compared with offspring of healthy parents (Birmaher et al. 2009). A prospective study reported the offspring of parents with BD to have an increased risk of a broad spectrum of disorders including BD (HR = 17.16; $P = 0.04$), major depressive disorder (HR = 17.16; $P = 0.004$), anxiety (HR = 2.20; $P = 0.03$), and substance use disorders (HR = 2.60; $P = 0.05$) compared with control. Childhood anxiety disorder was a predictor of major mood disorder, and the data based on longer observation suggested a progressive transition, the "staging hypothesis," from nonspecific psychopathology to depressive and then manic or psychotic episodes (Duffy et al. 2014).

Since schizophrenia and BD are severe forms of psychiatric disorders, careful and accurate diagnosis of these disorders is essential to achieve appropriate treatment and interventions, which may result in improvement of child outcomes.

Intergenerational Transmission of Psychiatric Disorders

A growing body of evidence is accumulating to demonstrate that psychiatric disorders in parents are associated with an increased risk of psychiatric and psychological problems in children. For example, maternal depression has been associated with an increased rate of cognitive, emotional, and behavioral problems in children. Four general explanations for the transmission of depression from mothers to children are proposed: heritability; innate neuroregulatory dysfunction; exposure to maternal

negative affect, cognitions, and behaviors; and increased stress in the family (Goodman et al. 2011). Understanding the mechanisms of intergenerational transmission, which is a complex and interactive process, is important for effective efforts at prevention and intervention of psychiatric disorders.

Stein and Harold suggested the contemporary research model that parental psychiatric disorders could be associated with disruptions in children's dysregulated neurobiological functioning (e.g., HPA axis dysregulation), disrupted cognitive-emotional-social processing (e.g., negative attributions, emotional dysregulation, less-developed social skills), and impairment of family functioning (e.g., heightened interparental conflict, negative parent-child relationships) (Stein and Harold 2015). These, in turn, could lead to negative outcomes in children. Genetic factors can interplay with adverse environmental conditions (gene-environment interaction), promoting more negative developmental psychopathology, rather than serving simply and directly as a cause of disrupted children's functioning.

Findings from recent studies suggest the complexity of genetic and/or environmental processes that underlie associations between parent and child psychopathology. Parental psychiatric disorder is presented as an early risk factor for a cascade of processes through which risk for transferring psychopathology from parents to children is increased. Recent research models have changed from examining associations between specific risk and related outcomes to examining the pathways and processes through which early disadvantage may come to constitute risk for adverse outcomes for children. Especially, factors that mediate and/or moderate initial associations can be examined as mechanisms through which risk effects are transferred, and offer sites through which targets of prevention and intervention may be aimed in order to reduce or mitigate the intergenerational transmission of risk outcomes.

For example, to prevent intergenerational transmission of depression, Garber reported three important clinical implications regarding maternal depression as a model case (Garber and Cole 2010). First, treating maternal depression may positively impact their offspring and preventing mothers from becoming depressed at all during their child's life would be ideal. Second, depression prevention programs should target young adolescents by teaching coping skills with maternal depression and its associated stressors, as well as their depressed mothers by teaching parenting skills to reduce family dysfunction. Third, multifaceted approaches to treatment and prevention of depressed parents and their offspring are necessary. To break the cycle of intergenerational transmission, it is critical to consider such several possible targets for interventions.

Neurobiological Processes

The neurobiological processes including genetic vulnerability, gene-environmental interactions, and epigenetics can contribute to the potential mechanisms of risk transmission. Epigenetic mechanisms organizing the chromatin structure such as histone and DNA modification, that do not involve changes to the underlying DNA

sequence, may mediate effects of environmental factors to transcriptional regulation of specific genes and be a primary factor in gene-environmental interactions. Developmental plasticity requires stable modulation of gene expression, and this appears to be mediated by both genetic background and epigenetic processes. Thus, both the genome and the epigenome interactively influence sensitivity to later environmental factors and the subsequent risk of disease. Epigenetics marks are considered to impact stress response, emotion regulation, disease susceptibility, and mental disorders (Scorza et al. 2019).

Mother's prenatal stress and mental illness can influence the amount and diversity of hormones (e.g., HPA axis) and thereby impact brain development (Aktar et al. 2019). From a developmental psychopathology perspective, child cognitive, emotional, and behavioral dysfunction can be partly due to inability to regulate their emotions appropriately. Two physiological and neural indices play an important role in regulation of individual's emotion. As a first index, vagal activity indexed by the respiratory sinus arrhythmia (RSA) is related to the process of physiological regulation during social engagement, which is known as polyvagal theory (Graziano and Derefinko 2013). Second index is related to the amygdala. The changes in amygdala structure and connectivity can increase vulnerability of offspring to depression (Lupien et al. 2011). Children of parents with psychiatric disorders are more likely to have physiological risk factors such as lower baseline RSA, reduced RSA withdrawal, and heightened amygdala connectivity between amygdala and other brain structures. These risk factors can contribute to heightened negative emotionality and affective disorders.

The idea that a single genotype is able to produce different phenotypes responding to different environments is important. For examples, prenatal exposure to a nutritionally sparse environment will cause a shift in the trajectory of structural and functional development toward a phenotype matched to that environment. Such a phenotype may have a reduced capacity to cope with a nutritionally rich environment later in life, and result in metabolic diseases (Gluckman et al. 2008). In this manner, fetal responses may include changes in metabolism, hormone production, and tissue sensitivity to hormones that may affect the relative development of various organs, leading to persistent alterations in physiologic and metabolic homeostatic set points.

Intervention on Parent and Child Outcomes

The effect of parental psychiatric disorders on child developmental psychopathology is a major public health issue. There is substantial research evidence on the intervention of mentally ill parents, their offspring, and parent-child interaction. Accumulating evidence on interventions have mainly concerned parental depression, suggesting that it is critical to treat their depression for child positive outcomes. A large treatment trial indicated that remission of maternal depression had a positive effect on both mothers and their children, whereas mothers who remain depressed

might increase the rates of their children's psychiatric disorders (Weissman et al. 2006).

As for interventions of parents with psychotic disorders, the major focus of various clinical applications regarding prevention and early intervention has been on prodromes and first psychotic episodes of their offspring (Hameed and Lewis 2016). The primary interventions for children of psychotic parents with early deficits include environmental enhancement and programs to improve functioning in both the social domain and the cognitive domain, including attention, memory, and mentalization approaches designed to enhance theory of mind and affect recognition (Brent et al. 2014). Furthermore, beginning with pregnancy, parents with psychotic disorders and their offspring may benefit from family-based interventions designed to promote resilience to parental mental illness, such as enhanced prenatal care, psychosocial treatments, enhancement of parenting skills, reduction of symptoms, and programs that are family-centered (Liu et al. 2015).

Other studies have especially been focused on preventing depression among adolescents of depressed parents. Preventive interventions designed to address risk factors largely involve psychoeducation teaching children about parental depression and cognitive-behavioral elements which aim to increase their psychological and physiological resilience. A randomized clinical trial suggested that the effectiveness of cognitive-behavioral program for preventing depression and promoting competence on new onsets of depression was strongest early and was maintained throughout the follow-up period, enhanced by additional booster sessions and concomitant treatment of parental depression (Brent et al. 2015). Positive mental health or wellbeing can protect against developing psychopathology. Based on a systematic review and meta-analysis, the effect of preventive interventions compared to control condition on depressive and internalizing symptoms, and incidence of depression at post-intervention follow-up was small but significant (Loechner et al. 2018).

Clinical Implications

This review underlines the importance of clinical practice and further research in the field of prevention of psychopathology in children of parents with psychiatric disorders. It is important to conduct a careful assessment for family functioning that are likely to be affected by parental psychiatric disorders, which may indicate an opportunity for potential intervention. Considering the effects of parental psychiatric disorders on family functioning, including their role, the interaction with their children, the quality of care they can provide, and relationships within the family, are likely to help a clinician to understand the family situation (Stein and Harold 2015). Subsequently, based on the assessments, clinicians can also play a positive and practical role in providing support, information, and treatment to parents with psychiatric disorder. Evidence is beginning to accumulate that the successful treatment of parental psychiatric difficulties and parent-infant relationship can contribute to be of benefit for the child and family outcomes, although this is not always the case (Fonagy et al. 2016; Letourneau et al. 2017).

On the other hand, if children are referred for psychological and/or psychiatric problems, clinicians should consider whether their parents may have a psychiatric disorder. Vigilant assessment of parental mental health could be an important part of the total treatment. For example, the UK NICE (National Institute for Health and Care Excellence) guidelines for the treatment of depression in children and young people identify the assessment of parental mood as part of the clinical assessment. Clinicians should conduct assessments carefully, since some parents are fearful that either they or their children are going to be labelled abnormal or sick mentally. In addition, since calm appearance of parents at initial visit can sometimes belly underlying difficulties, it is important to obtain information from people outside the family about the situation at home, with parental consent. There are some cases that parents spend most of the time in bed and are unable to provide appropriate support for their children and are reluctant to accept the fact. The close collaborative links with adult psychiatric service is desirable to be established, which can lead to the positive outcomes for mentally ill parents. It is critical of pursuing to assess, recognize, and arrange appropriate management of child psychological and psychiatric problems, as well as parental difficulties.

Regarding parents with depression, recent evidence implies that parental cognitive distortion may contribute to the transmission mechanism from parental depression to child outcomes. These cognitive distortions comprise a narrowed state of attention so that parent could be often overwhelmed intrusively by rumination in depression and worry/fear in anxiety (Watkins 2008). The narrowed focus of attention can adversely affect an individual's attention and response to their offspring. It is important to help parental attention shifting from internal disturbed cognition to appropriate communication with children (Stein and Harold 2015).

Children of parents with psychotic disorders often experience problematic parenting and issues with the parent-child relationship, impeding optimal development of children (Stein and Harold 2015). Children need support to cope with their parent's symptoms including delusions, hallucinations, negative symptoms, and fluctuations in mood and behavior by realizing such symptoms are part of parent's psychotic disorders. They also need to spend time with healthy adults in order to have positive experiences with their family and others. When psychotic parents require in-patient care, hospitals could consider providing space and facilities to allow children and infants to visit and spend time with their parents. Physicians should be careful about the potential danger to the child's well-being through risk from parent with delusional beliefs and/or hallucinations.

Alcohol and substance misuse impacts not only the user but also the user's family. However, a substantial proportion of affected children somehow show positive development in terms of their mental health, which is realized as resilient. A number of intervention programs have been developed for the user in relation to offspring outcomes. A review of randomized controlled trails suggests that interventions focusing on improving parenting practices and family functioning may be effective in reducing problems in affected children of parents with substance misuse (Calhoun et al. 2015). In addition, another systematic review including cross-sectional and longitudinal studies identified a secure parent-child attachment and a flexible use of

coping strategies in children as a protective mental health factors in children of parents with alcohol and substance misuse (Wlodarczyk et al. 2017).

Physicians and health professionals should consider psychiatric conditions of parents, their well-being, and family function. In addition, further research from children who adapt to their distressing life conditions should be conducted, and a focus on resilience is critical for the future.

Conclusions

Accumulating evidence has supported an association between parental psychiatric disorders and adverse child outcomes. However, since children are not always adversely affected, child outcomes and mechanisms of intergenerational transmission are heterogeneous. A nonjudgmental and compassionate approach to parents with psychiatric disorders by health professionals should be emphasized as important qualities of interventions that may facilitate parents for healthcare services in the perinatal period. Putting an equal weight on interventions of parental psychopathology and parent-infant interactions is critical for alleviating the risk of intergenerational transmission.

Finally, to improve child outcomes, future studies that incorporate both risk and resilience factors in longitudinal designs in parents with psychiatric disorders from pregnancy up to the point where child psychological disturbances develops will be critical for elucidating the mechanism of intergenerational transmission.

Cross-References

- ▶ Family Issues in Child Mental Health
- ▶ Parental Health and Early Child Development
- ▶ Perinatal Psychiatry
- ▶ Prenatal Mental Health: Continuous Care from Pregnancy

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Socioeconomic Inequalities and Mental Health Problems in Children and Adolescents

16

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Abstract

In this chapter we present findings of studies showing that socioeconomic inequalities, especially income and parental educational inequalities, are consistently associated with mental health problems in children and adolescents. Observational longitudinal and intervention studies suggest that socioeconomic status (SES) influences on child mental health are mediated by family characteristics indicating lack of parental involvement. Especially maternal mental health (e.g., maternal depression) and poor parenting practices, such as harsh parenting and less parental control, underlie the association between parental SES and child mental health. At the population level, there is some evidence that income inequality, more so than average income, is associated with less well-being in children, but little is known about possible mediating mechanisms. We advocate that, in addition to family functioning and parental mental health, other possible mediating factors such as family social network, grandparental support, leisure activities, access to and quality of special teaching programs or tutoring, childcare, but also children's lack of cognitive and social skills including self-control, should be included in studies looking at the associations between parental SES and child mental health, even if anticipated effects will be smaller. There is evidence that programs aimed at improving parenting skills and encouraging parental involvement help high-risk parents to interact with young children in ways that support their children's cognitive and socioemotional skills. School-based, universal social and emotional learning programs are effective in reducing child problem behaviors and increasing positive social skills and academic performance. Some studies suggest that universal unconditional cash transfer may result in improvements in child mental health, although effects may vary with the type of problems. With only few exceptions, intervention studies to reduce child problem behaviors and increase positive social skills and academic performance in young children of high-risk families have been conducted in developing countries and the USA. Public health and policy researchers in the field of behavioral economics should conduct more community trials in developed countries other than the USA.

Keywords

Socioeconomic inequalities · Income inequality · Family income · Parenting

Introduction

Socioeconomic inequalities in adult health, including mental health, are well documented and form a target for policy makers in many countries. Much less is known about the socioeconomic inequalities in mental health problems of children and adolescents. This is surprising, since the worldwide prevalence of 13.4% of mental health problems in children and adolescents is significant (Polanczyk et al. 2015). If parental socioeconomic status (SES) forms a risk or risk indicator for offspring's mental health, knowledge about factors that may alleviate socioeconomic inequalities in child mental health may help reduce the number of children and adolescents suffering from mental health problems. Knowledge about socioeconomic inequalities in mental health problems and successful interventions is not only relevant for children and adolescents but may impact adult well-being. If parental SES is associated with a wide array of negative health, cognitive and socioemotional outcomes in children and adolescents, including mental health problems, the well-documented persistence of these conditions into adulthood may decrease later opportunities for social mobility and affect next generation's social inequality.

What Is the Magnitude of Socioeconomic Inequalities in Child and Adolescent Mental Health?

The first general population studies that reported on associations between SES and child mental health problems in the general population showed inconsistent results. Some studies showed an inverse relationship between SES and child problem behavior (e.g., Achenbach and Edelbrock 1981), while others did not report a significant association (e.g., Rutter et al. 1970).

Later reports were much more consistent in demonstrating that low-SES children had more mental health problems than high-SES children. Achenbach and Rescorla (2007) reviewed 30 studies published between 1987 and 2005 that listed associations between measures of SES and scores on standardized rating scales from children in the general population. The majority of studies reviewed by Achenbach and Rescorla (2007) used the Child Behavior Checklist (CBCL) or the self-report or teacher versions of this scale, other studies used the Strengths and Difficulties Questionnaire (SDQ). These rating scales generate information on child problem behaviors from parents, teachers, and children themselves and can be scored on scales that are derived through factor analyses of representative samples of children. Most studies reviewed by Achenbach and Rescorla (2007) used parental occupation and/or education as SES indicator and few used family income. Despite differences in statistical analyses and SES indicators, the studies were very consistent in reporting higher problem scores and lower competence scores for lower-SES families than for higher-SES families. The effects of SES on total problems and internalizing and externalizing scores were usually rather small, accounting for $<$1–2% of the variance in the majority of studies. Some authors have argued that

there may be a trend indicating that SES disparities in child mental health in Western countries are increasing (Collishaw 2015).

Another overview of studies of socioeconomic inequalities and mental health problems in children and adolescents several years later confirmed the finding that socioeconomically disadvantaged children and adolescents are more likely to show mental health problems than children and adolescents who are better-off socioeconomically (Reiss 2013). Half of the studies in the Reiss (2013) review were published between 2006 and 2011. The majority of the 55 studies of mainly general population samples used the CBCL or SDQ, and of these studies 52 showed an inverse relationship between socioeconomic status and problem behavior in children and adolescents. Studies published after the Reiss (2013) overview were consistent with the finding that children from lower-SES families are at risk for more mental health problems (e.g., Lewis et al. 2015; Wickham et al. 2017).

In conclusion, there is solid evidence that low SES is associated with higher risk of mental health problems in children and adolescents, although the magnitude of the association is generally small.

Are There Differences in SES Indicators?

SES is a proxy for various social, economic, and educational variables. Most studies of socioeconomic inequalities and mental health problems in children and adolescents determined the independent effect of SES, including parental educational level, parental occupation status, household income, or other indicators such as welfare benefits. Some studies used a composite index of SES (e.g., Wadsworth and Achenbach 2005). Other studies used income difference as risk factor. There is some evidence from cross-national comparisons that, in rich countries, income inequality is more strongly associated with child well-being than with average income (Pickett and Wilkinson 2007). This is relevant since in most countries' inequality in income and wealth is increasing, although socioeconomic segregation is larger in the USA than in Europe (Musterd et al. 2017).

Generally, the strongest associations between parental SES and child mental health problems are for household income-based indicators (Van Oort et al. 2011), followed by parental educational level (Reiss 2013) although this may vary by country. Parental occupational level and parental unemployment had the smallest effects (Reiss 2013).

Are There Differences Between Countries?

Many social, economic, and educational variables associated with SES show variations across countries. For example, countries may differ in income inequalities, in proportion of the population living in poverty, and in access to health care or to educational facilities. Comparing SES differences in child mental health across countries may help identify which factors play a role in these disparities.

Most studies in the review by Reiss (2013) were conducted in North America, Europe, and Australia. The three studies of the 55 in the review that report no association between parental SES and child mental health problems were from Greece, Russia, and India. However, because studies differed in methodologies including SES indicators, it is not clear whether country differences are due to methodological differences or to real differences in the influence of socioeconomic inequality on child functioning.

Few studies directly compared the size of the association between parental SES and child mental health problems across countries. A study by Ravens-Sieberer et al. (2008) conducted in 12 European countries reported significantly higher OR's, indicating a greater likelihood for children from the lowest versus highest tertile of the SES measure to score in the borderline or clinical range of the SDQ, for Spain (OR = 2.64) and the UK (OR = 3.91), with an average significant OR of 1.41 for all the 12 European countries. In each country, SES was assessed with the Family Affluence Scale (FAS; Currie et al. 1997). The FAS differs from SES indicators used in most studies. It consists of questions on the family's car ownership, the child having its own unshared bedroom, the number of computers at home, and the frequency of family holidays in the past 12 months. Unlike most studies that used parental information on the family's SES, the FAS uses children and adolescents as informant. A limitation of the study was that the sampling procedures were not the same across the countries and the response rate varied widely from 24% to 91%. This severely hampers the comparisons of SES effects on child problem behaviors across countries in this study.

A direct, and much more rigorous, comparison of the association between parental SES and child mental health problems in two countries varying in access to public support services is the study by Van Oort et al. (2011). The authors analyzed two longitudinal studies from the USA and the Netherlands, using very similar methodologies, and showed that socioeconomic disparities in child mental health problems were very similar, despite the fact that The Netherlands, in contrast to the USA, has excellent public support services and protections against poverty. The two samples used parental occupational level as SES indicator and used the CBCL for child mental health problems. Occupational level, however, can be rather difficult to assess validly and occupational differences are less strongly related to child behavioral problems.

Due to methodological inconsistencies, no clear conclusions on country differences in SES inequalities of child mental health can be drawn. From existing studies, it is clear that non-Western countries are greatly underrepresented.

Are There Differences by Age and Gender?

There is some convergence that socioeconomic disparities are associated more strongly with mental health problems in younger children than in adolescents (Reiss 2013), although again variation in methodology makes it hard to draw firm conclusions. It is clear that already at 6 months of age, SES differences in the level of

problem behavior can be detected as infants of that age from mothers with low education were more likely to show difficult temperament than infants of mothers with high education (Jansen et al. 2009). However, age differences in the association between SES and child mental health may depend on the type of problem (Wadsworth and Achenbach 2005). For example, there is some evidence that externalizing problems, such as conduct problems, are more strongly affected by SES in adolescence. Yet, externalizing problems cannot be easily compared across childhood.

No consistent effects of gender on the association between parental SES and child mental health has been reported.

Are There Differences by Type of Disorder?

The impact of socioeconomic inequality across studies is slightly greater for externalizing than for internalizing problems (Achenbach and Rescorla 2007; Reiss 2013). In their longitudinal general population study of individuals aged 8–17 years, who were followed-up over a 9-year period through adolescence into adulthood, Wadsworth and Achenbach (2005) reported an increase in problem scores for low-SES adolescents with age versus very little change in the level of problems with age for middle- and high-SES adolescents, resulting in an increasing gap in problems with age between low and high SES. Although this was found for the majority of types of problems as measured with the CBCL, there was one exception. For the anxious/depressed scale (with a mix of anxiety and depression problems), which typically represents internalizing problems, the authors found that the high-SES adolescents had the most anxiety and depression and only in young-adulthood did low-SES individuals have the highest anxiety and depression scores. The finding that low-SES young-adults scored higher on anxiety and depression problems as reported by their parents confirmed findings from the adult literature where strong SES effects on depression are reported.

Do Continuity and Change of Parental SES Have an Effect on Child Mental Health?

What happens to children's mental health if families transition into or out of poverty? This is an important question to answer since the temporal order of these events tell us more about possible causality.

Using data from the UK Millennium Cohort, Wickham et al. (2017) studied children and mothers who were scored by the mothers below the clinical threshold on, respectively, a child- and self-report questionnaire of mental health problems and who were not living in poverty when children were in the age of 3 years. The authors subsequently looked at onset of child and maternal mental health problems at ages 5, 7, and 11 years of the child. They found that 14% of the children in the cohort transited into poverty in the full 8-year interval, versus 86% who remained out of

poverty. The authors reported an OR of 1.4 as risk of mental health problems for both children and mothers who transitioned *into* poverty. When controlled for mothers' psychological distress, the association between transition into poverty and child mental health problems was reduced and was not significant anymore. The associations were controlled for a number of variables, including ethnicity, unemployment, and single-parenthood. Although the sample in this study was sizeable ($N = 6{,}063$), the number of children who moved *out of* poverty was too small to allow analysis. Unfortunately, the authors used a very general measure of child mental health despite the fact that the instrument they used (the SDQ) allowed for differentiation in several subdomains of child problem behaviors, such as the internalizing versus externalizing domains.

Costello et al. (2003) tested the effects of family transition *out of* poverty on child mental health. In their natural experiment in which an entire community of American Indians living in an Indian reservation experienced significant income increases as a result of the opening of a gambling casino, 14% of study families moved out of poverty, and the originally higher externalizing problems of the children decreased to levels similar to those of children who had never been poor. For the children who moved out of poverty, the decrease in internalizing problems was much less marked. This is an excellent study as the increase in wealth or the rise out of poverty was due to the revenues of a casino and thus not likely related to baseline problems. The population in this study was American Indians, and we do not know to what extent their findings can be generalized. Strohschein (2005), using data from the National Longitudinal Study of Youth with repeated measures of children ages 4–14 across a 13-year time interval, also showed that improvements in household income reduced child mental health problems. This held true for externalizing as well as internalizing behavior.

Persistent or frequent exposure to poverty make children more vulnerable to mental health problems than children who lived under better socioeconomic circumstances (Melchior et al. 2010; Najman et al. 2010). This was true for both externalizing and internalizing problems (Fitzsimons et al. 2017).

In conclusion, studies that were able to test the effect of temporal changes in family income on child mental health showed that changes in family income were followed by changes in child mental health in the expected direction; there is some evidence that the impact varies with the type of problem.

Secular Trends and Child and Adolescent Mental Health

Western societies show improvements in general physical health and other societal standards, including key indicators of educational performance and accessibility to health-care facilities. It is therefore hard to understand why there is evidence for a substantial secular increase of adolescent emotional problems and antisocial behavior in the population prevalence in high-income countries (Collishaw 2015). One explanation may be that despite the absolute increase in income, the gap between low- and high-income groups has widened over time, and that this has implications

for child and adolescent mental health. This would best explain the strong relative differences. To our knowledge, there are no studies that directly tested this effect. Apart from possible direct effects of income inequality on child mental health, it may be that over time poorer families are exposed to more risk factors for child mental health problems. A third possibility is that the impact of income-related risk factors has become more powerful over time. A secular trend study from the UK (Gore Langton et al. 2011) compared the association between low- versus medium-/high-family income and parent-reported emotional difficulties in 15- and 16-year-olds in three cohorts assessed in 1974, 1986, and 1999/2004. Emotional difficulties were assessed with three parent-reported emotional problem items. They found an increase in income differential in adolescent emotional problems over the study period. The difference between low- versus medium-/high-family income in the level of emotional problems was similar for the 1974 and 1986 cohorts but increased for the 1999/2004 cohort. The authors found evidence that both sociodemographic risk factors for emotional problems, such as family type, maternal education, family size, and housing tenure, became more strongly associated with low-income families over time, and that the impact of these risk factors had increased over time. In other words, there is some evidence that risk factors for child developmental problems currently cluster more than in the past and may have more impact.

It is possible that improvements in societal standards have both beneficial *and* negative effects on child mental health. For example, it may be that children's better access to education coincides with greater demands on children. An example is the study by Rahim and Cederblad (1984) which compared two cross-sectional studies carried out 15 years apart in Khartoum, Sudan. This study revealed a time trend in the prevalence of child mental health problems. In 1964–1965, the authors reported few problems in children living in three villages near Khartoum, despite poor nutrition and physical health. These rural communities underwent rapid economic growth resulting in better housing, nutrition, health care, and education. Despite these improvements, the authors described that mothers reported more problems in their children in 1980 than 15 years earlier. They argued that sociocultural changes might be responsible for this increase. For example, hyperactive behavior that went unnoticed in the traditional rural life when few children attended school became a problem if children are expected to sit still in school.

Factors and Mechanisms Explaining Inequalities in Child and Adolescent Mental Health

Social Selection and Social Causation Hypotheses

There are, traditionally, two primary explanatory hypotheses for inequalities in (child and adolescent) mental health that are not mutually exclusive: the *social selection* and the *social causation* hypotheses.

The *social selection* or *downward drift* hypothesis posits that individuals with psychiatric disorders drift down the socioeconomic ladder as a result of their disorder

and the associated problems in fulfilling expected role obligations such as educational, occupational, family, and other social obligations. For severe adult psychiatric disorders such as schizophrenia, and less so for other disorders such as depression and antisocial personality, there is strong evidence suggesting that SES differences in rates of disorder are partly explained with the social selection hypothesis (Dohrenwend et al. 1992). The handicap associated with schizophrenia may impair the ability to stay employed and to secure a financial status that resembles that of the parents. However, for children there is little evidence that child problem behaviors will affect parental SES, although there is evidence that having a child with severe handicap, such as autism, may result in extra costs or may negatively affect family income because parents give up their jobs to take care of their child. In a study in the USA by Vohra et al. (2014), caregivers of children with ASD were more likely to report financial and employment burden as compared to three other special needs groups, including children with developmental disabilities or other mental health conditions such as attention deficit hyperactivity disorder or anxiety disorder. However, it is unlikely that parental financial burden in these families is so detrimental that it results in poorer child mental health outcomes. The effect is not very strong and can hardly explain the observed associations.

Social selection at the child level may play a role if mental health problems are chronic from childhood into adulthood with subsequent problems in overall adaptive functioning that reach beyond the mere level of psychopathology and extend to a broad range of maladaptive functioning such as impaired educational and social functioning (Verhulst et al. 1993), although this would not explain childhood SES differences in prevalence.

The *social causation hypothesis* posits that barriers against achieving highly valued goals (e.g., goods, services, and honor) produce stresses and strains toward deviant behavior (Dohrenwend et al. 1992). Dohrenwend et al. (1992) found evidence that social causation plays an important role in SES differences in depression in women and in antisocial personality and substance use disorders in males. Likewise, it may be that children of parents with low SES develop mental health problems as a result of adverse environmental influences. There is compelling evidence that children who, from early age onwards, grow up in extreme adverse circumstances have an increased risk of later psychiatric disorder, low educational achievement, unemployment, and increased mental health service use (Sonuga-Barke et al. 2017). Even without extreme negative environmental influences, poverty can be an adverse life circumstance that may cause mental health problems.

Mechanisms Explaining Inequalities in Child and Adolescent Mental Health

Social disadvantage is associated with poor child mental health, but SES is structural in nature, and to guide intervention strategies we must know which mechanisms mediate between SES and child mental health. This type of knowledge can aid in developing interventions. If we know more about specific modifiable influences on

child mental health that are unequally distributed across socioeconomic groups, we may be able to reduce the transgenerational transmission of SES inequalities in health.

The literature on mechanisms involved in the associations between SES and child and adolescent mental health identifies three types of mediators that are often interrelated: *individual, relational, and institutional* (Yoshikawa et al. 2012). Individual mediating factors include parental mental health, especially maternal depression, and the child's home environment, both physical (e.g., the presence of central heating, cleanliness, and presence of furniture) and supportive (investment in cognitively stimulating materials such as toys, books, and musical instruments). At the relational level, mediating factors include poor parenting practices, including parenting stress, harsh discipline, or lack of parental control. At the institutional level, possible mediators are poor quality of schools, neighborhood disadvantage, parental job instability, and access to health-care facilities.

Prenatal Influences

The negative impact of social disadvantage can be detected from the prenatal phase onwards. In the Generation R study, a Dutch population-based cohort study of children who are followed from fetal life onwards, SES differences were present in the intrauterine period, extending into the child's postnatal development. Low maternal education was associated with greater risk of premature birth and low birth weight, as well as with less fetal growth. Importantly, social differences were associated with fetal brain growth more than with peripheral and abdominal tissues (Silva et al. 2010). A number of risk factors were associated with less fetal growth, including maternal smoking, cannabis or SSRI use, low folate during pregnancy, and prenatal maternal depression, anxiety, and family stress. These psychosocial and maternal lifestyle factors are unequally distributed across SES groups and tended to accumulate in low SES families (e.g., Roza et al. 2008).

Despite the clear influences of adverse psychosocial and maternal lifestyle factors on the infant's intrauterine growth, there was no indication that intrauterine growth was associated with postnatal problem behavior. Likewise, other maternal exposures negatively affecting intrauterine growth, such as exposures to nicotine or cannabis, had little, if any, impact on later child problem behavior if carefully controlled for confounding factors. Furthermore, even if prenatal environmental exposures were associated with later problem behaviors in the preschool period, as was the case for family stress or parental psychopathology, there was no mediation by fetal growth, suggesting that much of the observed intrauterine association was due to genetic confounding or spillover of parental behavior from the prenatal to the postnatal period (Verhulst and Tiemeier 2015). Mothers who experienced family stress and who had high levels of hostility and depression in the prenatal period were also more

likely to have less positive parenting qualities, including less sensitive and harsh parenting. In other words, characteristics of the mother (and father) that were prenatally associated with less fetal growth were also associated with postnatal child functioning through continuation of these characteristics in the postnatal period. These characteristics were more prevalent in low- versus high-SES families and explain the fact that socioeconomic inequalities could be documented for early temperamental traits and problem behavior in young children.

Influences in Childhood and Adolescence

Despite differences, studies that tested the mediating role of maternal mental health, family income, and parenting practices in the association between poverty and mental health were quite consistent in describing parental emotional well-being (especially maternal depression) and parenting practices as potential mechanisms (Boe et al. 2013; Rijlaarsdam et al. 2013). Studies also described somewhat different pathways for internalizing versus externalizing problems. For example, Rijlaarsdam et al. (2013) found different pathways for internalizing versus externalizing problems when testing the mediating role of maternal mental health, the home environment, and the quality of parenting in the association between poverty and mental health in 3-year-old children from the general population. Using data from the Generation R Study, researchers found that for externalizing problems, poverty was not directly associated, all of the association between poverty and externalizing problems went through maternal depression and poor parenting. This suggests that the effect of poverty on externalizing problems operates largely through maternal characteristics and quality of parenting, in particular parenting stress and harsh discipline. In contrast, much of the association between poverty and internalizing problems was direct rather than through the home environment, maternal depression, or parenting. This suggests that characteristics of low SES families not directly related to maternal depression or parenting, such as genetic factors, are involved in the association between poverty and child internalizing problems. This is in line with the study by Costello et al. (2003) cited earlier. The income intervention that moved families out of poverty was followed by a reduction of child externalizing problems but not internalizing problems.

The effects of poverty on adolescent and young-adult mental health may depend on the duration of poverty across childhood. Poverty that persisted through childhood predicted poor young-adult (mean age 17 years) mental health irrespective of young-adult SES (Evans and Cassells 2014). However, this was only true for externalizing problems and not for internalizing problems. The associations between early childhood poverty and externalizing problems were mediated by an accumulation of psychosocial (violence, family turmoil, and child separation from family) and physical (noise, crowding, and substandard housing) risk factors during adolescence.

Influences at the Institutional Level

Societies differ in many ways including in economic, educational, cultural, and social standards. Societal institutions including the school, the neighborhood, the labor market, or the health care system may be associated with child mental health. For example, children living in neighborhoods that are disadvantaged may experience risks, including perceived danger, exposure to problematic peer and adult role models, low levels of neighborhood cohesion, informal social control, and collective efficacy (the ability of members of a community to control the behavior of individuals and groups in the community, for example, monitoring children playing in public areas).

In a general population sample from the city of Rotterdam, The Netherlands, neighborhood disadvantage was associated with an increase in parent-reported and self-reported problems, even after SES was controlled for (Schneiders et al. 2003). The New York Times (Badger and Bui 2018) published a full article on a study by the National Census Bureau (Chetty et al. 2018) with a conclusion that confirmed earlier findings, namely that poor children from one neighborhood may fare less well than poor children from another neighborhood and that there are large differences between neighborhoods in later adult income of these children. They concluded that it is largely unknown which factors drive these disparities. Of note, not all of the studies of neighborhood disadvantage sufficiently control for different indicators of parental SES and related risk factors. However, earlier studies give us some idea about factors involved in neighborhood disadvantage. In one study, neighborhood disadvantage was associated with less positive classroom climate as well as less effective instructional teaching practices (Pianta et al. 2002), and these characteristics are associated with greater child behavioral and social adjustment problems (Pianta and Stuhlman 2004). Intervention studies also confirmed that school environment is associated with child mental health. Improvements in the psychosocial environment of the school during intervention mediated most of the positive academic and behavioral student outcomes (Solomon et al. 2000).

Prevention Strategies

Two types of intervention strategies for reducing social inequality in child mental health can be described: (1) interventions that directly reduce poverty and (2) interventions that target known mediating mechanisms between social inequality and child mental health.

Interventions that Directly Reduce Poverty

Income in poor families can improve through conditional or unconditional cash transfer programs. Raising family income may have reduced family stress and may increase parental investment in their children. Examples of unconditional programs

include childhood allowances and tax credits. A problem with tax credits is that families who earn so little that they do not pay taxes do not benefit. It was shown that income tax credits increased the academic performance of children (Yoshikawa et al. 2005). There are conditional programs targeting at very-low-income families in high-poverty neighborhoods. These programs reward families for children's school attendance, school performance, and other school behaviors, resulting family increases in income. There is some evidence that universal unconditional cash transfer results in improvements in child mental health as well as improvements in marital relationship and parent–child relationship (Costello et al. 2003). To our knowledge, there are no examples of the effects of reduction of income inequality as an intervention. Some authors believe that improvements in child well-being in rich societies may depend more on reductions in inequality than on further economic growth (Pickett and Wilkinson 2007).

Interventions that Target Mediating Mechanisms

We have shown that much of the intergenerational transmission of socioeconomic disadvantage is closely related to factors determined by the family environment, in particular the quality of parenting and parental mental health. Researchers, mostly in the USA, have introduced programs that try to counteract these characteristics via interventions delivered in institutional settings, such as a school or health clinic with varying degrees of success.

Olds for example (Olds et al. 2002), studied the effects of a home visit program by nurses for high-risk mothers during pregnancy through the child's second year. Mothers were recruited from antepartum clinics serving low-income women if they either qualified for Medicaid or had no private health insurance. At follow-up, when children were age 9 years, women who were visited by nurses used welfare and food stamps for fewer months and had longer relationships with current partners. Nurse-visited children had better grade-point averages and achievement test scores in math and reading in grades 1 through 3. However, nurse-visited children did not show less conduct problems or anxiety and depression. Although the intervention had a somewhat positive impact on family income, as well as on the child's academic functioning, there were no long-term beneficial effects on child problem behaviors.

More positive results were reported by Durlak et al. (2011), who conducted a meta-analysis of studies prior to 2007 of school-based universal interventions delivered by teachers and aimed at enhancing students' social and emotional learning. Not all of the schools served children who lived in poverty, but many did. The meta-analysis entailed 213 school-based, universal social and emotional learning programs involving 270,034 kindergarten through high school students (ages 5–18 years). The authors found that there was a decrease in conduct problems and emotional problems (with little difference in effect sizes between the two types of problems), and an increase in positive social skills and academic performance.

To prevent poverty to go from one generation to the next, it is important to know if the possible beneficial effects of childhood intervention persist into adult life.

Heckman et al. (2013) conducted a long-term follow-up of preschool children who had been in The Perry program, a small randomized trial that targeted disadvantaged, low IQ African American children ages 3–4 years. This program was an intensive, teacher-administered, 2-year long program for children aged 3 years. Follow-up assessments were done up to age 40 years. The aim was to enhance cognitive and personality skills through sessions that lasted 2.5 h and were held 5 days a week during the school year. Although the program did not produce long-term gains in IQ, after an initial increase, it substantially improved externalizing behaviors which, subsequently, improved labor market outcomes, health behaviors, and decreased criminal behavior. The authors did not evaluate internalizing behaviors. Furthermore, upscaling of these small studies has not been successful (Spiel et al. 2018).

Most preventive intervention programs have been carried out in the USA. One of the few home-based intervention studies conducted in a developing country was carried out in Jamaica (Gertler et al. 2014). The intervention consisted of weekly visits from community health workers over a 2-year period who taught parenting skills and encouraged mothers and children to interact in ways that develop cognitive and socioemotional skills. The study group consisted of growth stunted children aged 9–24 months old, who were randomly assigned to psychosocial stimulation and/or nutritional supplementation or a control group. The psychosocial stimulation intervention was designed to improve maternal–child interactions and the quality of parenting. At follow-up, 20 years after the intervention, the earnings of the stimulation group were 25% higher than those of the control group. This study showed that psychosocial stimulation in early childhood for disadvantaged children can have a substantial effect on labor market outcomes and can compensate for developmental delays (Gertler et al. 2014).

Conclusions

Socioeconomic inequalities, especially income and parental educational inequalities, are associated with mental health problems in children and adolescents. Of the two major hypotheses explaining SES differences in mental health, there is evidence from longitudinal and intervention studies for social causation explaining SES differences in mental health problems in childhood and adolescence. It is unlikely that social selection is an important factor; child psychopathology is not a main cause why families drift downward on the socioeconomic ladder.

Both observational longitudinal and intervention studies suggest that SES influences on child mental health are mediated by family characteristics, indicating lack of parental involvement. Especially maternal mental health (e.g., maternal depression) and poor parenting practices, such as harsh parenting and less parental control, seem responsible for the links between parental SES and child mental health. At the population level, there is some evidence that income inequality, more so than average income, is associated with less well-being in children, but little is known about possible mediating mechanisms.

The negative effect of low parental SES on child and adolescent mental health seems to be stronger for externalizing than for internalizing problems. Also, research suggests that the pathways from family poverty to internalizing problems differ from those for externalizing problems. Poverty is partly associated with externalizing problems through maternal mental health and poor parenting factors, whereas in the association between poverty and internalizing problems other characteristics of low SES families are involved.

There is evidence from a number of small-scale studies that programs aimed at improving parenting skills and encouraging parental involvement help high-risk parents to interact with young children in ways that support their children's cognitive and socioemotional skills. School-based, universal social and emotional learning programs are effective in reducing child problem behaviors and increasing positive social skills and academic performance. Some studies suggest that universal unconditional cash transfer may result in improvements in child mental health, although effects may vary with the type of problems.

What Next?

In general, there is strong evidence that poverty is associated with child mental health problems. Less is known about mechanisms that mediate this association. This type of knowledge is important for informing prevention measures. To further our knowledge of the effects of socioeconomic inequalities on child mental health, a number of recommendations can be made based on studies that reported on socioeconomic disparities in child mental health.

1. So far, researchers focused on parental mental health and parenting quality as mediators of the association between SES and child mental health. Other possible mediating factors, such as family social network, grandparental support, leisure activities, access to and quality of special teaching programs or tutoring, childcare, but also children's lack of cognitive and social skills including self-control, should be included in studies looking at the associations between parental SES and child mental health, even if anticipated effects will be smaller.
2. The finding that different mechanisms may be responsible for the effects of poverty on internalizing versus externalizing problems needs further exploration. These studies should include genetic information such as polygenetic risk scores.
3. Secular trend studies on changes in mental health problems over time should also include careful SES measures and variables that potentially mediate the associations between poverty and child mental health.
4. With only few exceptions (e.g., Mejdoubi et al. 2015), intervention studies to reduce child problem behaviors and increase positive social skills and academic performance in young children of high-risk families have been conducted in developing countries and the USA. Public health and policy researchers in the field of behavioral economics should conduct more community trials in developed countries other than the USA.

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Part IV

Maternal Health and the Infant

Prenatal Mental Health: Continuous Care from Pregnancy

17

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Abstract

Childbirth brings biological, socioeconomical, and psychological changes to women. Health professionals need to understand fully the mother's understanding of the concept of motherhood and family. Not only psychologists and psychiatrists but also all the health staff who are working in perinatal medicine are recommended to have receptive listening skills in communication. Then it is important to receive education and training on maternal mental health to provide their service. The staff must know that most risk factors which lead women to suffer disturbances of mental health are identified during pregnancy period and that severity is different between the normal range of maternal worries and psychiatric symptoms.

Prevention, care, and treatment strategy throughout this period should be well designed to be carried out in a multidisciplinary way to women at risk or in need of care. Stigma of mental illnesses is an obstacle for women who seek emotional and psychiatric support.

Maternal mental care system starting from pregnancy which covers all kinds of problems is important for well-being of mothers and their families.

Keywords

Pregnancy · Prenatal · Maternal mental health · Transgenerational · Child outcome · Well-being · Family

Introduction

Childbirth brings many aspects of changes to women. Women have many drastic changes in their roles: as a woman, a partner, a mother, and a daughter. In modern society, a working woman needs to consider balance between work and childcare. This chapter covers mental health issues in general rather than formal psychiatric disorders which are described in the next chapter.

Importance of prenatal mental health, in particular, is mainly explained here. It should be continued to postnatal period. Mental health problems among pregnant and postnatal women have been interpreted in different ways in different cultures. Glangeaud-Freudenthal (2016) summarized the history of academic development in perinatal psychiatry. She introduced Marcé's work; in 1858, Louis Victor Marcé wrote "Treatise on psychoses of pregnant women, and newly delivered and nursing mothers." Much later in 1980, Kumar, Hamilton, Brockington, Cox, Margison, Paffenbarger, Winokur, and Oates founded an international society aimed at improving the understanding, prevention, and treatment of mental disorders related to childbearing. Since this foundation of the Marcé Society, academic and practical activities on maternal mental health and psychiatric subjects have been dramatically improved.

The members of the Marcé Society and their colleagues reported important articles and documents to promote maternal mental health by collaborating and

exchanging information, academic papers, practical knowledge, and experience. In this chapter, explanations regarding maternal emotional and psychosocial change, risk factors which disturb mental health, problems of mother-infant relationship and disturbed function of baby care, child outcome, education and training to multi-disciplinary staff, to give prevention, care, and treatment for women are given. The special issues of care for mothers who are separated from their babies treated in the neonatal intensive care unit, perinatal loss, and infertility are also explained.

The importance of maternal mental health is now spread worldwide, not only to health professionals but also all nonprofessional people. The Global Alliance Maternal Mental Health (GAMMH) was launched at the Marcé Society conference in 2016 (GAMMH homepage). Maternal mental health has become everybody's business.

What Childbirth Brings to Women

Much research has gone into understanding women's health during pregnancy and following childbirth. In this chapter we will discuss significant but still unresolved issues of prenatal mental health. We will firstly describe women's health because perinatal mental health includes wide aspects of the following issues: reproductive health, family circumstance including financial situation, bonding, and attachment styles.

Physical and Obstetric Conditions

Environmental factors can affect women's health and the subsequent health of the newborn, including use of alcohol, smoking, weight extremes (being under- or overweight), and dietary intake. Women with HIV are also concerned to protect maternal and infant health.

Many women of reproductive age are not biologically prepared for reproduction. The UK national dietary and nutrition survey shows nearly half of women are classified as overweight or obese, over a quarter are smokers, and a fifth have high alcohol consumption. These lifestyle factors can have numerous complications in both the stages of trying to become pregnant and pregnancy itself such as developing gestational diabetes, preeclampsia, fetal growth restrictions, and increased risk of miscarriage and stillbirth (Fleming et al. 2018; Stephenson et al. 2018).

Financial Health

Having a baby is expensive. Even with benefits of maternity leave, tax benefits, and allowances, there is an increased pressure on childcare. Many parents choose to return to work earlier than planned or not to return to work after childbirth. Baby care then becomes economically more viable (Centre for Economics and Business

Research homepage). There has been a cultural shift in the UK from nuclear to extended families. Most women state that family members are their first choice for baby care support (Grandparents Plus homepage).

Psychosocial Change of Women

Childbirth brings many aspects of changes to women. We need to consider emotional and psychological health of the mother to be, especially if pregnancy and childbirth is the first time. Women have many drastic changes in their roles, as a woman herself, as a partner, as a mother, as a daughter of baby's grandparent, and as a working woman with conflict of taking maternity leave or remaining at home. To become a mother, maternal bonding starts even before birth. The woman's understanding of the concept of motherhood and family is important for health professionals. As our society recently becomes more child focused, it is important to continue the intimate relationships between couples, which mean a woman could be given more emotional support from her partner.

Family Relationship

Women's mental health is directly related to family relationships. For example, women with postnatal depression have difficulties in relating with their husbands/partners if men do not understand what depression is or do not accept their suffering partners as they are. In this context, lack of emotional support from women's husbands/partners is actually a risk factor of having or worsening depression. On the other hand, husbands/partners would also suffer from mental problems including depression if their women had disturbance in perinatal periods. Maternal mental health is more directly related to mother-infant interaction and infants' outcomes (see the next chapter). Baldwin et al. (2019) reported the importance of recruiting fathers. They reported that if relevant health professionals fail to engage with fathers, they will not identify the father's mental health needs.

What Disturbs Women's Psychological Well-Being and Emotion

A number of social determinants including socioeconomic status, race/ethnicity, and a lack of social support influence a woman's risk of experiencing perinatal mental health issues. Also, a refugee or asylum seeker is vulnerable in mental health (Howard et al. 2014). Women with mental health issues may be reluctant to seek adequate treatment if they feel or have some pressure or negative influence from their surroundings or society. Even if a woman seeks care, she may not have optimal access to the services she needs. Providing high-quality perinatal mental health services has not been properly systematized, particularly in low-resource settings with limited health workforces. With regard to women's personal issues, obstetric

and infertility problems can be risk factors as well as their psychosocial vulnerability (Sejbaek et al. 2015). A study also showed that a prior miscarriage was associated with anxiety and depressive symptoms at the 14-year follow-up (Abajobir et al. 2017).

The possible risk factors of postnatal depression and bonding disorders are a history of adverse childhood experiences (ACEs), abuse, traumatic life events, personal psychiatric history, intimate-partner violence, young age pregnancy, and unwanted pregnancy (see the next chapter).

Risk factors include:

- Race/ethnicity/culture
  - Giving birth to a daughter in cultures with a strong male preference
  - Gender-based violence
  - Fear of stigma
  - Living in a conflict zone, being a refugee or asylum seeker
- Socioeconomic status
  - Poverty, poor social support
  - Medical conditions, severe obstetric complications
- Obstetric and pediatric problems
  - Experience of infertility and treatments with assisted reproductive technologies
  - Prenatal diagnosis for congenital abnormality
  - Baby's illness/disease (overload of baby care)
- Lack of social support
  - Attitudes and behaviors of maternal health-care providers
  - Single parent
  - Having a partner with no empathy or antagonistic; having belligerent in-laws; receiving no emotional or practical support from one's mother
- Specific situations related to psychiatric disorders
  - History of adverse childhood experiences (ACEs), abused
  - Traumatic life events
  - Personal psychiatric history
  - Intimate-partner violence (DV)
  - Young age pregnancy – child marriage
  - Unwanted pregnancy

Special Issues Related to Childbirth

Special Care for Separation

A baby born preterm or with low birthweight may need to be admitted in a neonatal intensive care unit (NICU). This results in separation of a mother and a baby. A woman may stay at an obstetric ward where voices of other babies can be heard. Separation can be experienced with strong distress for a woman. The mother worries

about the medical condition of the baby and the parents report feelings of guilt and shame and high levels of stress, mood, and anxiety symptoms (Roque et al. 2017). Continuous care for the woman by the medical professionals including obstetricians, pediatricians, midwives, NICU nurses, clinical psychologists, and the family care staff, for example, health visitors, prevents a woman from being alone isolated and worsening mental condition. Trainings for the NICU specialists on mental health are also important for supporting these women. Those trainings aim at doctors and nurses using receptive listening skills in communication with parents and making decisions collaboratively with them (Ahlqvist-Björkroth et al. 2017). The review by Mannava et al. (2015) showed that attitudes and behaviors of maternal health-care providers can affect patients' well-being, satisfaction with care, and care seeking. Mendelson et al.'s (2017) review showed that the trauma-focused cognitive behavioral therapy (CBT) and education adapted from COPE program and problem-solving education based on CBT achieves significantly reduced maternal depressive but not anxiety symptoms.

Special Care for Women Who Lost Their Babies

A perinatal loss includes any loss at any stage during pregnancy, including miscarriage and termination, as well as stillbirth and loss of a baby shortly after birth. Losing a baby is not just a loss of a significant person but also the losses of parental roles, dreams, and many other things. The parents who lost their baby may have multiple psychiatric symptoms. The understanding of the perinatal loss is important in caring these parents.

The Sands Guidelines have been used for caring parents who experienced perinatal loss (Hunter et al. 2016). Attendance of both parents is suitable for breaking the bad news, and a person who can stay with the parents afterward helps them. Also, the guidelines note that the bad news should be told at an early period (Aerde 2001).

The National Institute for Health and Clinical Excellence (NICE) clinical guideline for antenatal and postnatal mental health recommends to discuss with a woman whose baby is stillborn or dies soon after birth, and her partner and family, the option of one or more of the following: seeing a photograph of the baby, having mementos of the baby, seeing the baby, and holding the baby (NICE Guideline CG192 2014, updated 2020). It also says that if it is known that the baby has died in utero, this discussion should take place before the delivery, and continue after delivery if needed. Robinson argues the importance of seeing the perinatal loss from the attachment theory (Robinson et al. 1999). When accompanying the parents during the time of meeting and parting with the baby, acknowledging the relationship that a mother and a family have built up with the baby can help the parents. Having had a neonatal, infant, and/or child death was associated with symptoms of depression at 14-year follow-up (Abajobir et al. 2017). Planning pregnancy after death is complex and varies between individuals and sometimes within couples. Dyer et al. (2019)

reported the descriptive themes included deciding about subsequent pregnancy, diversity of reactions to the event, social network influences, and planning or timing of subsequent pregnancy.

Preconception Counseling

Increasingly, perinatal psychiatrists and other specialist colleagues are beginning to offer preconception counseling services to have a holistic assessment of her health and well-being in preparation for pregnancy. Timing of preconception counseling is important because the major organs and neural tube are formed at around 8 weeks gestation. Genetic counseling can be performed by checking medical history and records from both families. Conducting genetic tests with educated staff would support families to reach decisions whether to conceive or continue with the pregnancy (Biesecker 2001).

Mother-Infant Relationship and Child Outcomes

Maternal health is related to mother-infant relationships and mothering/parenting. Infancy is a critical developmental period of life, and supportive parenting is crucial for sound child development (Rayce et al. 2020). Moreover, it will be involved in a negative trajectory to the next generation. Maternal stress can be the cause of pediatric problems. Depression, for example, during pregnancy, was found to be a risk factor for low birthweight and preterm births (Dadi et al. 2020). This birth outcome will bring the women with prenatal depression an extra burden of baby care; therefore, these mothers will be pushed into a corner of no escape unless they have emotional support, care, or treatment.

Having reviewed predisposing biological and psychosocial risk factors of prenatal mental health, these suffering women had already had difficulties in baby care. A low-birthweight baby can be related to separation from the baby put into a NICU, which could lead to negative mother-infant relationship. These mothers are more likely to have bonding disorders (see the next chapter).

Murray and Cooper (1997) reported the classical important study. They followed up the children of the mothers with postnatal depression up to childhood. The study found that children's outcomes showed problems of attachment to their mothers and peer relationships in their play. Problems were more likely if the partners of depressed mothers gave insufficient support during 1 year postnatally. Furthermore, Bauer et al. (2015) followed longer outcome of children up to 16 years. The study showed that from 5% to 21% of children exposed to perinatal depression develop emotional, behavioral, or cognitive problems. Also, caring for these women from pregnancy and perinatal period is not only improving family well-being but also is cost effective. Twenty-four percent of the children would have special educational needs.

Significance of Care from Pregnant Period

Importance of maternal mental health is highlighted by the WHO (2015). In its statement the WHO advocates several objectives on maternal mental health: to provide support to the member states on evidence-based, cost-effective, and human rights–oriented mental health and social care services in community-based settings for early identification and management of maternal mental disorders; to provide strategies for promotion of psychosocial well-being, prevention, and promotion of mental disorders of mothers during pregnancy and after delivery; to support the integration of the programs with maternal and child health initiatives, reproductive health programs and mainstream them with gender sensitive, and equity and human rights–oriented strategies of WHO; to strengthen information systems, evidence, and research relevant to mental health of mothers.

The World Psychiatric Association (WPA) uses the same concepts in their position statement on perinatal mental health (2017, reviewed 2020). The WPA recommends that mental health data should include information on whether women are pregnant; have recently experienced any obstetric issues such as pregnancy loss, fertility treatment, and surgery; or have recently given birth. The WPA also points out the importance of all care providers in contact with women in the perinatal period to be trained and equipped with knowledge and skills. Then they are able to identify those women with perinatal mental disorders and give care or refer to mental health professionals to treat women. A review documented that a broad range of negative attitudes and behaviors of maternal health care providers affect patients' well-being, satisfaction with care, and care seeking (Mannava et al. 2015). The International Marcé Society for Perinatal Mental Health (International Marcé Society for Perinatal Mental Health homepage) more clearly states its major aims, which are to promote, facilitate, and communicate about research into all aspects of the mental health of women, men/partners, infants, and their families throughout pregnancy and the first 2 years after childbirth.

Conclusions

Perinatal mental health is everybody's business. This chapter focuses on prenatal mental health because most women, infants, and families should receive attention from early pregnancy rather than starting in the postnatal period. Most risk factors which lead women to suffer disturbed mental health should be identified during pregnancy period. Severity varies from normal range phenomena to very disturbed psychiatric disorders. Therefore prevention, care, and treatment strategy should be well designed in a holistic way throughout these periods in collaboration with multidisciplinary staff who are involved in pregnant and postnatal women. Education on importance of prenatal mental health and practical training should be provided to all the staff.

For well-being of the family, to de-stigmatize mental illnesses is important for the people in society so that women and family can reach to all available services with easier accessibility.

Cross-References

► Perinatal Psychiatry

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Abstract

Women in the perinatal period are at risk for psychiatric disorders. They suffer from depression, anxiety disorders, puerperal psychosis, and bipolar disorder in both the antenatal and postnatal periods. If the affected mothers could not function properly, as a result, the children's growth and development would be negatively affected. In severe cases mothers may even commit suicide. Depression is common. Incidence of postpartum depression ranges from 10% to 15%. Early detection, effective interventions, and importantly prevention should be delivered by well-trained health providers. Women with past psychiatric history of depression or depression during pregnancy are likely to have depression postnatally with a three to fourfold increase. Because of high incidence of depression and insufficient accessibility to mental health services, several screening methods including the Edinburgh Postnatal Depression Scale are widely used. Some women with perinatal depressive disorders have comorbid anxiety disorders or obsessive-compulsive disorder. Most of their symptoms are relatively mild or moderate. Women with severe symptoms need to be on psychotropic medication. The adverse impact on fetus and breastfed babies should be taken into consideration. There is little evidence of negative outcomes among the infants whose mothers were on psychotropic drugs. Therefore, maternal symptoms should be viewed as priority. This issue is important and recently many projects are in progress for well-being of infants, mothers, and families.

Keywords

Fetus · Pregnancy · Perinatal · Postnatal depression · EPDS · Breastfeeding · Bonding disorder

Introduction

Having a new baby and building up a new family are believed to be the happiest periods of our life. Pregnancy and the postnatal period, however, consist of dramatic changes. Biological conditions especially hormonal are transformed as are marital and family relationships and the psychosocial roles of non-working and working women. Women in the perinatal period are at risk of disturbances in mental health. In addition, the affected mothers may not be able to function properly, and as a result the children's growth and development may be negatively affected. In severe cases mothers may even commit suicide or infanticide.

Perinatal mental health problems reflect psychosocial and economic issues. Prevalence rates of mental disorder, most commonly depression or anxiety, have been found to be even greater in low and middle-income countries (Fisher et al. 2012). In spite of a high incidence of mental problems, the stigma of mental health issues and lack of education on perinatal mental health lead women to be reluctant to seek for support and treatment.

Not only mental health professionals but also all staff involved in perinatal medicine should pay attention to mental health issues around this period. Mental disorders are treatable. Early detection, effective interventions, and prevention should be delivered by well-trained health providers. This issue is important, and currently many projects are in progress for well-being of infants, mothers, and families.

Psychiatric Disorders in Perinatal Period

One in five women suffers from mental illness during pregnancy or after 1 year from delivery (O'Hara and Wisner 2014). Perinatal mental illness adversely affects not only mothers but also infants and families (Deave et al. 2008; Meltzer-Brody and Stuebe 2014). There is an increased risk of psychiatric episodes such as depression, anxiety disorders, puerperal psychosis, bipolar disorder, eating disorders, and personality disorder in both the antenatal and postnatal period (Howard et al. 2014; Jones and Shakespeare 2014). Yet only one-third of suffering women receive mental health care (Coates et al. 2004). From a viewpoint of public health, education on the importance of perinatal mental health should be provided for all women and families. The women and families should be aware of their needs of emotional and social support in terms of childbirth and infant care. Furthermore, it is clinically very important to identify pregnant and postnatal women at risk of suffering from mental illness as early as possible and provide early prevention and treatment. Then, those women and their children should be monitored continuously up to 1 year postnatally at shortest.

Perinatal Depression

Symptoms and Clinical Course

Women may feel low or tearful for the couple of days shortly after delivery. This phenomenon is commonly known as "maternity blues." Maternity blues is transitory, and it is mentioned that most women – nearly 80% of postnatal mothers according to Robin 1962 – have the phenomenon (Pitt 1973). Although maternity blues is not a disorder which requires any formal psychiatric treatment, we need to monitor mothers with maternity blues if they have prolonged tearfulness. This tearfulness can be an early symptom of postnatal depression.

Clinical depression is not uncommon during pregnancy and postnatal period. Depression prevalence is higher in pregnant populations than in general female populations, often due to hormonal changes during pregnancy. Depression is a common mental health disorder worldwide, which can manifest as a depressed mood, feeling of guilt, loss of interest, low self-esteem, difficulty in getting adequate sleep, and lack of concentration (WHO 2017). These depressive symptoms are not specific to this period, but mothers may express their uneasy feelings or anxiety about their babies.

Depression during pregnancy is found worldwide regardless of culture, social, political, and religious differences. It is higher in low-income countries than in middle-income countries (Dadi et al. 2020). In their review of studies, the prevalence of depression during pregnancy ranged from 5% to 30% and 15.6% to 31.1% in developed and low-income countries respectively. Kitamura et al. (1993) in Japan carried out research by using the Schedule for Affective Disorders and Schizophrenia (SADS) for confirmation of the diagnostic criteria of depression. Their study reported that 16% of the women were identified as having an onset of an affective disorder during the period of pregnancy, mainly (68%) during the first trimester. Oppo et al. (2009) reported that experiencing anxiety symptoms during the first trimester of pregnancy did not predict the onset of postnatal depression, while Ogbo et al. (2018) reported continuity of depression from pregnancy to postnatal period.

Postnatal depression is one of the most common and serious postpartum conditions, affecting 10–20% of mothers within the first year of childbirth (Gjerdingen and Yawn 2007). Studies have found that up to 50% of women with depression are undiagnosed (Chaudron et al. 2010). It used to be said that women with postnatal depression would show symptoms within a few months after delivery, usually around 2–3 months postnatally. Prospective research, however, found that in most women the onset was much earlier: within 4 weeks (Yamashita et al. 2000).

Risk Factors

The economic, maternal, and psychosocial risk factors are responsible for the occurrence of antenatal depression (Dadi et al. 2020). Dadi also suggested that the health policymakers in low-income countries should put interventions for antenatal depression as a priority issue because it is important in order to prevent the poor maternal and perinatal outcomes. With regard to prenatal depression during the first trimester, Kitamura et al. (1993) reported that the risk factors were as follows: being their first pregnancy or first delivery with past termination of pregnancy, early loss of their parent by death, high neuroticism, and psychoticism scores on the Eysenck Personality Questionnaire, living circumstances which could be crowded, and negative response to the news of the pregnancy by the husband with low intimacy. Ogbo et al. (2018) also confirmed that the history of intimate partner violence was a risk factor.

There are many studies on the risk factors of postnatal depression. The most important factor is a past history of depression with recurrence of approximately 25%–30% (Wisner et al. 2001). Oppo et al. (2009) reported that a history of depression and depression during pregnancy were associated with a three and fourfold increase respectively in likelihood of having depression by the 6th month after delivery. Oppo classified the risk factors of postnatal depression into three categories, according to their effect size: strong moderate, moderate, and small. The strong predictors are the experience of depression or anxiety during pregnancy or a previous depressive illness. In addition to these predictors, life stress and lack of social support have a moderate to severe effect size; psychological factors and marital problems have a moderate effect size, while obstetric factors and socioeconomic status have a small effect size (Ryan et al. 2005; Robertson et al. 2004). All of these predictors should be assessed during routine pregnancy care

(Priest et al. 2008). Other risk factors of postnatal depression are being 16 years old or younger, marital dissatisfaction, a vulnerable personality, and having a baby of the non-desired sex (Boyce and Hickey 2005).

Women who have the risk factors of either prenatal or postnatal depression should be detected in primary clinical settings or community based mental health centres. Most risk factors are shared between prenatal and postnatal periods, so screening women at risk of onset of depression is strongly recommended throughout pregnancy. Oppo et al. (2009) proposed that primary prevention with a reliable instrument that can easily identify women with a higher risk of depression is the key step to prevent women from suffering from depression. The screening leads to reducing the onset of depression and afterwards reducing the adverse impact of maternal depression on their children and family.

Screening

The Edinburgh Postnatal Depression Scale (EPDS)

Cox and his colleagues (1987) developed a widely used screening for women with postnatal depression. It is called the Edinburgh Postnatal Depression Scale (EPDS). The EPDS is a ten-item self-report questionnaire and has been translated in about 60 languages and the cutoff point is variable (Cox 2019). Health visitors were trained in the use of the EPDS and given information about the value and practice of non-directive counselling and about preventative strategies (Gerrard et al. 1993). Nowadays, in many countries, the EPDS has been used not only by community-based health visitors but also by other health professionals in primary clinical settings as an accurate depression screening tool (Thombs et al. 2015). Regardless of cultural or medical differences, the prevalence of postnatal depression is around 10% in the general population (Yoshida et al. 1997). Kozinszky and Dudas (2015) reviewed antenatal validation studies of the EPDS. Sensitivity and specificity estimates varied between 64–100% and 73–100%, respectively. Cox (2019) has warned that it is occasionally misused. Updated recommendations for optimal use in primary and secondary care as well as research are provided. Cox proposed that future studies to evaluate its use and validity in naturalistic community populations are required, and to determine the psychometric properties and practical usefulness of the EPDS including online use.

Whooley Questions

Apart from the EPDS, Whooley Questions (Whooley 1997) is a commonly used screening for antenatal and postnatal depression. Whooley Questions is usually administered by a midwife to perinatal women. A midwife asks two questions which are relevant to low mood and lack of pleasure or interest. These two questions are the essential symptoms of depression to be diagnosed. The Whooley Questions is used as a screening tool with the following diagnostic criteria:

Whooley∗ questions for depression

1. During the last month, have you often been bothered by feeling down, depressed, or hopeless? (YES/NO)

2. During the last month, have you often been bothered by little interest or pleasure in doing thing? (YES/NO)

YES to one or both questions is taken as a positive screen for depression.

∗ So called from the first author of the original publication (Whooley et al. 1997)

A positive response to this two-item instrument had a sensitivity of 96% and a specificity of 57% as determined by the standardized interview for major depressive disorder. Whooley (1997) concluded that the two-question case-finding instrument is a useful measure for detecting depression in primary care. Because there is limited evidence on the prevalence and identification of antenatal mental disorders, Howard and her colleagues (2018) compared the EPDS and the Whooley questions in terms of accuracy of making diagnosis of depression, by using the Structured Clinical Interview DSM-IV-TR as a gold standard. They concluded that diagnostic accuracy was similar in identifying depression. Whooley Questions, however, should be used as a clinical assessment of diagnosis only when maternity professionals have been trained to ask the questions properly and sensitively. Ukatu et al. (2018) reported that no one tool was better than others at accurately detecting postnatal depression on the basis of sensitivity and specificity. Additionally, there was no recommended time duration in which screening should be done.

Anxiety Disorders

Anxiety disorders are more common in women than men (Kessler et al. 2012). The perinatal period and 1-year postnatal periods have been reported as particularly vulnerable times for the onset or relapse of anxiety disorders in women (Martini et al. 2015). Importantly, anxiety disorder is found as a comorbid diagnosis of depressive disorder detected by the EPDS (Wisner et al. 2013).

Anxiety disorders are present in 4–39% of pregnant women and in up to 16% of women postnatally (Marchesi et al. 2016). Nath et al. (2018) estimated the population prevalence of anxiety disorders during pregnancy at 17%: 5% for GAD, 4% for social phobia, 8% for specific phobia, and 2% for obsessive-compulsive disorder. They also studied the diagnostic accuracy of the two-item Generalized Anxiety Disorder scale (GAD-2) but found that it generates many false positives and concluded that the GAD-2 may be unhelpful in maternity services (Nath et al. 2018). It is therefore prudent that mental health professionals should be clinically aware of risk factors and management strategies for perinatal women.

Risk factors for anxiety disorder were studied by Martini et al. (2015). The strongest predictors for peripartum anxiety and depressive disorders were anxiety and depressive disorders prior to pregnancy, and maternal education, low self-esteem, satisfaction with partner, and social support factors were also associated.

With regard to obstetric and pediatric problems, antenatal anxiety disorders have been associated with adverse pregnancy outcomes, including preterm birth, low birth weight, lower Apgar scores, postpartum anxiety and depression, and adverse child developmental outcomes. The latter include difficult temperament, increased sleep

problems, bonding/attachment problems, and poorer emotional, behavioral and cognitive development (Stein et al. 2014; Glover 2014; O'Connor et al. 2002).

Anxiety disorders are treatable, so early detection and treatment during the antenatal period, when women are in regular contact with healthcare professionals could prevent adverse outcomes (National Institute for Health and Care Excellence 2014).

Obsessive compulsive disorder (OCD) in particular is important for caring and treating mothers who carry out baby care. Some mothers are afraid of their thoughts of harming babies, some mothers obsessively spend their energy and time in keeping their babies as hygienic as possible. The risk in the decision to treat or not to treat OCD with pharmacological agents in pregnant women is not zero. For this reason, the treatment decision and options should be individualized (Uguz 2015).

Bonding Disorder

Significance of Bonding Disorder

Bonding disorders in the postnatal period have adverse influences on the mother-infant relationship. Emotional rejection of the infant has become recognized as a particularly morbid condition. Brockington et al. (2006a) categorized the types of bonding disorders from mild to severe levels. A mother with mild disorder expresses disappointment about her maternal feelings such as having no feelings. Or the mother feels estranged or distant from the baby as if the baby is not hers; feels herself to be a baby-sitter. A mother with rejection is distressed and appeals for help from family or others to take care of her baby, or wants to escape from baby care temporarily or permanently. These mothers all lack a positive response to the baby. Some mothers with anxiety report feeling anxious, particularly when alone with her infant. Mothers with anger may lose verbal control, shouting, screaming, or swearing at the baby. If mothers' anger is accelerated, she might experience impulses to harm the baby. Mothers may reach the extreme of committing child abuse.

The result can be serious distress and danger to both the mother and her infant in early life (Brockington et al. 2006b). While bonding disorders have been discussed in relation to perinatal depression (Brockington et al. 2006b; Kumar 1997), the two conditions differ in terms of their severity, clinical course, and response to treatment (Brockington 2016). Depression will carry more evidence of psychopathology of a formal psychiatric disease.

From the view of psychiatric treatment, antidepressant treatment for depression is sometimes effective enough by itself to improve bonding problems as well (Poobalan et al. 2007). These findings suggested that improvement of depressive mood and negative cognition of mothers could contribute to improving maternal emotional response to her infant and change of maternal behaviors in terms of sensitivity and responsiveness. However, it is not applicable to all cases. After depressive symptoms improved, bonding problems could remain. Due to the importance of bonding disorders, Brockington clearly advocated that the bonding disorder should be identified as an independent formal psychiatric disorder (Kumar 1997;

Brockington 2016). Furthermore, as bonding disorders are probably seen in all countries, maternal emotional rejection needs to be identified in addition to other psychiatric diseases.

Screening

The Mother to Infant Bonding Scale (MIBS) and the Postpartum Bonding Questionnaire (PBQ)

Bonding disorder, although not categorized as a formal psychiatric disorder, are still important to detect. There are two major screens: the Postpartum Bonding Questionnaire (PBQ) (Brockington et al. 2006a), and a screening originally invented by Kumar (unpublished) and later developed as the Mother to Infant Bonding Scale (MIBS; Yoshida et al. 2012), which is a self-reported questionnaire with ten items.

The PBQ consists of 25 questions. There are four scales: scale 1 (impaired bonding), scale 2 (rejection and anger), scale 3 (anxious), and scale 4 (abuse which is requiring urgent intervention). The other, MIBS, consists of ten questions with two factors: lack of affection and anger/rejection.

Puerperal Psychosis

Puerperal psychosis is a rare psychiatric emergency. Kendell and his colleagues (1987) reported the results of a population-based study of 470,000 people over ten years, which resulted in 54,087 births and 120 women admitted to psychiatric hospitals within 90 days of parturition. The onset rate is, therefore, 1–2 per 1000 women. The timing of admission is very early postpartum, especially in the first 30 days after birth. The other studies also suggest that the onset is typically sudden, and it occurs within the first two weeks postpartum (Kendell et al. 1987; Klompenhouwer et al. 1995).

Osborne (2018) summarized and explained the symptoms. Early warning symptoms include insomnia, anxiety, irritability, or mood fluctuation. With regard to insomnia, Sharma suggested a relationship between insomnia and labors which are prolonged or give birth in the middle of the night (Sharma et al. 2004). The psychotic symptoms are often dramatic. They include mood fluctuation, abnormal thoughts or behaviors, disorganization, and confusion. Confusion is a delirium-like waxing and waning of consciousness. The women also have bizarre delusions which often concern the child or childbirth. Delusions may also be fixed false beliefs. Their content is often bizarre or unusual and can also be sexual, religious, or violent. The delusional mother may believe that her child has been cursed by the Devil and that she must throw her baby out the window.

Although puerperal psychosis is very rare, women with a history of bipolar disorder are at highest risk. There is strong evidence that puerperal psychotic episodes run in families. Episodes of puerperal psychosis occurred in 26% of parous women with bipolar disorder (Jones and Craddock 2001). There are some possible risks being reported for first-time mothers (Valdimarsdóttir et al. 2009). Women with

postpartum psychosis require inpatient hospitalization and should be treated with lithium, antipsychotics, and benzodiazepines (Osborne 2018).

Bipolar Disorder

Bipolar disorder is characterized by chronic remitting and relapsing episodes of depression, hypomania, and mania (Clark and Wisner 2018). The lifetime prevalence is 4.4% in the USA, but women of reproductive age are more affected than other age groups. Pregnancy is a vulnerable time for episode recurrence.

Compared with women with major depressive disorder, those with bipolar disorder are at a greater risk for mood worsening immediately postpartum and are 50% more likely than those with major depression to have postpartum depression (Sit and Wisner 2009). Women with bipolar disorder are seven times more likely to be hospitalized for a first-time mood episode in the early postpartum (Terp and Mortensen 1998).

Treatment

Intervention for Depression

Prevention and early interventions for pregnant and postnatal women to prevent postnatal depression are important because of their clinical effectiveness, cost-effectiveness, acceptability, and safety for those women at risk or with psychiatric symptoms. Morrell (2016) carried out a systematic reviewing of quantitative and qualitative studies available up to 2013 to evaluate the preventive impact on women, their infants, and their families and estimated cost-effectiveness. They concluded that the beneficial interventions appeared to be midwifery redesigned postnatal care, person-centered approach, cognitive behavioral therapy, interpersonal psychotherapy-based interventions, education on preparing for parenting, promoting parent-infant interaction, and peer support. Women valued seeing the same health worker, the involvement of partners, and access to several visits from a midwife or health visitor trained in person-centered or cognitive-behavioral approaches. Educating healthcare professionals will facilitate the interventions for these women (Martínez-Paredes and Jácome-Pérez 2019). Evidence based certainty should be enhanced by randomized controlled trials.

Psychotropic Medication

Most symptoms of depressive or anxiety disorders are mild, some are moderate. Women in these conditions may be treated without medication. Community based practical and emotional support by professionals as well as by their families and

surroundings are recommended. However, women with severe symptoms need to see psychiatrists, and most of them need psychotropic medications.

Among antidepressive drugs, selective serotonin reuptake inhibitor (SSRI) is widely used. For depression or anxiety disorders that are mild to moderate in severity, it is unclear from trials whether treatment with a psychotropic is superior to untreated illness in terms of safety of fetus, due to lack of well-designed, controlled, long-term studies (Uguz 2015). Larsen et al. (2015) recommended sertraline and citalopram among SSRIs. They also explained that women with bipolar disorders may also need to be on lithium or lamotrigine can be used. Olanzapine, risperidone, quetiapine, and clozapine can be used for bipolar disorders and schizophrenia. Valproate is contraindicated.

The choice of medication should be made based on women's symptoms, but prescribers need to pay attention also to safety for fetus and breastfed babies. There are still few studies about impacts on fetus and breastfed babies. Payne (2019) reviewed the currently available data and regarded them as reassuring for most psychiatric medications that have been subjected to properly controlled studies. The results of the studies indicated small to no risk for most, but not all, psychiatric medications.

Selective Serotonin Reuptake Inhibitor (SSRI), Serotonin-Norepinephrine Reuptake Inhibitor (SNRI), and Antipsychotic Drugs

Untreated maternal psychiatric illness also carries substantial risks for the mother, fetus, infant, and family. The goal of perinatal mental health treatment is to provide optimal pharmacotherapy to mitigate the somatic and psychosocial burdens of maternal psychiatric disorders (Betcher and Wisner 2019). They reported the evidence on exposure to common psychotropics during pregnancy and breastfeeding. Selective serotonin reuptake inhibitors (SSRI) or serotonin-norepinephrine reuptake inhibitors (SNRI) are probably not associated with higher rates of birth defects or long-term changes in mental development of children after adjustment for confounding factors associated with underlying psychiatric illness.

Gustafsson et al. (2018) examined maternal SSRI and polypharmacy use in relation to serial assessments of five indices of fetal neurobehavior and Bayley Scales of Infant Development at 12 months. On average fetuses showed the expected development over gestation. Speculatively, prenatal serotonin reuptake inhibitor exposure may act as a plasticity rather than a risk factor. In their study covering in utero and early postnatal development, associations between maternal prenatal psychotropic medication use and adverse offspring development were largely unsubstantiated. Maternal depressive symptoms are well treated by the SSRI, and their findings are promising for the sake of the well-being of the mother and infant dyad.

Antipsychotics, other than risperidone and potentially paliperidone, has not been associated with an increase in birth defects. Olanzapine and quetiapine have been linked with an elevated risk of gestational diabetes (Betcher and Wisner 2019).

Antianxiety Drugs and CBT

Women in perinatal period often complain of insomnia and anxiety, these symptoms may come from their depressive symptoms because anxiety disorders are often comorbid with depression. However, some women only have anxiety symptoms.

Panic disorder and general anxiety disorder do not contribute to adverse pregnancy complications. Women may require treatment with medications during pregnancy, Yonkers et al. (2017) describe that medication can shorten the duration of gestation slightly. The mothers on antianxiety medication also may have sleepy babies. As a practical example in clinical settings, Whitelaw et al. (1981) reported that the use and monitoring of lorazepam, for the sake of neonatal care, should be restricted to hospitals with facilities for neonatal intensive care if there is to be intravenous use at any stage in pregnancy or oral use before 37 weeks.

Marchesi et al. (2016) conducted a systematic review on pharmacological and non-pharmacological treatment of anxiety disorders in the perinatal period. They found that the selected studies supported the use of cognitive behavioral therapy (CBT) for OCD, panic disorder, and specific phobia both in pregnancy and postpartum. Selective serotonin reuptake inhibitors (SSRIs) led to significant OCD and panic disorder improvement both in pregnancy and postpartum with no side effects for the babies. During pregnancy, SSRIs and tricyclic antidepressants (TCAs) led to remission of panic symptoms and healthy outcomes for the babies.

Lithium

National Institute for Health and Care Excellence (2014) advises not to offer lithium to women who are planning a pregnancy or pregnant, unless antipsychotic medication has not been effective (NICE Guideline CG192, updated 2020). If the pregnant women are on lithium, the NICE guideline explains the plasma lithium levels should be monitored monthly, and after 36 weeks into gestation monitoring should be weekly.

A systematic review by Fornaro et al. (2020) found no significant difference of having any malformation (related to exposure during any pregnancy period or the first trimester) and cardiac malformations (related to exposure during the first trimester) between offspring of women – exposed and unexposed to lithium. It also found that lithium was more effective than no lithium in preventing postpartum relapse of maternal depression. The qualitative synthesis showed that mothers with serum lithium levels <0.64 mEq/L and dosages <600 mg/day had more reactive newborns without an increased risk of cardiac malformations such as Ebstein's anomaly. They concluded that the risk associated with lithium exposure at any time during pregnancy is low, but the risk is higher for first-trimester or higher-dosage exposure. The risk estimates, however, could be lower than previously reported (Poels et al. 2018). Betcher and Wisner (2019) consider that tapering of lithium during the first trimester could be considered but should be weighed against the risks of relapse.

Antiepileptic and Other Drugs

One-third of women of childbearing age with epilepsy do not consider having children. Women with epilepsy need regular review and should receive appropriate information about the impact of their treatment in a timely manner (Crawford and Hudson 2003). Valproate carries a high known teratogenic risk in pregnancy and should only be prescribed to women unless they have no alternative medication (Whelehan and Delanty 2019). They also examine the rationale for monitoring drug levels, optimum delivery strategies, and evidence for the safety of breastfeeding while taking antiepileptic medication.

Apart from therapeutic drug prescription, misuse of substances such as alcohol, tobacco, cannabis, and addictive drugs by pregnant women is also a concern. Potential hazard extends to maternal health, adverse impact on fetus, and later child outcomes. Substance misuse leads to prolonged exposure to the fetus in utero, and it may result in a neonatal abstinence syndrome in the couple of days after birth (Raffaeli et al. 2017).

In-Patient Treatment

Women with acute onset or severe postnatal disorders need inpatient treatments. In some countries, women with severe postnatal disorders are admitted to psychiatric mother and baby units to avoid separation from the baby at a critical time for mother-infant bonding, but availability is inequitable (Glangeaud-Freudenthal et al. 2014). A Mother and Baby Unit (MBU) is a specialist, in-patient unit for some women with mental health problems during pregnancy, or after the birth of their child.

Specialist staff nurture and support the mother-infant relationship on the ward at the same time as the mother has treatment for her mental illness (Royal College of Psychiatrists 2018). The service of specialist MBUs also aims to encourage the involvement of fathers or partners while paying attention to the safety of the infants. A team on the MBU basically consists of a perinatal psychiatric consultant, occupational therapist, clinical psychologists, a ward manager, deputy managers, and a team of experienced mental health nurses, social workers, support workers, peer support workers, and nursery nurses. They specialize in the treatment of antenatal and postnatal illnesses (South London and Maudsley NHS Foundation Trust 2020). Fewer than half of the mothers in such a unit, however, were able to be discharged together with their babies, and at follow up less than a third were caring for their children. Mothers with depression were more likely to remain primary carers (Seneviratne et al. 2003). Mothers at risk for custody loss need to be monitored by the child protection services (Brown et al. 2018). The effectiveness and cost-effectiveness of the MBUs have not been investigated systematically, and research is ongoing (Trevillion et al. 2019).

Conclusions

In this chapter, formal psychiatric disorders and bonding disorders are explained with references to the clinical characteristics of women in the perinatal period and the essential points of providing mental health care for them. Women with chronic disorders, such as schizophrenia, intellectual disabilities, developmental disorders, and epilepsy, should be taken into consideration as well.

Multidisciplinary mental health care system is crucial to provide women with optimal services including prevention throughout pregnancy and postnatal. More studies are needed to focus on fathers, inter-partner relationships, and emotional support for childbearing women. Beyond these periods, continuous care and treatment, if necessary, should be provided for the sake of children's better outcome and well-being of families.

Cross-References

► Prenatal Mental Health: Continuous Care from Pregnancy

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Parental Health and Early Child Development

19

Hiroshi Yamashita, Kenichi Yamane, Daisuke Katsuki, and Keiko Yoshida

Contents

Abstract

The period from pregnancy to age 3 is when children are most susceptible to environmental influences. The period lays the foundation for health, well-being, learning, and productivity throughout a person's whole life and has an impact on the health and well-being of the next generation. The biggest threats are extreme poverty, insecurity, gender inequities, violence, environmental toxins, and poor mental health. All of these things affect parental health.

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Children's early development requires nurturing care – defined as health, nutrition, security and safety, responsive caregiving, and early learning – provided by parent and child interactions and supported by an environment that enables these interactions. Early childhood development programs vary in coordination and quality, with inadequate and inequitable access, especially for children younger than 3 years. To provide it, parents and their families – in all their diversity and all their forms, biological and social – need information, resources, and services.

Effective and sustainable interventions to improve developmental outcomes need to promote nurturing care and protection, be implemented as packages that target multiple risks, be applied at developmentally appropriate times during the life course, be of high quality, and build on existing delivery platforms to enhance feasibility of scaling-up and sustainability.

Keywords

Early child development · Nurturing care · Developmental origins of health and disease · Early mother infant interaction

Introduction

The period from pregnancy to age 3 is when children are most susceptible to environmental influences (Shonkoff et al. 2012). The period lays the foundation for health, well-being, learning, and productivity throughout a person's whole life and has an impact on the health and well-being of the next generation. The biggest threats are extreme poverty, insecurity, gender inequities, violence, environmental toxins, and poor mental health (Black et al. 2017). All of these affect parental health. The threats reduce these parental capacities to protect, support, and promote young children's development. Children in the early developmental stage need nurturing care, the conditions that promote health, nutrition, security, safety, responsive caregiving, and opportunities for early learning (Lagercrantz 2016). Nurturing care is about children, their parents, and the places they interact.

Parents are at the center of nurturing care for young children. In the period from pregnancy to age 3, parents are the people most consistently present in children's lives. As such, they are the primary providers of nurturing care. To provide it, parents and their families – in all their diversity and all their forms, biological and social – need information, resources, and services. Parents need to be included in programs that are designed to educate and support them in providing nurturing care (Richter et al. 2017). There are accumulating evidences that elucidate what strengthens parents' capacity to support young children's development. A facilitating environment is needed: policies, programs, and services that parents the knowledge and resources to provide nurturing care for young children. Community participation is a key part of this environment, which also needs to consider the diversity of children and families.

Early Child Development and Contributions of Parental Health

Developmental Origins of Health and Disease

Noncommunicable diseases (NCDs), mainly cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases, are responsible for 63% of global deaths. The Developmental Origins of Health and Disease (DOHaD) hypothesis was developed from the notion of fetal programming, initially proposed by Barker in the 1990s (Barker 1995, 2007), based on his observation on human epidemiology (Safi-Stibler and Gabory 2019). This concept postulates that the environment in which the individual finds himself/herself during his early development (pre-conceptional, in utero, and early postnatal periods) may have important consequences for his health, during his adult life, leading to NCDs. The literature about Developmental Origins of Health and Disease (DOHaD) studies is considerably growing. Maternal and paternal environment, during all the development of the individual from gametogenesis to weaning and beyond, as well as the psychosocial environment in childhood and teenage, can shape the adult and the elderly person's susceptibility to her/his own environment and diseases. The different mechanisms by which the environment can model the epigenome: receptor signaling, energy metabolism, and signal mechanotransduction from extracellular matrix to chromatin. Then the epigenetic changes in response to maternal environment during the vulnerability time windows, gametogenesis, early development, placentation and fetal growth, and postnatal period are described with the specific example of overnutrition and food deprivation. The hope and effort carried by the epigenetic field in DOHaD is the possibility of reversibility, with an intervention proposed to the individual himself/herself. In the case of epigenetic changes in response to parental environment leading to the phenotype in the first hypothesis. Alternatively by taking care of parent-at-risk in the adequate time window, we could avoid the establishment of a deleterious epigenotype in the offspring, thus preventing the development of pathology. The question of the causal chain is therefore a crucial question we have to answer now. A final aspect is that it would be time to take a closer look, 30 years after the Barker's hypothesis, at the health aspect in DOHaD. We could draw a parallel with the sociological concept of "salutogenesis" and suggest that certain foods or early behaviors that parents will provide to their children will help boost a "fitness" epigenome, helping therefore to break the vicious cycle of the NCDs pandemic.

Contributions of Perinatal Mental Health of Parents

There are some valuable researches regarding the effects of depression in fathers on child development. The Avon Longitudinal Study of Parents and Children (ALSPAC) study showed that paternal depression in the postnatal period could adversely affect emotional and behavioral outcomes in children aged 3.5 years and was associated with increased risk of conduct problems, especially in boys (Birmaher et al. 2009). Based on two other large longitudinal studies, paternal

depressive symptoms during childhood were associated with depressive symptoms in their adolescent offspring, independent of the association between maternal and adolescent depressive symptoms (Boyce 2003). There is an association between depression in fathers during the postnatal period and subsequent depression in girls at age 18 years, and conduct problems in childhood seem to be a pathway for risk transmission between paternal depression and subsequent depression in adolescent offspring (Brent et al. 2014). These findings emphasize the importance of recognizing and treating depression in also fathers during the postnatal period.

Antenatal anxiety has been reported to be associated with various offspring problems, including both emotional and behavioral problems (Brent et al. 2015). Postnatal anxiety has been suggested to cause both psychological and somatic problems (Calhoun et al. 2015). Another study examining the role of PND and GAD symptom chronicity on children's emotional and behavioral functioning at 24 months showed that maternal PND and GAD symptom severity were related to maternal report of child behavior problems and higher levels of emotional negativity (Chen and Weitzman 2005).

The Importance of Nurturing Care for Early Child Development

Nurturing care starts before birth, when mothers and other caregivers can start talking and singing to the fetus. By the end of the second trimester of pregnancy, the growing fetus can hear. And, from birth, the baby can recognize the mother's voice. Early bonding is facilitated by skin-to-skin contact, breastfeeding, and the presence of a companion to support the mother. These also build the foundations for optimal nutrition, quality interactions, and care. Soon after birth, babies respond to faces, gentle touch and holding, as well as the soothing sound of baby talk. Parents soon learn to appreciate how babies respond to them, which is essential for the optimal development of the baby's rapidly growing brain. Scientific findings from neuroscience and developmental psychology show that these caregiver-child interactions are highly beneficial for early childhood development, and have long-lasting effects. Starting from the first months, quality time with the baby, including smiling, touching, talking, storytelling, listening to music, sharing and reading books, and engaging in play, builds neural connections that strengthen the child's brain (Gutierrez-Galve et al. 2019).

Nurturing care is necessary for all babies, but premature and low-birthweight babies (and babies with congenital conditions) need it even more. Unfortunately, they often get less of it. Parents need guidance in their interaction with these vulnerable babies, because these babies' behavior and responses are often less predictable than others'. Without nurturing care, these infants are at risk of difficulties in their development. These difficulties can challenge caregivers who are already stressed by the birth of a so-called small baby. As a result, premature and low-birthweight babies may receive less attention and are sometimes neglected or maltreated, which puts them at greater risk of poor development. Health services and professionals need to give caregivers information and advice, and to support

families, particularly ones with babies who are experiencing perinatal problems. Interventions during the neonatal period, such as kangaroo care, accompanied by specific, enhanced nurturing care at home, improve neonatal outcomes in small babies and have long-term beneficial effects throughout life. There would also be greater benefits for mothers and babies if health services gave parents information about how breast milk nurtures both the child and the parent-child relationship.

The mother's nutrition during pregnancy affects her health and well-being, as well as the developing child's nutrition and growth. Young children flourish on exclusive breastfeeding, from immediately after birth to the age of 6 months, together with skin-to-skin body contact (Charpak et al. 2017; Rollins et al. 2016). From the age of 6 months, young children need complementary foods that are frequent and diverse enough, which contain the micronutrients they need for the rapid growth of their body and brain (Black et al. 2008). This is in addition to breast milk and needs to be offered in a way that accommodates the social and emotional interaction involved in feeding a young child. And when children's daily diet fails to support healthy growth, they need micronutrient supplements or treatment for malnutrition (including obesity). Food safety and family food security are essential for adequate nutrition.

Early Mother Infant Interaction

Responsive caregiving includes observing and responding to children's movements, sounds, and gestures and verbal requests. It is the basis for protecting children against injury and the negative effects of adversity which are recognizing and responding to illness, enriched learning, and building trust and social relationships. Responsive caregiving also includes responsive feeding, which is especially important for low-weight or ill infants (Engle and Pelto 2011). Before young children learn to speak, the engagement between them and their caregivers is expressed through cuddling, eye contact, smiles, vocalizations, and gestures. These mutually enjoyable interactions create an emotional bond, which helps young children to understand the world around them and to learn about people, relationships, and language. These social interactions also stimulate connections in the brain.

Due to parental depression, limitations in their ability of synchrony, reflection, and emotional expression may affect infants' emotional, behavioral, biological, and physiological profile. Infants of depressed parents tend to express less emotion, engage less in positive interactions, and elevated cortisol levels. These altered profiles may also constitute risk for intergenerational transmission.

Perinatal depression (PND) affects around 13% of mother (Stein and Harold 2015). Since infants are totally dependent on parents for their development, postnatal period has been a particular interest of clinical research and a critical focus on the benefits of early prevention and intervention. PND-mediated disturbances in parents' emotional expression, regulation of emotions, and affective synchrony could adversely affect socio-emotional development of their offspring. Further, impairments in the parent-child reciprocal regulation of affect and the resulting difficulties

in emotion regulation may contribute to vulnerability for development of psychopathology in children, especially in the presence of other risk factors such as insecure attachment and difficult temperament (Aktar et al. 2019). Those at particular risk of developing PND include women with a past history of depression, lack of social support, socioeconomic deprivation, or social isolation (Boyce 2003).

Good mental health and strong motivation are important for parents. They enable parents to recognize the child's needs and respond appropriately, empathize with a young child's experiences, and to manage their own emotions and their reactions to their baby's dependence. Mental health problems among women who are pregnant or have recently given birth are among the most common causes of pregnancy-related morbidity. In resource-constrained low- and middle-income countries, the prevalence of common perinatal mental disorders including depressive, anxiety, and adjustment disorders is much higher than in high-income settings. That is because of risk factors such as socioeconomic stresses, unplanned pregnancy, being younger or unmarried, lacking the empathy and support of an intimate partner, being subject to violence, and having hostile in-laws. Protective factors include having more education and secure income-generating work and having a kind, trustworthy partner. Depression also affects fathers. Mental health problems affect emotions, concentration, judgment, and thinking. Depressed women are likely to have irritability and pessimism, as well as difficulty expressing warmth, affection, and pleasure. They are also likely to be preoccupied with worries and anxiety, including worries about infant care (Murray 1992). These influence their social interactions, including their interactions with the baby.

Risk and Protective Factors for Early Child Development

Inequality between and within populations has origins in adverse early experiences. Developmental neuroscience shows how early biological and psychosocial experiences affect brain development. The foundations of brain architecture are laid down early in life through dynamic interactions of genetic, biological, and psychosocial influences and child behavior. Biological and psychosocial influences affect the timing and pattern of genetic expression, which can alter brain structure and function, and behavior. Through bidirectional effects, children's behavior affects brain development directly and by modifying the effects of biological and psychosocial influences. Previously identified priority risk factors for early child development are inadequate cognitive stimulation, linear growth retardation (stunting), iodine deficiency, and iron-deficiency anemia. Other priority risks are intrauterine growth restriction, malaria, lead exposure, maternal depressive symptoms, and exposure to violence. Recent research emphasizes the importance of these risks; strengthens the evidence for other risk factors including intrauterine growth restriction, malaria, lead exposure, HIV infection, maternal depression, institutionalization, and exposure to societal violence; and identifies protective factors such as breastfeeding and maternal education. Learning opportunities that facilitate early cognitive development include caregiver activities and materials that promote age-appropriate language and

problem-solving skills. Parent-child interactions that facilitate early social and emotional development include parental positive emotionality, sensitivity, and responsiveness toward the child and avoidance of harsh physical punishment. Evidence on risks resulting from prenatal maternal nutrition, maternal stress, and families affected with HIV is emerging. Interventions are urgently needed to reduce children's risk exposure and to promote development in affected children. Our goal is to provide information to help the setting of priorities for early child development programs and policies to benefit the world's poorest children and reduce persistent inequalities. Risks often co-occur and persist, leading to exposure to multiple and cumulative risks. For example, maternal depression increases risk of low birthweight, stunting, and insecure attachment. Protective factors attenuate adverse consequences of risk factors. Although risk and protective factors are conceptually distinct, many protective factors are the inverse of risk factors (e.g., insecure attachment vs. secure attachment). Studies in high-income countries have identified biological, psychosocial, and behavioral protective factors for young children, but there are few studies from low-income and middle-income countries. Maternal education also can act as a protective factor, reducing child mortality and promoting early child development. Figure 1 shows how risk and protective factors encountered

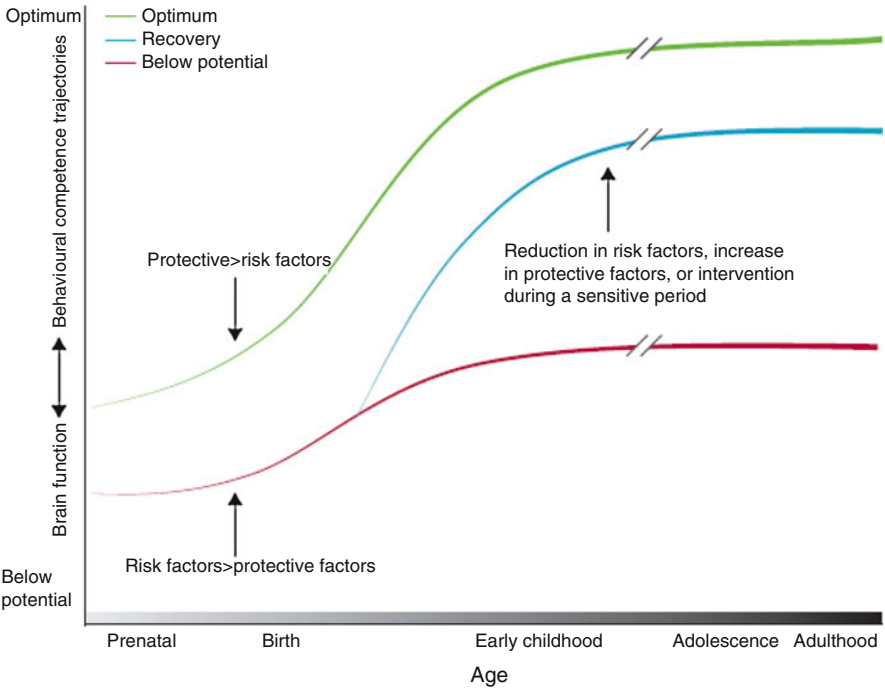

Fig. 1 Differing trajectories of brain and behavioral development as a function of exposure to risk and protective factors The cumulative effect is illustrated by the progressive strengthening (darker lines) of the trajectories over time (Black et al. 2014)

before age 5 years compromise children's development (Black and Dewey 2014). The greater the exposure to cumulative risks the greater the inequality, suggesting that early interventions that prevent inequality are more effective than later interventions, which attempt to remedy cumulative deficits. Risk factors are likely to co-occur, emphasizing the importance of integrated interventions involving the simultaneous reduction of multiple risks.

How to integrate nutrition and psychosocial stimulation programs at scale will be discussed in the next part.

Interventions for Parental Health and Early Child Development

There are many preventive and promotive interventions to improve nurturing care between pregnancy and age three. These achieve more and cost less than attempts at later ages. There have been long-term studies in countries across the socioeconomic spectrum looking at nutritional and psychosocial programs implemented from pregnancy to age 3. These studies show that the programs have significant long-term benefits, including for adult health, well-being, education, earnings, personal relationships, and social life (Britto et al. 2017) (Fig. 2).

For children to develop in the way that's best for their whole lives, parents need to have time and resources for providing nurturing care. This is facilitated by enabling environments of policies, services, community, and family. Global policies encourage healthy environments and universal coverage. Countries' social protection systems protect families and individuals when they face economic and social adversity. Health, education, and social welfare services provide parents with the necessary information and support, including specialized services for children with developmental difficulties. There are home visits for vulnerable families, giving them support, information, and assistance, and linking them with families and children who share their needs. And those who provide all this consider local attitudes, beliefs, and norms, in order to build on practices that are positive and to mitigate ones that are harmful for young children's development. At each level, a conducive environment enables families and parents to provide nurturing care for young children. The program is designed for low-income mothers who have had no previous live births.

The Nurse Family Partnership program have three major goals: to improve the outcomes of pregnancy by helping women improve their prenatal health, to improve the child's health and development by helping parents provide more sensitive and competent care of the child, and to improve parental health from life-course perspective by helping parents plan future pregnancies, complete their educations, and find work (Olds 2010).

Figure 3 summarizes how these influences are thought to reinforce one another over time. On the far left side of this figure we note the three broad domains of proximal risks and protective factors that the program was designed to affect: prenatal health-related behaviors; sensitive, competent care of the child; and early parental life-course (pregnancy planning, parents' completion of their educations,

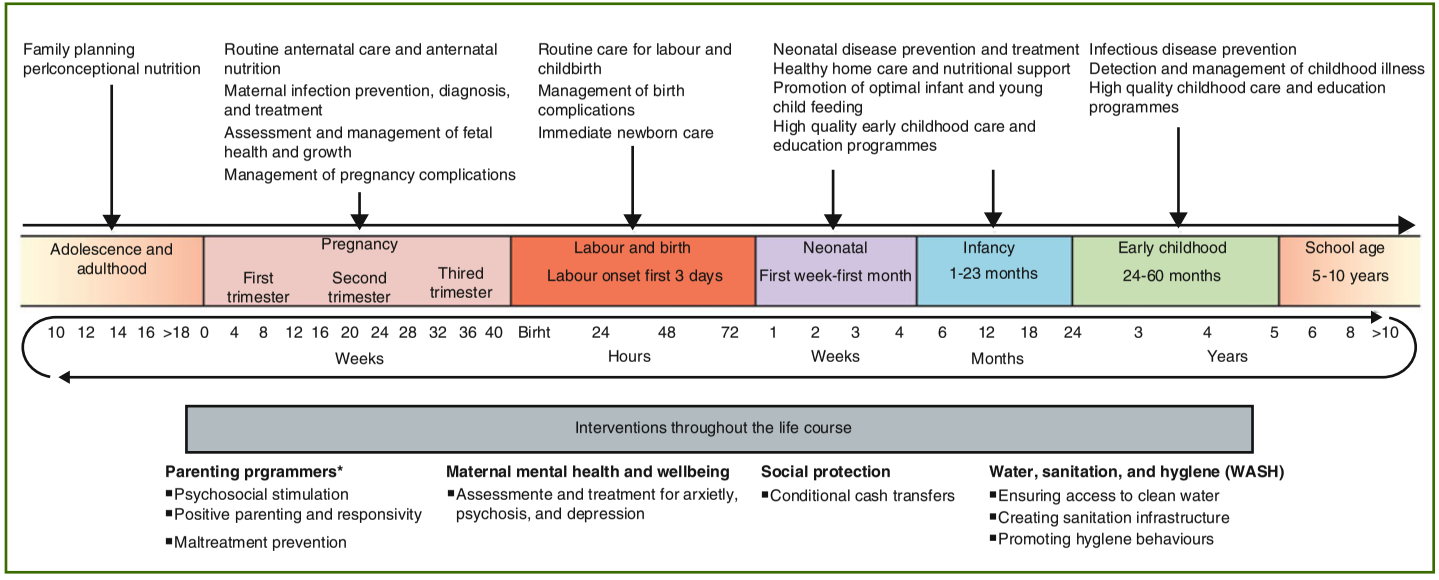

Fig. 2 Evidence Based Interventions that affect aspects of nurturing care (Britto et al. 2017)

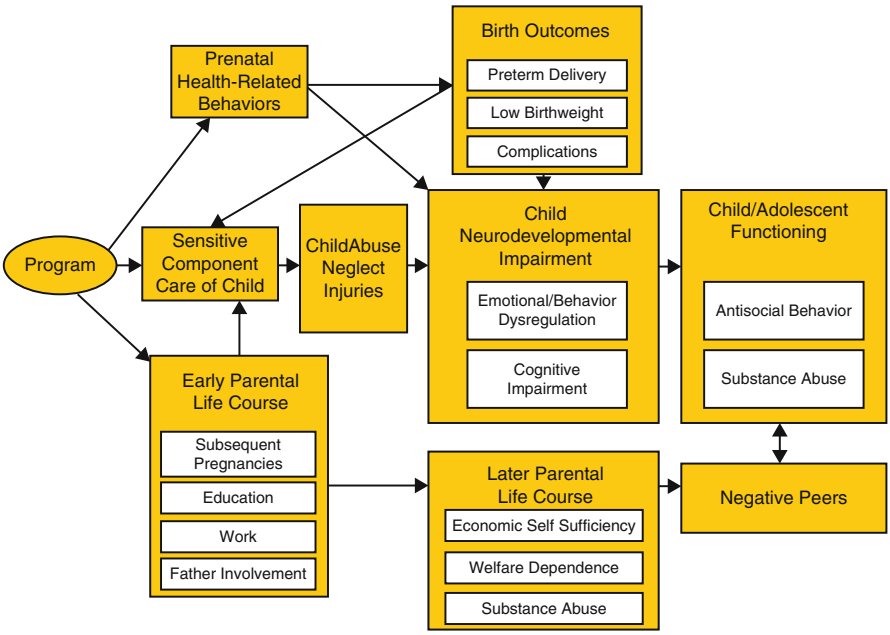

Fig. 3 Conceptual model of program influences on maternal child health and development (Olds et al. 2010)

finding work, and father involvement in the lives of their children). The middle set of outcomes reflects corresponding child and parental outcomes that the program was designed originally to influence: birth outcomes (obstetric complications, preterm delivery, and low birthweight), child abuse, neglect and unintentional injuries, child neurodevelopmental impairment (perturbations in emotional, behavioral, and cognitive development), and later parental life-course (family economic self-sufficiency, welfare dependence, maternal substance abuse). On the far right, we show child and adolescent outcomes that the program might affect years after completion of the program at child age 2, including school failure, antisocial behavior, and substance abuse.

There are also effective interventions for reducing depression and promoting maternal mental health. They are generally implemented by trained community health workers under professional supervision. Interventions designed to improve mothers' mental health have a positive impact on infants' health and development. And interventions to promote infants' health and development have a positive effect on mothers' mood. The effects on infant health and development appear to be stronger when interventions for mothers and babies are provided together. Interventions that improve parenting and the quality of the parent-child relationship have been shown to have long-lasting benefits on a range of both externalizing and internalizing symptoms of offspring. A randomized controlled trial indicated that, in addition to intensive treatment for persistent postnatal depression, additional

specific parenting intervention such as video-feedback therapy could be effective for child development outcomes leading into the normal range (Stein et al. 2018). Another randomized controlled trial suggested that the relationship-focused behavioral coaching intervention by home visits of nurse in increasing maternal-infant relational effectiveness between depressed mothers and their infants during the first 9 months postpartum, where nurse taught mothers to identify and respond sensitively to their infant's behavioral cues, increased in quality of mother-infant interaction and decreased in depression severity (Horowitz et al. 2013). Interventions targeting both parental psychopathology and parent-infant interactions appear promising in mitigating the risk of early intergenerational transmission (Aktar et al. 2019). The treatment of prenatal depression appears to have beneficial effects on offspring self-regulation, stress reactivity, and temperament. The combination of effective early interventions targeting parental depression and parent-infant relationship may significantly improve child outcomes, compared to the interventions addressing either parental psychopathology or parent-infant relationship in isolation.

Conclusions

New evidence supports a life-course perspective on childhood development primarily through advances in neuroscience and longitudinal follow-up approaches. Poverty and adverse childhood experiences have long-term physiological and epigenetic effects on brain development and cognition. The accumulation of adversities, beginning before conception and continuing throughout prenatal and early life, can disrupt brain development, attachment, and early learning. Developmental delays are evident in the first year, worsen during early childhood, and continue throughout life.

Children's early development requires nurturing care – defined as health, nutrition, security and safety, responsive caregiving, and early learning – provided by parent and child interactions and supported by an environment that enables these interactions. Early childhood development programs vary in coordination and quality, with inadequate and inequitable access, especially for children younger than 3 years. New estimates, based on proxy measures of stunting and poverty, indicate that 250 million children (43%) younger than 5 years in low-income and middle-income countries are at risk of not reaching their developmental potential (Black et al. 2017). There is therefore an urgent need to increase multisectoral coverage of quality programming that incorporates health, nutrition, security and safety, responsive caregiving, and early learning. Coordinated multisectoral, multilevel programs might be necessary to reduce multiple adversities while enhancing protective factors.

Effective and sustainable interventions to improve developmental outcomes need to promote parents' nurturing care and protection, be implemented as packages that target multiple risks for parents and child, be applied at developmentally appropriate times during the life course, be of high quality, and build on existing delivery platforms to enhance feasibility of scaling-up and sustainability.

Cross-References

- ▶ Parents with Psychiatric Conditions
- ▶ Perinatal Psychiatry
- ▶ Prenatal Mental Health: Continuous Care from Pregnancy

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Infant Feeding and Clinical Problems

20

Yumi Nishikii and Keiko Yoshida

Contents

Abstract

The ultimate goal of perinatal mental health care is the next generation's wellbeing. During the perinatal period, the infant establishes autonomous internal regulation of feeding and emotions, and rhythms of sleep and elimination. Perinatal mental health care focuses on problems in these basic functions as well as on the mother-infant dyad. In this chapter, we describe feeding problems and disorders.

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Feeding problems are not rare if they are minor or temporary; however, only 1% of infants have a serious feeding disorder. Feeding problems are assessed by using a comprehensive procedure including the assessment of the infant's and mother's behaviors, the mother and infant relationship, and various psychosocial and environmental factors. Feeding disorders are treated by a multidisciplinary team, including psychiatrists, pediatricians, dietitians, speech therapists, and psychologists. For the outpatient treatment of feeding disorders, it is important to target the mother-infant interaction in daily situations, such as meal time, directly.

Keywords

Feeding disorders · Infant mental health · Avoidant/restrictive food intake disorder · Mother-infant relationship

Introduction

Infant mental health especially in postnatal period is connected to the quality of relationships with caregivers. The problems of infant mental health, including excessive crying, sleeping, or feeding problems, can be stressful for the mothers and could deteriorate mutual interactions of the dyad. Meanwhile, feeding problems can result in failure to thrive and severe medical conditions of the infants. The focus of this chapter is on the feeding problems and disorders which occur in the first year of life.

Development of Feeding

In utero, the fetus receives nutrients passively through the maternal umbilical cord. However, from the moment of birth, infants obtain nutrition actively. In a reciprocal way, mothers respond to their babies' cues of hunger by feeding them. During the first year of life, oral motor skills develop rapidly, enabling infants to move from exclusively breast or bottle feeding through sucking to chewing solid foods. This process is promoted through reciprocal interactions between mother and infant and unfolds through three stages: (a) state regulation, (b) dyadic reciprocity, and (c) transition to self-feeding (Chatoor 2009).

The first stage (a), in the first few months after birth, is called state regulation, in which infants must signal hunger and satiety to their caregivers by crying. If caregivers appropriately respond to them, infants will become calm. For success of the state regulation of infants, their caregivers must learn to differentiate between various cries, including the differentiation between cries that signal hunger from cries that are associated with other physical signs or with emotions. The second stage (b), which can begin anywhere from 2 months to 6 months, is called caregiver-infant reciprocity. By 2 months, infants are able to show social smiles, and they are

increasingly capable of communication with their caregivers through eye contact, body language, and vocalization. Feeding becomes a mutually regulated and usually enjoyable process through the infants' developing communication skills and the mother's ability to respond. The third stage (c), between the age of 6 months and 3 years, is called the stage of motor and cognitive maturation. Infants become physically and emotionally more independent from their caregivers. This is a transitional period to self-feeding. Throughout those developmental stages, it is clear that the role of primary caregivers is crucial for a smooth transition from the stage to the next of the infants' feeding skills.

Feeding Disorders

Definition and Diagnostic System

Regarding the international diagnostic system, in the most recent edition of the Diagnostic and Statistical Manual of Mental Disorders, the fifth edition (DSM-5), feeding disorders are grouped into "Avoidant/Restrictive Food Intake Disorder (ARFID)," which is a subcategory of "Feeding and Eating disorders" (Bryant-Waugh and Watkins 2015). Eating disorders occurring both in infancy and in older children are well described in ARFID, such as food avoidance emotional disorder, selective eating, food phobias, and functional dysphagia; however, descriptions of the features for infant feeding problems in the first year of life are limited. Keren described that a further available classification relevant to infants is The Diagnostic Classification of Mental Health and Developmental Disorders in Infancy or Early Childhood (DC: 0–5; 2016), which is the revised version of DC: 0–3 and can be used by child psychiatrists to classify mental health problems in younger children (aged 0–5 years). "Eating Disorders of Infancy/Early Childhood" is the renewed category of the DC: 0–5, in which various feeding disorders in infancy are defined descriptively by observable symptomatic behaviors rather than by etiologies. This includes subcategories: (1) overeating disorder, (2) undereating disorder, and (3) atypical eating disorder: pica, rumination, hoarding, and pouching (Keren 2016).

Risk Factors and Etiology

Feeding and eating disorders are complex multifactorial disorders. There is little in the literature about risk factors for feeding (Bryant-Waugh and Watkins 2015). As for factors recognized in the postnatal period, parental mental problems relating to feeding disorders have been investigated. Mothers with lifetime eating disorders, including bulimia and anorexia nervosa, have been shown to increase the risk of feeding difficulties in their offspring. In the Avon Longitudinal Study of Parents and Children (ALSPAC), women with lifetime eating disorders have been compared with women without any lifetime psychiatric disorder (Micali et al. 2011). Micali et al. suggested in this study that maternal lifetime eating disorders and maternal

symptoms of eating disorders in pregnancy have a direct effect on infant feeding problems and also have a mediational path via maternal anxiety and depression in pregnancy and/or postnatal. In turn, feeding difficulties increased maternal anxiety and depression in postnatal period. Maternal postpartum depression is well known to affect various aspects of parenting. Hughes et al. showed the impact of parent's depression and the parenting stress, not only mother's, on the young child's eating behavior (both undereating and overeating) (Hughes et al. 2015).

Not all eating problems are relational. Indeed, infant's eating disturbance may reflect own developmental characteristic, including constitutional difficulties of state regulation, difficulties in making changes and transitions, sensory aversions, and reactions to traumatic medical procedures or conditions.

Assessment

The DC: 0–5 is descriptive and focusing on especially behaviors rather than pathophysiology and etiology. Using this diagnostic system is significant for clinicians as a step in the further process of the clinical formulation. The formulation needs to capture psychosocial factors, infant's somatic and psychiatric factors, and parental factors described below, to demonstrate clinical significance.

1. Assessment of psychosocial factors: Regardless of the types and causes of eating disorders, history taking must address predisposing, precipitating, perpetuating, and protective factors derived from clinical examination.
2. Assessment of infant factors: the younger the child, the more important it is to do physical assessment and investigate organic diseases. Dysphagia and odynophagia may present with food refusal. Coughing or choking may suggest uncoordinated swallowing. Aspiration can be subtler and result in wheezing chronically. Involvement of a pediatrician might be required; however, it is noted that failure to thrive is more often a feature of behavioral problems than of organic disease (Kerzner et al. 2015). Meanwhile, behavioral assessment of infants with feeding disorders is essential, whether or not possibly coexisting somatic problems are identified. Undereating in DC:0–5 includes delay or lack of eating skills, refusal to eat solid foods, lack of interest in food, poor appetite, fear of traumatic events such as invasive medical procedures or choking, and selective eating. Some infants may resist weaning from breastfeeding. In the second half of the first year, especially at the transition to solids food, those problematic eating behaviors may appear.
3. Assessment of parental feeding styles: as the parents' attitude toward their infant can alter the infant's eating behavior in a positive or negative way, behavior assessment and modification can be beneficial for treatment. Recently, a classification of four feeding styles has been proposed, in which Kerzner et al. referred to the caregiver's preferred feeding style as responsive, and the remaining three behavioral styles, which are controlling, indulgent, and neglectful, generally have negative consequences (Kerzner et al. 2015).

To aid assessment, there are parental rating scales to assess feeding problems that provide useful information (Nicholls and McCrann 2017); however, a full clinical evaluation, including mealtime observations, is necessary to obtain a complete picture of the child's feeding problems and to formulate a treatment plan.

Treatment

Although various treatment approaches for feeding disorders have been reported, evidence of the efficacy of these treatments is limited due to a lack of any systematic evaluation of specific and clearly described interventions (Hay et al. 2014). Behavioral management (e.g., stable nutrition intake and regular mealtimes, without distractions, such as television or cell phone, with a pleasant neutral attitude during mealtime), parental psychoeducation to correctly recognize the infant's cues during mealtime, parent–infant interactive guidance aimed at improving the caregiver's feeding styles (e.g., controlling, indulgent, or neglectful) are the most commonly described approaches which can be applied to feeding disorders in infants (Chatoor 2009; Kerzner et al. 2015; Luiselli 2000; Silverman 2015). In addition, several methods of intervention that address tactile sensitivity and support the infant's need to have a sense of control with attention to appropriate nutrition in infancy have been reported (Angell 2010). Woolley et al. used detailed video-analyses of mealtime sessions and video-feedback intervention to mothers with eating disorders and their infants in the postnatal period. The results from this study indicated that mothers with eating disorders had significantly more mealtime conflicts with their infants than other daily conflicts. The video-feedback was successful in reducing mealtime conflicts and also improving other aspects of the mother-infant interaction; however, longer-term treatment outcomes are unknown (Woolley et al. 2008).

Treatment strategies for feeding problems should address somatic, behavioral, and psychosocial contributors to these problems in the infant, the parent, and their relationship. The complexity of feeding disorders necessitates the integration of several types of treatments to each individual presentation of a feeding disorder. For instance, Toomey's SOS (sequential–oral–sensory) approach is a transdisciplinary program that follows typical developmental feeding stages and systematically guides the child through a hierarchy of skills and behaviors and a continuum of textures of food. The SOS approach is applicable for children from birth to 18 years (Toomey and Ross 2011). The children between 18 months and 7 years of age respond most effectively to the program of the SOS, which is commonly carried out in a peer-feeding group. Meanwhile, for the children who are less than 18 months of age, the SOS program is applied in an individual therapy session, including the infant and at least one parent, and the therapist (Toomey 2010). There are no published data which is available to explore the efficacy of the adaptation of this program for the infants younger than 18 months.

Clinical Example

A 2-year-old girl and her mother were referred to our outpatient psychiatric clinic. The girl had symptoms of avoidance of any food and failure to thrive.

The mother was in her 30s and had a past history of anorexia nervosa herself in her teens. During pregnancy, she had marital discord and had suffered from depression. At 3 months after her daughter was born, domestic violence from her husband occurred. At 6 months postnatally, the mother divorced and was diagnosed with postpartum depression.

At the age of 6 months, the girl had avoided eating any solid food and accepted only breast feeding. She showed poor physical growth and at the age of 2 years her weight was only 7 kg. At the age of 1 year, the girl entered a nursery where the nurses forced her to eat with harsh discipline. The girl, however, refused to eat and showed rapid weight loss and became withdrawn and expressionless. The girl was removed from the nursery by her mother. The nurses in the next nursery kindly encouraged the mother to wean her infant from breast feeding. The girl also continued to avoid eating solid foods except formula milk with a nursing bottle or a spoon, threw temper tantrums, and did not gain weight.

The therapist set up 30 min mealtime-observations in our outpatient clinic to assess mother and infant interaction during feeding. The mother took food from home that she usually tried to feed her infant as well as bottled milk for the observations. The girl sat still on her mother's lap and looked around suspiciously. The mother looked nervous and started to feed solid food to the girl in haste. The girl rejected that the spoon touched her lips and brush the spoon off from her mouth with a sour look. When her mother saw that, the mother showed tension more and was frightened by something. The therapist suggested the mother to feed her daughter anything she wanted to eat. The mother fed her infant the bottle of milk.

Assessment of this case included: (1) psychosocial factors: parental discord that included domestic violence; (2) infant factors: difficult temperament, sensory aversion without verbal developmental delay, depressive mood and withdrawal, poor appetite, and fear of feeding as a reaction to forceful feeding by nurses at the first nursery, malnutrition with severe growth failure; (3) maternal factors: postnatal depression with a history of anorexia nervosa and indulgent feeding style, lack of clear instructions toward the infant during mealtime and lack of restrictions toward the infant indicating mother's fear of rejection by her own infant.

Mother and infant were treated by a multidisciplinary team. The pediatrician and dietician provided nutritional guidance for the mother about appropriate amounts or types of foods. The infant was helped by the speech therapist and the psychologist to learn how to bite comfortably and was challenged to tolerate new textures of food. The mother's depression was treated. Individual psychotherapy with the mother aimed at her fear for interpersonal anger. To improve maternal feeding style and mother-infant relationship during mealtime, the speech therapist, the psychologist, and the child psychiatrist set up several mealtime sessions in the outpatient clinic. They helped the mother to read and respond to her infant's hunger cues appropriately, and to apply more structure and restrictions. After we continued this approach

for 2 years in our outpatient clinic, the infant's eating behavior and physical growth improved with normal cognitive development.

Conclusion

Feeding disorders in early life should be recognized because feeding problems in children are common with various degrees of severity. Feeding disorders in infants may have negative influences on both mother's and infant's wellbeing, with long-lasting negative developmental consequences. Treatment consists of holistic support and care by a multidisciplinary team. Especially in the first year after birth, treatment should not only address improvement of the interaction between the mother and her infant during but also across other situations.

Cross-References

▶ Parental Health and Early Child Development

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Part V

Physical Conditions and Child and Adolescent Mental Health

Toxins and Pollution

21

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Contents

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Abstract

This chapter describes the major hazards in the physical environment that alter the development of the brain and predispose to mental disorders. Neurodevelopmental disorders such as autism spectrum disorders and attention-deficit/hyperactivity disorder are often associated. Industrial pollution with heavy metals, exposure to insecticides and other chemicals, and early influences of tobacco, alcohol, and certain drugs have all been implicated. Some individuals are predisposed (e.g., by genetic constitution) to adverse reactions to substances in an ordinary diet, including artificial dyes and additives, and to recreational substances such as cannabis. Selective deficiencies of some micronutrients can also have harmful effects and are described here. Clinical implications are drawn out.

Keywords

Toxins · Insecticides · Lead · Mercury · Allergens · Pollution · Early adversity · Neurodevelopment · Epidemiological designs

Introduction

Early adversity is a potent cause of mental disorders in children. Some of this damage can be traced to the physical effects of environmental influences on the developing brain (Taylor and Rogers 2005). The influences are particularly strong on brain development in fetal and early childhood life. There is controversy about their importance and the ways in which they work. This chapter will therefore outline the state of scientific knowledge and the clinical implications. It will be organized by the nature of the most important hazards of the physical environment, with the exception of malnutrition which will be the subject of a separate chapter (Table 1).

Our knowledge of the effect of toxic influences on the child population comes from several sources. Concern has often arisen in the first place from urgent situations of epidemics of pollution, from findings of associated risks in population surveys, or from political concern. Many concerns relate to low levels of exposure to dangerous substances and to any threshold effects. The associations found in surveys and in case-control studies include heavy metals, exposure to

Table 1 Environmental physical hazards for brain development

Metals
Lead, mercury, manganese
Chemicals in Pregnancy and Infancy
Organohalogens, other pesticides, alcohol, tobacco, fluoride, prescription drugs, cocaine, air pollutants
Chemicals in postnatal life
Cannabis, food additives, allergens

chemicals in pregnancy, postnatal chemical pollution, e.g., in diet and air quality, and post-natal deficiencies, e.g., of vitamins, minerals, and essential organic acids. Many have been investigated primarily for their effects on IQ and ADHD (Polańska et al. 2012) but influences on autism have often been considered separately (Newschaffer et al. 2007).

Several designs have been able to progress from the finding of an association with a clinical problem to investigate whether the effective exposure is itself the direct cause (Taylor 1991). Investigators have gone beyond case-control studies to considerations of etiology. Animal studies predominate, but it is hard to generalize from these to human children. Design questions include:

- Is there a dose-response relationship?
- Does the association still hold after adjusting for possible confounders such as social adversity?
- Are there prospective studies of an exposed cohort?
- Are there opportunities for natural experiment, i.e., an exposure which is not influenced by the decisions or qualities of children and their families?
- Is there a plausible mechanism? Is it possible to exclude genetic influences on exposure and effect? Are the effects reversible?

Metals

Lead

Lead is a toxic substance found nearly everywhere as a result of industrial pollution. The common sources are from old paint, industrial plants (such as battery recycling and smelting), petrol fumes (from vehicles using organic lead as anti-knock measures), and old water pipes in soft water areas.

Prenatal lead exposure can be detected by measuring in cord blood. There is a dose response relationship. The reduction of IQ and worsening of behavior are directly proportional to blood level (Wani et al. 2015). Covarying for potentially confounding influences, such as social adversity, has usually reduced the size of the relationship but not abolished it completely. Natural experiments, such as monitoring the effects of introducing and subsidizing lead-free petrol, have been effective in reducing the burden of lead. Such a reduction in exposure, however, has not yet been shown to be directly related to improvements in children's behavior and learning – though lead levels are sometimes speculatively linked to secular changes, e.g., in knife crime. The rather scanty evidence for such an association is based on studies in several countries, notably in South America, reviewed by Olympio et al. (2009) who concluded that "it is tempting to state that there is a high probability that many young delinquents are actually victims of lead poisoning and not necessarily genetic or social criminals." Delinquency and aggression may indeed associate with high lead burdens in young people. There are, however, many other asssociated risks in poor

cities – including poverty and widespread family dysfunction – that are just as likely to be the responsible causes.

In postnatal life, lead exposure can continue to have a harmful effect on neurodevelopment. Detection depends on clinical suspicion (e.g., because of peripheral nerve involvement or motor delays) and measuring blood levels in suspected cases. There is no safe blood level. However, a level over 5 μg/dL is considered to indicate risk; risk and exposure should then be monitored and if possible reduced. When the source is old paint and complete repainting is not feasible (lead tends to seep through coverings of fresh paint) then it may be possible to seal the walls effectively. Replacement of old water pipes based on lead is likely to be cost-effective in soft water areas. Blood levels above 45 μg/dL are considered to be in immediate need of treatment, e.g., with chelating agents.

Mercury

Mercury, especially in organic compounds such as methylmercury, is potentially toxic. A negligent release of industrial chemicals at Minamata, Japan, was followed by an outbreak of neurological problems in children including, but not confined to, autistic symptomatology. The severity of neurological impairment was directly related to the level of mercury in children's blood (Harada et al. 1999). Higher blood levels of mercury occurring in the general child population have been linked to higher levels of autistic symptoms (Kern et al. 2016), The evidence at low levels of exposure is, however, inconsistent.

One source of mercury in the general population is thimerosal. This is an ethyl mercury-based preservative, used in vials containing vaccines, to prevent infection. It has been the subject of claims that it is involved in the causation of autism spectrum disorders (Bernard et al. 2001).The claim has largely been discredited by extensive investigation, including epidemiological evidence from countries tracking situations where preservatives including mercury have been introduced or eliminated. They have failed to find that periods with or without exposure differ in the incidence of autism. Indeed, thimerosal was removed from vaccines in 2001 as a precautionary measure and was followed (but not caused) by an increase in the diagnosed rate of autism spectrum disorders (Centres for Disease Control 2015). Massive media exposure and social media sites, however, still discourage many families in many countries from the highly desirable procedure of routine vaccination.

Manganese

Manganese occurs naturally in the diet and is needed for human health and some industrial processes. High levels, however, assessed by blood levels, have been associated in several countries with cognitive problems and poor school achievement (Henn et al. 2010); and at the extreme with extrapyramidal neurological

signs. Infant formula milks, whether from cows or soya, sometimes contain very high levels.

Implications for Practice

The clinical lessons from both lead and mercury are that:

- Heavy metals are poisonous but widely present from industrial pollution.
- Clinicians and other citizens should discourage such pollution, as matters of public health.
- Routine testing of heavy metal concentrations in children with ADHD and ASD is not usually cost-effective; but clinicians should know whether they are practicing in a heavily exposed area and if so consider routine measurement in clinic attenders. They should also be aware of the measures to be taken at high levels.

Chemicals in Pregnancy and Infancy

Organohalogens

Polychlorinated biphenyls (PCBs) and other pesticides including dichlorodiphenyl trichloroethane (DDT) are widespread in the environment even after public health moves to reduce them. Other halogenated pesticides such as Lindane have appeared. They are all known to have neurotoxic potentials after both acute intoxication (Hsu et al. 1985) and chronic exposure (Mariussen and Fonnum 2006). Children exposed to PCBs prenatally and/or during the breastfeeding period are particularly at risk for motor abnormalities, deficits in short-term memory and problems in social communication (Rossignol et al. 2014). Animal studies have indicated effects on brain turnover of dopamine, noradrenaline, and serotonin.

Other Pesticides

Pesticides more generally are in widespread use, especially in agricultural areas. Children can be exposed in utero or through breast milk, through eating contaminated food, and through skin contact in households. Indeed, problem behavior in the children (such as ADHD) may contribute to bringing them into contact with hazardous substances. A review of relevant studies by Liu and Schelar (2012) finds only inconsistent relationships between high exposure and mental function. Furthermore, even when an association is found, it is not yet possible to go on to an understanding of causal processes. The authors nevertheless invoke the "precautionary principle" to argue for education to parents and schools about potential risks. For instance, agricultural workers in contact with pesticides could be encouraged to wash and change before contact with children. Workers in schools

could be taught how to assess the risks of individual children for high exposure (Chalupka and Chalupka 2010).

Tobacco

The offspring of women who smoke are more likely than other children to be of low birth weight and to show behavioral and cognitive abnormalities, including attentional deficits, impaired learning and memory, and lowered IQ. ADHD has been a particular focus of study (Han et al. 2015).

Several research designs have been used to disentangle the direct impact of tobacco products on the fetus from the many other possible explanations of the association. The effects of postnatal passive smoking for the child might be responsible, as might a link with other adversities such as maternal alcohol abuse or an adverse postnatal environment. A comparison between mothers who continued to smoke during pregnancy with those who did not indicated a potential direct effect on brain development (Roza et al. 2009). Fetal head circumference showed a growth reduction in those whose mothers had never smoked during pregnancy. On the other hand, the rigorous design of comparing children who had been exposed in utero with their own siblings who had not been exposed suggested a more complex pattern (D'Onofrio et al. 2008). Only small direct effects of exposure on features of ADHD could then be detected, and almost none on conduct problems.

There could also be a genetic explanation: if the genetic influences on maternal smoking overlap with those leading to problems such as ADHD in the offspring, they could create a false impression of the dangers of maternal prenatal smoking on offspring mental health. There may indeed be some direct harmful effect of mothers smoking in pregnancy on the birth weight and later neurodevelopmental outcome of the child (Knopik 2009); but the evidence favors complex patterns of transmission.

The mechanism is likely to include an effect of nicotine in disrupting the development of nicotinic cholinergic receptors, which are present very early in the developing brain of rodents (embryonic day 10) and humans (4–5 weeks of gestation). Nicotinic signaling is part of the normal development of the brain, and its disruption is likely to have extensive effects.

Alcohol

The fetal alcohol syndrome includes poor growth, cranial and other bodily defects, and a range of neurodevelopmental consequences. There is an excess of psychopathology (including ADHD, emotional disorders, sleep disorders, and abnormal habits and stereotypies) with strong persistence over time. Cognitive functioning is vulnerable: Children with the syndrome show a disproportionately high rate of intellectual disability. There is a dose-response relationship in that the physical stigmata correlate with the psychological impairment.

Lesser levels of alcohol exposure to the fetus can also be harmful. Meta-analysis of studies testing children who were exposed in the womb to the effects of mothers drinking alcohol has defined the size of the risk (Flak et al. 2014). Heavy drinking in pregnancy and binge drinking on occasions (>4 drinks in a day) are both associated with a wide range of adverse behavioral and cognitive outcomes; moderate levels of drinking (<1 drink daily) are not consistently associated with neurodevelopmental problems in the offspring, but there remains a possibility of subtle effects. Some affected children demonstrate behaviors of concern, including increased demand for attention, behavior regulation problems, and poorer interactive play skills.

In the case of ADHD, some of the association may be due to genetic influences determining both mothers' drinking and children's ADHD. An offspring-of-twins design indicated that the monozygotic twins of mothers who misuse alcohol are just as likely as the misusers to have a child with ADHD, even if they do not misuse alcohol themselves (Knopik et al. 2006).

Clinical implications include the need for asking about mothers' alcohol intake in pregnancy for all children with neurodevelopmental disorders. This can be challenging to do and is sometimes omitted in practice for fear of inducing parental guilt. Nevertheless, it can be important for protecting future children from the same disadvantage.

Prenatal Fluoride?

Fluoride is routinely added to water in many countries in the interests of dental health. A long-running controversy queries whether this is safe for other organ systems. For instance, an association has been reported between fluoride levels in pregnant women in Mexico and cognitive problems including ADHD in the offspring (Bashash et al. 2017). No scientific consensus has yet been achieved, and clinical recommendations are accordingly inappropriate.

Prescribed Medications

Some prescribed drugs have proved to be harmful when given to pregnant mothers. Autism and other neurodevelopmental changes are a part of thalidomide embryopathy (Strömland et al. 1994). The antiepileptic and mood stabilizer valproate, if given in pregnancy, is a known cause of autism and probably ADHD – but the risk does not extend to other antiepileptic drugs. In a population-wide case register study, exposures to carbamazepine, oxcarbazepine, lamotrigine, and clonazepam monotherapy were not associated with increased risks of autism spectrum disorder and childhood autism; valproate was (Christensen et al. 2013). Recent epidemiological work has concluded that there has also been a raised risk of ADHD in the children of mothers who received valproate in their pregnancy (Christensen et al. 2019).

The risks are sufficiently large that valproate should not be given to females who may become pregnant.

Cocaine

Prenatal exposure to cocaine is associated with compromised mental development, even in adolescence (Richardson et al. 2015). It has, however, been hard to show with any consistency that this reflects a direct causal effect after allowing for potentially confounding influences such as maternal mental disorder and exposure to other substances (Frank et al. 2001).

Air Pollution

Air pollution related to traffic (such as particulate matter and nitrogen dioxide) has been quite strongly associated in epidemiological studies with autism and other early neurodevelopmental conditions (Rossignol et al. 2014). The mechanism of association is still obscure. Nevertheless, the cumulative weight of both retrospective and prospective studies argues that clinicians should, at least provisionally, regard such pollution of the air as a contribution to the etiology of neurodevelopmental disorders and support public health measures for reduction.

Post-natal Chemical Exposure

Cannabis

A main psychoactive component of some strains of cannabis used for recreation is delta- 9- tetrahydrocannabinol (see chapter ▶ "Misuse of Alcohol, Drugs, and Other Substances"). Regular and heavy use has been shown to have harmful effects on a range of adverse psychological outcomes. The effects include schizophrenia, hallucinations, and delusions short of actual psychosis, and impairments of memory and concentration (Lubman et al. 2015).

Cassava root contains a known toxin and its use should be discouraged. *Lathyrism* describes a neurological syndrome from eating *Lathyrus sativus* ("famine grass"), a practice normally resorted to only in conditions of starvation.

Allergens and Intolerance

There is a distinction to be made between substances believed to be generally hazardous and those that are only incriminated in susceptible people. Individuals may be at heightened risk because of genetic constitutions that make them

particularly susceptible (Nigg et al. 2010) or because immune changes have led to allergic response to specific substances.

One type of theory has stressed that many naturally occurring substances could be hazardous in constitutionally vulnerable people. The effects of cow's milk, wheat flour, eggs, and citrus fruits have all been implicated in this way. The evidence for this, however, is not strong enough for clear recommendations to be applied generally. Families deserve to be informed, both of the current evidence and of its inconclusive status. NICE (2018) has advised health care professionals seeing cases of ADHD to enquire about a history of intolerance to particular foods and, if present, to advise parents to keep a food diary. If the diary indicates a relationship between specific foods and behavior, then referral to a dietician is helpful for detailed advice. There are dangers involved in elimination diets, especially that necessary foodstuffs may be excluded by an over-rigorous regime.

It must be said, however, that the research evidence for this kind of approach is lacking. Meta-analysis of trials has indeed found a positive and significant effect of elimination, but also that this is dependent upon the outcomes being judged by the same people (usually parents) who are administering the treatment. When the meta-analysis has focused on raters who are potentially blind to the approach being used, such as teachers or researchers making direct observations, then the effect sizes shrink to a level that is too small for the approach to be generally recommended (Sonuga-Barke et al. 2013).

Artificial Food Colors and Preservatives

Synthetic food dyes, such as tartrazine, and preservatives, including benzoate, have received significant research attention for their contribution to ADHD. Meta-analyses have indicated that there can be a helpful effect of eliminating artificial colorings and preservatives (Sonuga-Barke et al. 2013). The effect sizes are not large when ratings are made by people who are probably blind to the intervention, but they are statistically significant. Furthermore, an experimental study in the general population has contrasted cocktails, of different artificial colorings, with placebo; and found an effect in the general population of increasing irritability as a result of receiving the active chemicals (McCann et al. 2007). This effect is variable and appears to be mediated by non-immune factors. Genes in the histamine degradation system have been found to predict this adverse response. The main importance of this finding is for public health. Manufacturers are now discouraged from including such substances in their food products. It does not follow automatically that removal of such elements from the diet will be associated with improvement in cognitive or behavioral problems (long-term tolerance may have developed). Families who wish to try the effects of removing artificial colorings and preservatives should not be discouraged.

Summary and Conclusions

In summary, there is reasonable evidence for the involvement of toxins and allergens in the genesis of some psychiatric conditions in childhood and adolescence.

The evidence for direct causation comes from the methods outlined at the start of this chapter and does not depend wholly upon the mere observation of associations. Dose-response studies have been positive, for instance, in indicating the potential toxicity of lead in childhood and of maternal smoking during pregnancy. Study of a cohort of children with unusually strong exposure, such as the Minamata epidemic, was instrumental in identifying the effects of mercury on the development of the nervous system. Natural experiments have included the elimination and reintroduction of vaccines using organic mercury as a preservative.

Understanding of the mechanisms responsible for toxicity has often stemmed from animal studies, and incautious extrapolation to humans remains a potent source of unsubstantiated claims. Genetic designs have been important in studying the fetal effects of alcohol and tobacco, by testing whether the associations between exposure and ADHD are attributable solely to common genetic influences on both. Reversal designs, i.e., elimination and supplementation, have been at the heart of examining the mechanisms of toxins and deficiencies in the diet.

Clinicians should be aware of the local effects of pollution in their community and of the indications for individual treatment.

Cross-References

- ▶ The Effect of Malnutrition and Micronutrient Deficiency on Children's Mental Health
- ▶ Services for Neurodevelopmental Disorders such as Autism Spectrum, Attention Deficit Hyperactivity Disorder (ADHD), and Tic Disorders
- ▶ Misuse of Alcohol, Drugs, and Other Substances

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Chronic Illness: Asthma

22

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Contents

Abstract

Stress and emotional stimuli that disturb the homeostasis of the brain are strongly implicated in the morbidity and mortality from several types of inflammatory diseases, asthma included. Stress contributes to the development of asthma,

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affects its course through provoking exacerbations and inhibiting response to treatment, and acts directly on pathogenic mechanisms in the airways. In children who already have asthma, stress operates via a two-way process. Having asthma in itself causes stress, giving rise to anxiety and depression. Anxiety and depression, in turn, impact on asthma through immune function and autonomic dysregulation.

Keywords

Airways · Asthma · Stress · Psychosomatic · Autonomic dysregulation · Immune function · Anxiety

Introduction

Stress and emotional stimuli that disturb the homeostasis of the brain are strongly implicated in the morbidity and mortality from several types of inflammatory diseases, asthma included. Stress contributes to the development of asthma and affects its course through provoking exacerbations and inhibiting response to treatment and by acting directly on pathogenic mechanisms in the airways. Specific pathways through which stress modulates epigenetic and transcriptional activity in asthma-relevant cells have also been highlighted, and susceptibility genes conferring risk to stress-related asthma exacerbations identified.

In children who already have asthma, stress operates via a two-way process. Having asthma in itself causes stress, giving rise to anxiety and depression. Anxiety and depression, in turn, impact on asthma through immune function and autonomic dysregulation. Caring for a child with asthma increases parental burden and may contribute to depression in parents, which in turn affects the child directly and indirectly. Chronic and acute stress are both equally damaging, though operate by somewhat different mechanisms. The role of prenatal and early life stress in the development of asthma is gaining increasing significance. Lately, attention has been paid to stress transmitting through generations.

The sources of stress in children with asthma, like in other children, are mostly to be found in the child's immediate environment and include parent mental health problems, family conflict, and problems in the parent-child relationship. Stress can also relate to the school situation or stem from the wider environment. The mechanisms by which stress influences asthma often involve combinations of biological, psychological, psychosocial, and neuroendocrinological processes. Over the recent decades, substantial progress identifying alterations in the hypothalamic-pituitary-adrenal axis, autonomic nervous system, and immunological processes likely to underlie these phenomena has taken place. Persisting, chronic stress can lead to reprogramming of the whole stress mechanism.

Treatment targets include child depression and anxiety, parent-child relationship problems, interparental discord and other family conflict, stress and depression in

expectant mothers, and whenever possible, environmental toxins, social inequality, and neighborhood problems.

Effects of Stress in Children with Asthma

Psychological Problems of the Child

Associations between asthma and psychological symptoms have been studied for well over half a century. Initially, the research mostly involved children attending clinics but has subsequently widened into epidemiological studies of general population samples, and more recently, meta-analytic methods have enabled large data sets to be pooled together for a bigger picture. The general finding has been an increased overall risk of psychiatric problems and internalizing disorders, particularly anxiety and depression, among children with asthma (Calam et al. 2003, 2005; Collins et al. 2008; Halterman et al. 2006).

A recent meta-analysis (Dudeney et al. 2017), involving over 20,000 children and adolescents, showed that more than one in five of children with asthma have anxiety disorder, a prevalence more than three times that among children without asthma. The rates of specific anxiety disorders, such as separation anxiety, social phobia, generalized anxiety disorder, agoraphobia, and panic disorder, are also significantly higher in children with asthma.

Findings from epidemiological studies support the above conclusions and widen the picture by highlighting the roles of various asthma-related and other factors. These include the severity and duration of asthma and its accompaniment by atopy. Poorly controlled asthma has been shown to be associated with a variety of psychiatric problems, with the disease severity correlating with the severity of psychiatric symptoms (Avcil et al. 2018; Calam et al. 2005; Halterman et al. 2006; Klinnert et al. 2000).

Apart from having an increased risk for depression, children with persistent asthma symptoms, including a history of several exacerbations, have been found to be more timid and anxious, have difficulties with emotion regulation and poorer peer social skills, and suffer from attention problems, compared with children without asthma (Feldman et al. 2006; Halterman et al. 2006). Increased likelihood of panic attacks/panic disorder (and a choking sensation during panic attack) has been found associated with asthma, even after controlling for overall disease severity (Goodwin et al. 2003). A high rate of depressive symptoms has been reported in children and adolescents, especially girls, with asthma unaccompanied by atopy (Bahreinian et al. 2011). Possible explanations for this somewhat unexpected finding (so far based on one, albeit large, study) have been sought from psychosocial and hormonal processes. Besides these, the explanation may lie in depression preceding the asthma diagnosis. The co-occurrences of asthma and depression also pose a risk for substantially elevated inflammation concurrently and over time and thereby contribute to asthma morbidity and mortality (Shanahan et al. 2013).

Parental Burden

A child's chronic illness, such as asthma, induces excessive stress and physical and psychological burdens to parents and the whole family (Ekim and Ocakci 2016; Kim and Yoo 2007; Silva et al. 2015). At the same time, caregiver stress is known to contribute to the development and course of child asthma, with depression in the parent predicting poorer asthma control (Celano 2006; Rioseco et al. 2017; Rodriguez et al. 2017; Wood et al. 2015). Depression correlates with parental style and ability to cope with stressors. For example, adapting to a stressor using strategies such as cognitive restructuring, acceptance, and positive thinking and engaging with a thought or activity unrelated to the stressor (distraction technique) are impaired by depression. Conversely, depression tends to increase parental disengagement – a coping style marked by detachment from the stressor through avoidance, wishful thinking, or denial.

Role of Stress in Asthma Onset

In longitudinal studies starting from birth, the mother's depression during pregnancy, difficulties parenting the newborn baby, and parental stress during the child's toddlerhood have predicted the development of asthma by school age (Klinnert et al. 2001; Ramratnam et al. 2017). Parenting difficulties in the newborn period also correlate with maternal depression, child emotional problems, and the total psychological risk score. The role of prenatal maternal stress predicting early asthma phenotypes in the next generation has gained heightened significance in the past decade (Lee and Wright 2016; Radhakrishnan et al. 2018; van de Loo et al. 2016). Even though most asthma begins early in life, with the developing immune system interacting with environmental influences, asthma can have its onset in adolescence – in boys but not in girls – in conditions of chronic exposure to stress (high allostatic load (AL)) (Bahreinian et al. 2013). AL represents a biomarker of the body's physiologically dysregulated response to stress, with puberty-induced hormonal changes further contributing to this. The precise mechanisms explaining the sex difference in adolescent onset asthma risk still await confirmation.

Effect of Stress on the Course of Asthma

Current conceptualizations view asthma outcomes being influenced by processes within three main domains: biological, social, and psychological. The role of chronic psychosocial stress in morbidity from asthma, including severe exacerbations, has been highlighted (Puranic et al. 2017). Severely negative life events, especially when multiple chronic stressors are also present, have been found to increase the likelihood of new asthma exacerbations. The risk goes up to fivefold immediately after an acutely negative life event and in the next coming weeks (Sandberg et al. 2000, 2004).

Effect of Stress on Treatment Response

Potential mechanisms for the detrimental effects of chronic psychosocial stress on morbidity from asthma, including severe exacerbations, include nonadherence with controller medications, decreased therapeutic responses, and stress-induced changes in DNA-methylation and expression of genes regulating behavioral, autonomic, neuroendocrine, and immunological responses (Puranic et al. 2017). Consistent with stress-induced treatment resistance, chronic stress has been linked to decreased expression of genes for the β2-adrenergic receptor and the glucocorticoid receptor in leukocytes of children (and adults) with asthma. This, in turn, predicts reduced bronchodilator response through downregulation of β2-adrenergic receptors by persistent secretion of catecholamines.

Time of Stress Exposure

Acute Stress Closely Preceding Exacerbations

A prospective study referred to above (Sandberg et al. 2000, 2004) was set to examine whether the timing of stressful experiences relates to the timing of asthma attacks, i.e., do stressful life events actually provoke acute asthma exacerbations. The results revealed a rapid effect within 1–2 days after a severely negative life event; the risk of a new exacerbation increased nearly fivefold. After that time the risk was substantially reduced but rose again to almost double at 5–7 weeks following the severely negative life event.

Joint Effects of Acute and Chronic Stress

Prevailing chronic stress magnifies the risk of a new asthma exacerbation soon after a severely negative life event (Sandberg et al. 2000). Most negative life events are by nature unpredictable and frequently involve loss, as in parental separation, death of a family member or close friend. The situation is, however, different when there is a high level of background stress such as poverty, poor housing, neighborhood violence, physical infirmity or psychiatric illness in a parent, parent substance abuse, family discord, or school problems. The child's predicament can be further worsened by parental hostility and indifference or peer hostility and rejection. Under such circumstances, severe events immediately preceding an acute asthma exacerbation in most instances arise directly from an existing chronic adversity, most commonly family problems. This prevents the child accessing the support he or she would badly need to cope with an acutely stressful life event.

Prenatal/Early Life Stress

The development of the immune system and lungs occurs largely in utero and during early childhood. Psychosocial stress is an important development-programming agent and can have long-lasting neurobiological effects, including harmful

consequences on offspring stress regulation systems relevant for asthma development (Wright 2011). Increased cortisol output and heightened inflammatory activity in persons exposed to social adversity in early life has been reported in a number of studies, with psychosocial stress during pregnancy increasing the risk of child asthma (Andersson et al. 2015; Flanigan et al. 2018). Of the various stressors in the prenatal period, exposure to maternal anxiety and depression appears to exert the strongest effect, especially for early-onset and persistent asthma.

Intergenerational Transmission of Stress

In addition to prenatal maternal stress predicting asthma in the next generation, chronic exposure to trauma throughout the mother's life has been shown to be associated with an almost threefold risk of asthma in boys, but not in girls (Brunst et al. 2017). To explain the differential risk for asthma in male and female offspring, evidence from both animal and human studies shows sex-specific changes in placental gene expression in pregnancies complicated by asthma, implicating growth, inflammatory, and immune pathways as additional mechanisms. It is suggested that increased risk for asthma among offspring is not simply due to genetic predisposition but likely includes in utero transfer of environmental risk.

Sources of Stress

Parent Mental Health Problems

Depression is common among parents of children with asthma, expressing itself in a variety of ways, through impairing parental coping with daily life stressors and with the challenges of the child's asthma. Parental depression is associated with more asthma symptoms, increased healthcare use, poor asthma management, and missed medical appointments (Avcil et al. 2018; Rioseco et al. 2017; Rodriguez et al. 2017; Wood et al. 2015). It also contributes to negative affect and irritability, hopelessness, anxiety, and distressed relationships between the parent and child and increases the likelihood of authoritarian, hostile, and rejecting styles of parenting. Some depressed parents, especially those with accompanying anxiety, involve the child within their anxieties and may become overly protective. Parental depression can also directly stress the child by causing worry about the parent's safety.

Family Functioning

Family emotional characteristics, asthma management behaviors, and physiological factors account for key influences on child asthma outcomes (Celano 2006; Kaugars et al. 2004; Wood et al. 2015). Whole-family processes are involved, with higher number of hospitalizations for asthma correlating with greater family conflict, while

high family cohesion correlates with better asthma control. Dysfunctional family interactions in infancy predict the risk of illness continuing; negative family climate, partially mediated by the lack of security in parent-child relationship, is associated with child depressive symptoms, which in turn predict worse asthma outcomes. Negative affect in the parent-child relationship and parental difficulties in emotion regulation are associated with increased asthma severity. Early parenting difficulties act as precursors to asthma onset and predict persistence (Klinnert et al. 2001). Problems in family functioning can affect asthma management in the form of poor medication adherence, exposure to allergens and tobacco smoke, inconsistencies in daily decision-making, and sometimes, as unhelpful health beliefs.

Parent-Child Relationship

An insecure attachment relationship directly creates stress in the child and magnifies the effect of family or other environmental stress. It has been proposed that attachment relationship characterized by insecurity mediates between asthma severity and depressive symptoms, with the child's impaired functional status influencing the parent-child relationship in ways that promote depression (Bleil et al. 2000). A beacon study of mother-child interactions in children with asthma applied the Five Minute Speech Sample (FMSS) measure (Hermans et al. 1989). The mother's negative attitude and critical comments toward the child were more prevalent in children with asthma, compared with healthy peers and predicted increased number of asthma attacks. The parent's negative attitude combined with critical comments is equal to a chronic stressor, with coercive communication patterns having particularly adverse effect on the child's immune status.

School Influences on the Stress-Asthma Relationship

Managing school life can also be stressful for children with asthma. Studies commonly report poorer relationships with peers and teachers, lacking friends, and being unhappy at school compared with healthy children (Collins et al. 2008; Rhee et al. 2017). The likely explanations relate to asthma itself: having to use medication at school and face restrictions on physical exercise make children feel different from peers; missing school days leads to poorer academic performance, less motivation to try, and low self-esteem. Parental depression, with consequent negative effects on coping with the tasks of daily life and the child's asthma care routines, the child's educational needs included, further compound the stresses the child has to encounter regarding his/her ability to manage school (Rodriguez et al. 2017).

Wider Social Influences on Stress-Asthma Relationship

Community and interpersonal violence, racism, discrimination, trauma, poverty, unemployment, and family breakup, referred to as "social toxins" by Wright

(2011), all contribute to social stress. Likewise, environmental toxins such as traffic-related air pollution, prevalent in impoverished communities, increase the risk of asthma, with the risk significantly increasing in children with high parental stress (Shankardass et al. 2009). Furthermore, the risk can predate birth: prenatal exposure to ambient nitrate pollution and concurrent maternal stress have been shown to significantly increase the risk of asthma by school age, especially in boys (Bose et al. 2017).

Large proportions of health disparities are known to be due to social stressors and to factors interfering with access to healthcare and disease management. Chronic stress brought about by social disadvantage impacts on families in a variety of ways (Wood et al. 2015). Stress from poor social and economic circumstances may exceed parental capacity for coping and lead to feelings of depression and anxiety, parental discord, and conflict, all known to negatively impact on children's asthma. Prenatal effects, in utero tobacco smoke included, promoting asthma onset and negative outcomes are also more common in socially disadvantaged populations.

Mechanisms of Stress

Current paradigms for chronic childhood illness assume mutual and dynamic influences of biological, social, and psychological factors. "Biobehavioral reactivity" (Jemerin and Boyce 1992) is a construct referring to the degree/intensity with which an individual responds physiologically, emotionally, and behaviorally to psychological challenge. It reflects an individual's ability to regulate stress and arousal and is physiologically mediated by the activation of stress pathways, including the hypothalamic-pituitary-adrenal (HPA), sympathetic-adrenal-medullary, and autonomic systems. It is presumed to be shaped by innate tendencies of emotional and physiological reactivity and by external influences, especially by patterns of attachment and caregiving.

Research in psychoneuroimmunology supports an integrated, dynamic psychosocial model involving links between social contextual factors and asthma morbidity (Celano 2006; Wood et al. 2015). The complex relationship between asthma and psychological stress is mediated and modified by environmental exposures, adherence to treatment, and coping mechanisms, with patterns of family dysfunction having relevance for psychobiological pathways.

The brain's receptivity to psychological stress plays a central role in initiating signal transduction processes, followed by efflux of neuropeptides such as opioids and histamine (Ohno 2017). From the brain, the signal is transmitted to the lungs mainly through the activation of the HPA-axis, leading to the release of stress hormones. Stressors perceived as threatening and unmanageable modify the activity of the HPA-axis and the autonomic nervous system (ANS) (Rosenberg et al. 2014). The ANS consists of sympathetic and parasympathetic branches; effector molecules include adrenaline, noradrenaline, and acetylcholine. HPA activation occurs in response to corticotropin-releasing hormone (CRH) secreted by hypothalamic neurons. CRH travels through the hypophyseal portal circulation to the anterior pituitary

gland, which responds by secreting adrenocorticotropic hormone (ACTH), the signal of which is carried through the peripheral circulation to the adrenal glands that synthesize and release cortisol.

Originating from stress-induced brain activity, endogenous glucocorticoid secretion, together with enhanced pro-inflammatory (Th2-type) immune responses in the lungs, is associated with asthma exacerbations. Acute psychological stress induces exacerbation of airway inflammation in chronically stressed asthma patients, promoting the development of refractory asthma characterized by glucocorticoid resistance.

Increased cortisol output and heightened inflammatory activity have been reported in persons exposed to social adversity in early life (Miller et al. 2009). The potential underlying genomic mechanisms blunt glucocorticoid receptor activity and heighten transcription factors responsible for inflammatory processes. The syndrome of glucocorticoid receptor desensitization and reciprocal increased pro-inflammatory signaling are suggested as a common biological response to threats from the social world and a mechanism by which they potentially contribute to disease development and progression.

Co-occurrence of asthma and depression poses a risk for substantially elevated inflammation concurrently and over time and impacts the disease process through asthma-relevant immune function and autonomic dysregulation (Miller and Chen 2007; Miller et al. 2009; Shanahan et al. 2013). Acute asthma exacerbations may, at least in part, be due to associations between inflammation, depression, and neuroendocrine processes involving glucocorticoid hormones regulating the body's immune response, including heightened responses to environmental agents such as pollution (Shankardass et al. 2009). The possible mechanisms for the relationship between stress, depression, and recurrent wheeze include stress-induced neuroendocrine effects through HPA and ANS effects on lung development, airway size, and interactions with viral infections, rather than being mediated by allergic sensitization (Ramratnam et al. 2017).

Adaptive immunity develops prenatally, with allergen-specific immune responses demonstrable in newborns. Important domains of the immune system, including T-cell differentiation, are susceptible to fetal programming. One suggested pathway for prenatal psychosocial stress to increase child asthma risk is through the activation of the HPA system (Andersson et al. 2015; Flanigan et al. 2018). The prenatal HPA-axis seems particularly susceptible to modulation by maternal stress. Due to mutual regulatory relationship between the HPA and immune systems, glucocorticoid hormones are essential in immune development. Some studies have suggested exposure during the third trimester as most harmful. However, this could represent cumulative exposure. A single time assessment may fail to detect a specific trimester effect as stressors can be acute, prevail throughout pregnancy, or even be an extension of stressful events predating pregnancy. All in all, there is substantial evidence highlighting psychological stress starting in utero, permanently altering interrelated immune, autonomic, neuroendocrine, and oxidation systems, believed to program lung growth and consequent respiratory disorders, including asthma (Lee and Wright 2016; van de Loo et al. 2016).

The transition mechanisms of maternal stress response to the fetus include transplacental transfer of stress mediators and activation of placental release of neuroendocrine stress transmitters. Here, epigenetic alterations have emerged as a link. Stress-related changes in the prenatal environment can lead to perturbed enhancer methylation ahead of any disease phenotype developing (Trump et al. 2016). Methylation status of the glucocorticoid receptor gene in newborns is sensitive to prenatal maternal mood. Extensive epigenome alterations as genome-wide perturbations in DNA-methylation, affecting genomic regulatory elements, have been reported in mothers and children exposed to stress. These may potentially explain the processes linking antenatal mood and altered HPA-axis stress reactivity during infancy, measurable, for example, as increased salivary cortisol stress responses (Oberlander et al. 2008). The effects of prenatal stress involving epigenetic changes through DNA-methylation affect immune responses leading to Th2-type inflammation and aeroallergic sensitization, thus giving rise to intergenerational transmission of distress. Lately, growing attention has also been paid to other mechanisms by which maternal prenatal stress influences offspring development and health, including allergies; these involve links via infant intestinal microbiota composition (Zijlmans et al. 2015).

Children, particularly boys, of mothers with lifetime interpersonal trauma have been shown to have increased asthma risk (Brunst et al. 2017). Trauma exposure during sensitive developmental periods, i.e., early childhood and adolescence, in addition to cumulative stress, has emerged as the most significant. Apart from HPA disturbance, autonomic imbalance/dysfunction, independent of hormonal/neuroendocrine abnormalities, may be just as important. Indirect pathways have been suggested: women experiencing chronic lifetime interpersonal trauma are more likely to have active asthma during pregnancy, which in itself is associated with asthma in the next generation. Furthermore, women exposed to chronic trauma are more likely to encounter more negative life events at time of pregnancy, which also contribute to increased asthma risk in children. Of the lifetime traumas, childhood abuse has been linked to disrupted cortisol production during pregnancy and further to early asthma phenotypes in children. Alteration in maternal cortisol, leading up to and persisting during pregnancy, could be one mechanism through which chronic interpersonal trauma contributes to both maternal active asthma and asthma development in the next generation. The complexity of developmental processes affected by prenatal asthma milieu suggests that the increased risk for asthma is not simply due to genetic predisposition, but also includes in utero transfer of environmental risk.

Although maternal stress in pregnancy affects both sexes, it affects males disproportionately (Bose et al. 2017; Brunst et al. 2017; Saif et al. 2014). Glucocorticoid exposure and metabolism are likely to be involved, despite the exact mechanisms remaining unclear. Prenatal glucocorticoid exposure, such as that to naturally occurring cortisol, can lead to oxidative stress and decreased antioxidant defenses, two potential mechanisms implicated in asthma development.

The human placenta adapts to glucocorticoid exposure in a sexually dimorphic manner. Female placentas are hypersensitive to glucocorticoids in the presence of

high levels of cortisol, suggesting their better ability to inactivate cortisol, thus protecting females from excess cortisol and oxidant imbalance. In contrast, the placentas of male fetuses appear resistant to glucocorticoids in a high-cortisol environment, making males more vulnerable to induced prooxidant states. This may be due to the expression of glucocorticoid receptor protein isoforms present in the placenta being influenced both by fetal sex and maternal asthma. Sex-specific changes in placental gene expression, in pregnancies complicated by asthma, implicate growth, inflammatory, and immune pathways as additional mechanisms explaining the differential risk for asthma in male and female offspring.

The style of parenting has an important mediating role with regard to psychiatric problems and asthma. The chronic stress of negative family emotional climate, parental conflict, insecure parent-child relationship, and negative parenting predict increased asthma severity via child depression and anxiety (Lim et al. 2011). Conversely, an affectionate and permissive parenting style appears capable of increasing resilience against depression in children with asthma (Kim and Yoo 2007).

Family influences on child asthma operate via various mechanisms and contribute to inflammation, symptom perception, and asthma management (Celano 2006; Kaugars et al. 2004). Emotional factors affecting HPA-axis functioning, ANS functioning, and symptom perception have been proposed as potential mechanisms. Early caregiver stress influences immune development; the HPA-axis is involved in the regulation of inflammation; increase in vagus nerve activity may mediate psychobiological influences and lead to constriction of upper airways via increased cholinergic activation in despairing, depressed, and hopeless, psychophysiologically vulnerable affective states. There also appears to be a significant indirect path through an association between social disadvantage and negative family emotional climate, which in turn predicts decreased expression of the neuron-specific glucocorticoid receptor gene (NR3C1). This proposes negative emotional expression between parents and child as a key mechanism linking family socioeconomic status to the biology of asthma (Farrell et al. 2018). Apart from directly impacting on the biological mechanisms of asthma, family influences involve asthma management behaviors (medication adherence, exposure to allergens and tobacco smoke, daily decision-making). Treatment adherence is affected by problems in family functioning, parental criticism, parent mental health problems, family conflict, and communication difficulties with healthcare providers.

Clinical Implications and Therapeutic Possibilities

Children with asthma are referred to mental health professionals for many reasons: for solutions to explain intractability of asthma, poor treatment compliance, or for emotional distress in the child or family. Acknowledging the potential stress and impact that the child's asthma has on the family is usually helpful at the start of consultation. Stating that almost any disease is made worse by the effects of stress on it often opens the opportunity to sensitively enquire about possible chronic

social and family relationship difficulties and acute negative life events that may stress the child and lie in the way of optimal illness management (Celano 2006; Wood et al. 2015).

It is important to observe the family emotional climate for warmth, hostility, depression, and anxiety and to note the emotional relationship and supportiveness between the adult caregivers and the attachment relationship between the child and parent(s). If depression in one or both parents seems likely, proper clinical assessment is advisable, and when necessary, recommendations for appropriate treatment should be made. In treating parental depression, possible adjacent attachment problems between the parent and child also need to be addressed.

In interventions involving whole family systems, the mutually exacerbating effects of parental depression, distressed family relationships, and negative parenting styles need to be addressed. It may also be useful to alternate whole family sessions with individual sessions – for example, for an adolescent or parental couple. Sometimes the parent-child dyad needs particular attention because of attachment problems or distressed parent-child relationship (Wood et al. 2015). Interventions aimed at improving parent-child relationships have also produced biological benefits in the form of reduced levels of inflammatory cytokines (Miller et al. 2014). The importance of positive family interactions for asthma-related immune responses was demonstrated in a novel study by Tobin et al. (2015). Higher maternal responsiveness, via greater positive affect in the children, was associated with lower levels of pro-inflammatory cytokines.

Besides education and support on asthma management, family focused interventions should aim to reduce caregiver stress (Celano 2006). This can be achieved by psychoeducation to improve parental coping and problem solving, by family therapy to address family dysfunction and conflict and, in some cases, to alleviate parents' post-traumatic stress when the child has a life-threatening episode. In cases where social disadvantage is a major source of caregiver stress, all efforts should be made to improve the family's social and economic circumstances. A series of CBT sessions combined with training in asthma management has been shown to lead to greater reduction in anxiety and bring longer lasting benefits, especially in children with high levels of state anxiety, compared with sessions offering information about asthma (Pateraki and Morris 2018).

In caring for children with chronic asthma, particular efforts should be directed to those whose lives are characterized by multiple chronic adversities, including unsafe environments (Chen et al. 2011). Also, the interconnections and joint effects of acute and chronic stressful experiences require special attention (Sandberg et al. 2000). While acute negative life events are hard to predict, and therefore to avoid, most chronic stresses occur in, or arise from, the child's immediate environment (home or school) and are interpersonal by nature. Therefore, heightened sensitivity to these problems by professionals such as teachers, school nurses, family doctors, pediatricians – and even town planners, is called for. In cases where more complex psychosocial difficulties within a family are identified, there should be consultation with child mental health services, preferably ones with experience in liaison work.

Regarding the role of positive life events, two separate issues merit being raised. The first concerns are creating opportunities for children to experience positive life events in the hope of helping to offset the detrimental effects of the unpredictable negative events that most children are likely to experience at some point in their lives. The other relates to the pernicious role of multiple chronic stressors, usually stemming from the child's immediate living environment, and enhancing the risk caused by negative life events. The finding that only positive life events taking place in close proximity to negative life events have a protective role is more difficult to translate into practical advice (Sandberg et al. 2002). Despite a large proportion of children's positive life events relating to interests and hobbies, positive experiences such as having an absorbing interest or a rewarding hobby do not in themselves have a protective function. For this to be so, a child engaged in such interests must have a chance to achieve something in them. Just encouraging children with asthma to join clubs, etc. in the hope that this will result in self-esteem-enhancing accomplishments is not necessarily an answer but may have an opposite effect. Children with asthma may join several sports clubs and other pastime activities, only to be forced to give them up with a sense of disappointment, either because the challenges are too great for their health or because of a lack of parental support. The best buffer against stressful experiences is, however, a confiding relationship between a child and a trusted adult (Sandberg et al. 1993). Although having friends is important for a child, unhindered access to a trusted adult, preferably a parent, or grandparent, as a confidante, exerts the most powerful protection against the detrimental effects of stressful experiences.

Cross-References

- ▶ Family Issues in Child Mental Health
- ▶ Gaps Between Knowledge, Services, and Needs
- ▶ Mental Health in Schools
- ▶ Parental Health and Early Child Development
- ▶ Prenatal Mental Health: Continuous Care from Pregnancy
- ▶ Trauma-Related Mental Illness in Children and Adolescents

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Conversion Disorder

23

Vivek Agarwal and Prabhat Sitholey

Contents

Abstract

Conversion disorder is characterized by the presence of neurological symptoms without any known neurological disorder. It is often associated with psychosocial problems. Conversion disorder is more common in Asian and African countries. Understanding and recognition of conversion disorder is poor in primary care. Therefore, it is associated with high use of health facilities, unnecessary investigations, treatment, and impairment. The chapter describes conversion disorder in children and adolescents, treatment, challenges associated with it, ways to improve services, and possible prevention.

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Keywords

Conversion disorder · Children and adolescents · Functional neurological symptom

Introduction

Conversion disorder is characterized by the presence of neurological symptoms without any pathophysiological basis or any known physical disease. The symptoms are very often related to psychosocial problems. Conversion disorder is placed under the category of somatic symptoms and related disorders in DSM 5 as a **functional neurological symptom disorder**. It is important to be familiar with conversion disorder because it often leads to high use of health facilities in terms of a greater number of specialists involved in care, more and unnecessary investigations, and hospitalization (Leary 2003). Early identification and management of conversion disorder is required for resolution of the symptoms and prevention of chronicity and disability.

Epidemiology

The 12 month incidence of conversion disorder was reported to be 1.3/100000 in children and adolescents (children unless specified) between 7 and 15 years in the UK, 2.3 to 4.2/100000 in children under 16 year in Australia, and 1.7/10000 in Canada (Ani et al. 2013; Grant and Krasnik 2015; Kozlowska et al. 2007). Although conversion disorder is reported to be more frequent in Asian and African countries, reliable epidemiological data are not available from these regions because it is difficult to establish diagnosis of conversion disorder in community surveys. An Indian epidemiological study reported a **prevalence** of 0.17% for conversion disorder in children up to 16 years (Indian Council of Medical Research 2005). 14.8% of pediatric psychiatry outpatients had conversion disorder in India (Srinath et al. 1993). In pediatric outpatients, the prevalence of somatoform disorder was 0.2–0.59% of which a majority of the children were suffering from conversion disorder (Bisht et al. 2008; Richa et al. 2018).

Conversion disorder generally manifests in adolescents and is rare before age 5. It is more common in females and in children with less educated parents, from low socioeconomic strata and rural backgrounds.

Clinical Features

The conversion symptoms may be motor or sensory. Motor symptoms could be **pseudoseizures**, syncope, unresponsiveness, abnormalities of gait, movement of limbs, tremors, motor weakness, or paralysis of limbs or body. Sensory symptoms

may present in the form of an inability to feel or anesthesia, pain or paresthesia. There could be blindness, deafness, or aphonia. The symptoms and neurological signs on examination do not conform to any specific known physical/neurological illness. For example, in conversion disorder convulsions occur only in day time and in the presence of people. The affected children do not get injured. They fall gradually so as not to injure themselves seriously. Movements of limbs in conversion seizure are asynchronous, and may involve pelvic thrusting. The affected children may twist or turn. The symptoms may last for minutes to hours without any postictal confusion. The children may have multiple episodes in a day for many days. They may have awareness of events during a conversion seizure episode (Alessi et al. 2013; Grattan-Smith et al. 1988; Huang et al. 2009).

Distribution of anesthesia could be marked by a distinct line, for example, a vertical midline dividing the body in two equal halves. There may be associated symptoms of hyperventilation, headache, bodyache, lump in throat, weakness, hiccups, nausea, and vomiting. There are generally mixed presentations.

It is important to understand that there may be associated physical or psychiatric **comorbid disorders**, but they do not explain conversion symptoms. Common comorbid disorders are anxiety and depression. Other disorders may also be present, like ADHD, learning disorder, eating disorders, and conduct disorder. In conversion disorder, comorbid epilepsy may present with nonepileptic convulsions (Ercan et al. 2003; Pehlivanturk and Unal 2000).

Assessment

The assessment of conversion disorder involves obtaining a detailed history from the child, parents, as well as other informants, if possible, like other family members, peers, and school teachers. A comprehensive medical, neurological, and mental status examination should be done to rule out possibility of any neurological disorder. If possible, **joint assessment** should be done with a pediatrician. If required, investigations should be done to reliably rule out physical or neurological disorder. An assessment should be made of the child's temperament, schooling, and peer relationships. The family functioning should be explored. An assessment of psychosocial circumstances and problems should be done specially to find out which ones are temporally associated with the onset of conversion symptoms. The possibility of conversion symptoms superimposed on neurological or medical disorders, or other psychiatric disorders, should always be carefully considered (Dell and Campo 2011).

If conversion symptoms appear for the first time in a preschool child, a strong suspicion of an underlying physical or psychiatric disorder should be kept in mind because conversion disorder is very rare in this age group.

The diagnosis of conversion disorder is not just of exclusion of a neurological disorder. One must pay attention to the dramatic presentation and abnormal behavior associated with the conversion symptoms. There should also be some evidence of a stressor. The clinician should always keep in mind the overall biopsychosocial context of the child and the symptoms. When the diagnosis of a conversion disorder

Table 1 Psychosocial factors that may act as stressor

1. **Individual factors**
(a) Temperament (anxious, behavioral inhibition, harm avoidance)
(b) Poor coping skills
(c) Borderline intellectual functioning
2. **Familial**
(a) Parenting (critical, overinvolved)
(b) Parental physical/psychiatric problem
(c) Parental substance abuse
(d) Marital or family disharmony
(e) Poor communication with child
3. **Environmental**
(a) Peer group problems
(b) Bullying
(c) Academic stress
(d) Harsh, critical teacher
(e) Abuse

is made with too much certainty without proper assessment, other physical or psychiatric disorders are often missed.

Psychosocial Problems or Stressors

Psychological distress, overt or covert, is a very frequent causative factor for conversion disorder (Dell and Campo 2011; Plioplys et al. 2014). A list of common stressors in pediatric dissociation is given below (Table 1).

Attempts should be made to systematically explore and understand the child's psychosocial environment, stressors, and coping abilities to handle stressful life situations. An attempt should also be made to find out the secondary gains due to conversion disorder.

A view that stressors are "unconscious" creates a barrier in the physician's mind about identifying the stressors. Studies in children with conversion disorders have shown that stressors are generally present in day-to-day life of the patients and are usually known both to the patient and the family members. However, they may not correlate conversion symptoms with them. It is important to evaluate the child for the stressors from a developmental perspective.

Differential Diagnosis

Conversion symptoms could be the presenting symptoms of an underlying undetected psychiatric disorder. Therefore, it is important to screen for all age appropriate psychiatric disorders in the child to avoid missing an underlying primary or a comorbid diagnosis.

Conversion disorder should be differentiated from factitious disorder and malingering. In the latter two conditions, the symptoms are intentionally produced to assume a sick role. The gain is psychological in factitious disorder a need for a sick role and being taken care of. In factitious disorder by proxy, the parent(s) induce illness in the child for their own psychological gains. In malingering, the symptoms are feigned to obtain an incentive like money or some other material gain, or to avoid a disliked responsibility, or punishment. Apparent fabrication of symptoms or gross inconsistencies in history should raise the possibility of malingering or factitious disorder. Conversion symptoms should also be differentiated from the somatic symptoms like headache, chest pain, or abdominal pain occurring in patients with anxiety or depression. In anxiety or depressive disorder, pain symptoms are not of major concern for the patient as compared to conversion disorder.

Rates of misdiagnosis of conversion disorder are around 4% (Stone et al. 2005). False positive diagnosis is likely if importance is given only to the symptoms and not to the underlying physical or psychiatric morbidity and psychosocial circumstances. One must assess the case with an open unbiased mind. One should review the past medical records carefully and, if required, further assessments should be done.

It is also likely that these false positive diagnoses are made more often in females, psychiatrically disordered children, patients presenting plausible psychogenic explanations for their illnesses, and patients with unusual movement disorders or epilepsy. Some of the differential diagnoses could be epilepsy, movement disorders, multiple sclerosis, myasthenia gravis, and periodic paralysis.

Treatment

It is very important to have a good doctor-parent relationship because the parents have to become an ally in the treatment of the child. Unless the parents understand the physician's point of view, it may not be possible to alter their overprotective and overindulgent attitude and behavior towards the child. One should listen to the concerns of the family carefully and try to understand their perception of the child's symptoms. Any confrontation about the nature of the symptoms should be avoided at all costs. It is essential to psychoeducate family as well as the child about the illness (Table 2).

Table 2 Key points in **psychoeducation**

It should be acknowledged that the child has real symptoms and sufferings but the reasons could be psychological and not physical
Harmlessness of the symptoms should be emphasized. It should be emphasized that symptoms are not dangerous or fatal
Symptoms in the absence of serious physical disease are common. These symptoms could be better explained by the mind body relationship, e.g., anxiety can lead to palpitations, tremors, rapid breathing, sweating, etc.
Therefore, emotions can cause physical symptoms, and this can happen even in children
Stressors may not be severe or important from an adult point of view but may be a very important matter of concern for the child

Table 3 Behavioral management of children

Reassuring the child that he/she is not seriously ill
Encouraging the child to gradually resume normal daily activities and functioning including studies and school attendance
Encouraging physical exercise and play
Relaxation exercises, e.g., deep and slow abdominal breathing
Paying attention to the child when normal without symptoms
Engaging the child in age appropriate activity of interest like drawing, painting, story book reading, etc.
Encouraging joint activities with parents
Praise and appreciation for positive behavior

Once the psychosocial factors are known, then attempts should be made to address them. The stressor should be discussed with the child and the family. In case of adolescents, if the stressor has been revealed to physician or the staff in confidence, then consent of the adolescent should be taken to discuss it with the family. The physician's aim should be to resolve the problem by finding and suggesting age appropriate solutions that suits the child's and the family's psychosocial context. The physician should not force his opinion on the child or the family. It is also important to open up the channels of communication between the child and his family. A **rehabilitative approach** should be used with the aim of restoring the normal functioning of the child with conversion symptoms (Campo and Negrini 2000; Heimann et al. 2018) (Table 3).

The aim of the rehabilitative approach is to enhance the child's functioning regardless of the conversion symptoms. Reduction in **secondary gains** is not advisable very early in the treatment and without adequate explanations to the family. The family may perceive reduction in secondary gain as neglect of the child. Also, initially the family may not have full confidence in the physician and the hospital's ability to take total care of their child.

Later on, the family should be offered adequate explanations regarding secondary gains. Reduction in secondary gains in a child should be coupled with an alternative, healthy, socially acceptable, and age appropriate role or activities for the child in which he or she can be trained and rewarded for doing something positive.

Medication should be used only for concomitant anxiety, depression, or behavioral problems and not for the conversion symptoms.

Hospitalization is required when there is doubt in the diagnosis, severe symptoms are present, the family is very distressed, or the symptoms are recalcitrant and resistant to outpatient treatment.

Treatment of Chronic Conversion Disorder

If the conversion symptoms last 6 months or more, then it may be called chronic. Family-focused cognitive behavioral therapy (CBT) helps the affected child to become aware of, examine, and to revise the way they think, respond, and behave

rationally to their symptoms. The aim of CBT is to maximize functioning and reduce the conversion symptoms. The onus of treatment should be gradually shifted from the physician to the child and the family.

Prognosis

A large number of children with conversion disorder improve within 3–6 months. However, about 10–15% may have a chronic course. Relapses may occur in 25–30% of children. A chronic course is associated with a long duration of symptoms, associated psychiatric or medical disorder, and poor premorbid adjustment (Pehlivanturk and Unal 2002; Yadav et al. 2015).

Barriers to Care

Often, especially in rural areas, families seek help from faith healers or at religious places like a temple, grave, or a shrine before visiting a medical facility due to their superstitions (Prabhu et al. 2015). Families usually seek help at primary care. As health staff in primary care may not be trained in mental health problems, they are unable to diagnose conversion disorder (Ndukuba et al. 2015). This leads to a lot of unnecessary investigations, medications, and delay in proper diagnosis. There is also miscommunication with the family about the diagnosis and management. Further, when families are referred to an appropriate mental health facility, due to lack of awareness and stigma, they may avoid seeking expert help.

There is also poor availability of mental health specialists specially in developing countries.

When physical or psychiatric disorders are ruled out and the possibility of the conversion symptoms being psychogenic is put forward, it is usually rejected by the child and parents. That there could be anything psychologically wrong with their "severely ill" child, their parenting, or with their family functioning, is totally unacceptable to the parents.

There is a need to integrate mental health with primary care. Primary care staff should be trained in mental health problems with availability of ongoing support from the mental health specialist. This is being done in many countries with variable outcomes. There should be better **collaboration with primary care** and mental health care institutions. Furthermore, children with conversion disorder are more likely to consult a pediatrician, and families are more comfortable in visiting a pediatrician than a mental health specialist. Pediatricians should have training on mental health problems of children during their postgraduate training.

Psychiatrists need to engage and train traditional healers, community health workers, and teachers to identify children with mental health problems and refer them to primary care, including conversion disorder. Primary care should be able to identify and provide treatment. For example, in the UK, 50% of doctors entering any speciality have to do 4 months of training in psychiatry during their foundation years

(Perry et al. 2016). A major component of the psychiatrist's role should be of training, supervision, development of standard protocols, and liaising with primary care providers.

Future services will be more internet based without geographical boundaries. It will be possible to provide treatment in remote areas by technology. Studies have shown improvement and patient and parent satisfaction with delivery of therapies through telepsychiatry for various disorders in children such as ADHD, ODD, and Tics (AACAP 2017). Studies have shown that a telepsychiatry module-based assessment by a non-psychiatrist doctor or paramedical worker to be of help in remote areas of India (Malhotra et al. 2017).

Prevention

Primary prevention programs in schools may help in reducing the prevalence of conversion disorder. For example, children can be better equipped to handle stress if they get trained in life skills through **life skill education** programs. This can be group based and done by teachers during regular school hours. Similarly, efforts should be made to make children mental health literate during schooling. It will help in reducing stigma and facilitate seeking help (Patel et al. 2008).

Conclusion

Conversion disorder is more common in Asian and African countries. It is common in pediatric and neurology outpatients. However, its recognition in primary care or by pediatricians is poor. It is often associated with other psychiatric comorbidities. Treatment involves working with family and the child using psychoeducation and a rehabilitative approach. It is associated with significant use of health facilities and often unnecessary investigations and treatments. Therefore, there is a need for better integration of mental health with primary care as well as more need of training of primary care health workers in mental health problems. There is also a need for implementation of prevention programs in schools to enhance the coping skills of children as well as addressing their problems in learning to reduce the incidence of conversion disorder.

Cross-References

► Education and Training
► Family Issues in Child Mental Health
► Mental Health Strategy and Policy

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Chronic Fatigue in the Context of Pediatric Physical and Mental Illness

24

M. E. Loades and T. Chalder

Contents

Abstract

"Fatigue" describes an overwhelming sense of exhaustion or extreme tiredness, and a lack of energy or depletion of reserves. Fatigue is inherently subjective; this means that one person may experience fatigue in a different way to the next. Fatigue can be thought of as being on a continuum from normal fatigue, which arises after exertion and remits with rest, to problematic fatigue, which does not necessarily arise from exertion, does not remit with rest, and interferes significantly with functioning. At the extreme end of the continuum is chronic fatigue

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syndrome (CFS), which is diagnosed in a child or adolescent who has experienced substantial and disabling fatigue for at least 3 months, for which there is no alternative medical explanation (NICE 2007). Fatigue is often associated with chronic diseases. Nevertheless management strategies which regularise activity and sleep can help reduce fatigue and improve quality of life.

Keywords

Chronic fatigue · Children and adolescents · Management

Introduction

"Fatigue" describes an overwhelming sense of exhaustion or extreme tiredness, and a lack of energy or depletion of reserves. Fatigue is inherently subjective; this means that one person may experience fatigue in a different way to the next. Fatigue can be thought of as being on a continuum from normal fatigue, which arises after exertion and remits with rest, to problematic fatigue, which does not necessarily arise from exertion, does not remit with rest, and interferes significantly with functioning. At the extreme end of the continuum is chronic fatigue syndrome (CFS), which is diagnosed in a child or adolescent who has experienced substantial and disabling fatigue for at least 3 months, for which there is no alternative medical explanation (NICE 2007).

Fatigue is experienced by adolescents as uncertain and uncontrollable. It can result in significant functional limitations, including having a significant impact on school and social functioning (Collin et al. 2016). Therefore, it can have a detrimental impact on the normal adolescent developmental progression.

Fatigue is common, affecting as many as one in three adolescents. As children develop, fatigue usually increases, particularly later in adolescence. Approximately, 1 in 50 children and adolescents have had unexplained disabling fatigue lasting for at least 3 months (Collin et al. 2016; Nijhof et al. 2011). Rates of fatigue and CFS-like illness appear to be even higher in some ethnic groups (Bhui et al. 2011). Fatigue is a common symptom in physical illness; for example, at least half of adolescents with type 1 diabetes (Varni et al. 2009) and more than 6 in 10 with multiple sclerosis report fatigue (MacAllister et al. 2013). Rates of fatigue have also been found to be raised in pediatric rheumatoid arthritis, chronic pain, neurological conditions, HIV, and cancer. Fatigue in physical illness may result from biological consequences of the disease itself, and, in some instances, to arise from side effects of treatment regimes. However, evidence to date shows that specific disease factors, such as viral load in HIV, explain relatively little of the variance in fatigue.

The subjective nature of the fatigue makes it tricky to measure because:

1. There is no clear agreement about when "normal" fatigue becomes "abnormal," and this may change at different developmental stages.
2. Informant report (e.g., parental report) may not be a valid measure of the subjective fatigue experience.

3. Different aspects of fatigue can be measured, including duration, severity, and impact.
4. Fatigue is a fluctuating and unpredictable symptom, so timing of the measurement is complicated.

As a result, there is a lack of robust, well-validated measures of fatigue for pediatric populations, and there are issues with the measurement properties of the existing tool. An example of a measurement tool is the Chalder Fatigue Questionnaire (Chalder et al. 1993), which is a brief self-report questionnaire assessing the severity of physical and mental fatigue over the past month (see Table 1).

Fatigue and Disability

Fatigue can have a substantial impact on young people's functioning, often over and above that resulting from any underlying disease itself. It sometimes interferes with school attendance and with social and leisure activities, and may also impact on family life by limiting or curtailing family activities. Decreased school attendance can result in problems with academic attainment, and even if a fatigued child is in school, fatigue can have a detrimental impact on their learning (Crawley et al. 2011).

Table 1 Chalder Fatigue Scale

We would like to know whether or not you have been having any problems with feeling tired, weak, or lacking in energy in the last few weeks. Please answer *all* the questions simply by *ticking* the answer which you think most nearly applies to you. We would like to know how you feel either at the moment or recently, rather than a long time ago. If you have been feeling tired for a long time, we want you to compare yourself to how you felt when last well

	Less than usual (0)	No more than usual (1)	More than usual (2)	Much more than usual (3)
Do you have problems with tiredness?				
Do you need to rest more?				
Do you feel sleepy or drowsy?				
Do you have problems starting things?				
Do you lack energy?				
Do you have less strength in your muscles?				
Do you feel weak?				
Do you have difficulty concentrating?				
Do you make slips of the tongue when speaking?				
Do you find it more difficult to find the correct word?				
How is your memory?	Better than usual	No worse than usual	Worse than usual	Much worse than usual

If the child is at home more, an indirect result may be that this affects the parents' ability to maintain their employment, impacting on family finances too. Childhood and adolescence are a time of rapid social and emotional development, and for the child, not being able to keep up with peers can become difficult, even over a relatively short space of time.

Fatigue and Psychopathology

The DSM-5 and the ICD-10 diagnostic criteria for depression and generalized anxiety disorder include fatigue as a possible symptom. In adolescents with depression, between 43% and 73% had substantial fatigue (Goodyer et al. 2016; Orchard et al. 2016). Fatigue may contribute to problem maintenance in mental health problems. For instance, a depressed adolescent may be less inclined to do activities if they are fatigued, resulting in a lack of positive reinforcement from the environment, compounding their low mood. It may also make it more difficult to engage in talking treatments like cognitive behavior therapy (CBT), which require considerable cognitive and behavioral effort.

Existing evidence has found that fatigue and mood problems co-occur. This holds true across a multitude of illness conditions, including after EBV, cancer, multiple sclerosis, and in inflammatory diseases (Goretti et al. 2012; Spathis et al. 2015; Van Langenberg and Gibson 2010; White et al. 2001). It is possible that this could be explained, at least in part, by the diagnostic criteria for depression including fatigue. However, it seems unlikely that this symptom overlap fully explains the co-occurrence, given that in qualitative studies, children and young people talk about the impact of fatigue and the resultant disability on their mood more extensively.

Model of Understanding Fatigue

Fatigue is often associated with disrupted attention, concentration and memory problems, sleep disturbance, weakness, dizziness, light-headedness, nausea, hypersensitivity to noise, light and touch. Fatigue is a multidimensional construct, which includes cognitive, behavioral, affective, and physiological aspects. The cognitive behavioral model of fatigue has been applied to fatigue in the context of a range of physical illnesses such as CFS, rheumatoid arthritis, and multiple sclerosis. The model aims to explain the onset and maintenance of fatigue (see Fig. 1). Biological disease characteristics such as a disease process or a treatment regime, and/or environmental stressors, such as stressful events, may trigger the onset of fatigue. Fatigue is then maintained by cognitive factors, such as illness perceptions and beliefs about the controllability and predictability of the symptoms, emotional factors such as depression and anxiety, and behavioral responses to fatigue such as over-exertion or excessive rest. Although patients may gain relief from fatigue or stress as a result of not engaging in school activities (operant conditioning), the negative consequences of not being in a developmentally appropriate educational

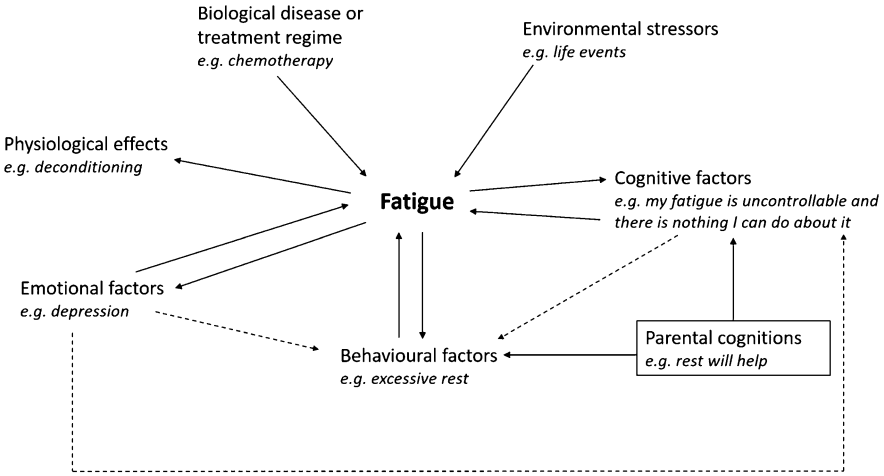

Fig. 1 Cognitive behavioral model of fatigue in pediatric chronic illness

and social environment can be huge. Physiologically, inactivity results in de-conditioning and increased post exercise myalgia.

In children and young people, the response of significant others to them and to the symptoms they are experiencing is also an important consideration. Parents have a vital role; they could inadvertently contribute to the cycles which perpetuate fatigue, by, for example, encouraging excessive rest. They could also contribute to finding ways to overcome fatigue including by seeking help for fatigue or modeling an adaptive coping style.

Treatments for Fatigue

Across pediatric physical and mental illness, there has been little convincing evidence that medication helps to combat fatigue. What has consistently been shown to be promising across different populations experiencing fatigue is an intervention approach which includes:

1. Psychoeducation – aimed at improving understanding of what fatigue is, what keeps it going (including sleep hygiene), and what might help. Conveying the message that rest is helpful in the context of acute fatigue or acute illness, but that when fatigue or illness becomes more chronic, rest becomes unhelpful and can maintain fatigue, is key. Involving the family in this is very important so that they can better understand the fatigue and avoid inadvertently reinforcing it.
2. Cognitive behavior therapy (CBT) – CBT for fatigue includes targeting unhelpful thoughts about fatigue (for example, "I must do everything I can today as I might be too tired tomorrow"), shifting the focus of attention away from fatigue, and

stabilizing activity patterns and then gradually increasing activity levels. Activities considered include physical, cognitive, social, and emotional activities. Behavioral experiments can be a useful means of testing out the thoughts about fatigue and discovering the impact of doing things differently.

3. Graded Exercise Therapy (GET) – GET focuses on gradually increasing levels of physical activity specifically. After establishing a baseline of physical activity from which to start, moderate physical activity levels are gradually increased (e.g., starting by walking for 1 min a day, 2 min the next day, 3 min the following day, etc.).

Barriers to Treatment

There is a dearth of research into how best to intervene when a child or adolescent has both fatigue and a mood problem like depression or anxiety. CBT is an evidence-based treatment for fatigue, and also for mood problems. However, the problem is in the sequencing of the techniques used within the CBT approach. For instance, for depression, the usual course of action would be to commence treatment with behavioral activation, which means scheduling and increasing activities that give a sense of enjoyment and/or achievement. For fatigue, CBT would commence by establishing a consistent routine of activities that the person can manage to do every single day, even on a bad day, and then to gradually increase this. For the person who has both fatigue and depression, behavioral activation may be difficult to achieve while feeling fatigued and also working to establish a consistent baseline of activities. Similarly, for the anxious person who is also fatigued, a CBT approach for anxiety would advocate exposure to the feared stimulus, which in the short term, increases anxiety, before habituation occurs. Anxiety causes fatigue to worsen, and fatigue may get in the way of carrying out exposure tasks, compounding the problem.

Therefore, careful formulation of problem maintenance, including both mood and fatigue, and mapping cycles in specific situations to collaboratively figure out where best to start to intervene is important. Thinking creatively too, for example, around identifying low energy pleasurable activities that a depressed individual can do even if they are fatigued, is useful. Adapting CBT session delivery itself, including taking rest breaks during sessions, keeping sessions briefer, or limiting travel time by offering sessions by videoconferencing or telephone can also be considered.

Including parents in treatment is important. Parents need to understand the model of fatigue and ways to overcome it to be able to support the young person to make the changes required. Working with parents also allows for potential identification of any unhelpful cognitions that they may have about their child's fatigue, which could be addressed alongside the child's own cognitions.

Conclusion

Fatigue is a transcultural symptom, which if untreated can lead to severe disability. We recommend that it is enquired about in the clinical setting and that evidence-based treatments are provided.

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Conflicts of Interest TC is the author of several self-help books on chronic fatigue for which she has received royalties.

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The Effect of Malnutrition and Micronutrient Deficiency on Children's Mental Health

25

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Contents

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Abstract

Malnutrition and micronutrient deficiencies are highly prevalent in low- and middle-income countries (LMICs) and micronutrient deficiencies also occur in high income countries. Ample research has examined the association of malnutrition to children's cognitive, language, and motor development but mental health has generally been neglected. In this chapter, we selectively review the evidence linking malnutrition, iron, zinc, iodine, and vitamin D deficiencies to mental health and socioemotional behavior.

Keywords

Malnutrition · Micronutrient deficiency · Children · Mental health · Socioemotional behavior · Psychosocial interventions

Introduction

Mental health in young children is determined by the interaction of the environment and genetic predispositions and provides the foundation for future mental health and all other types of development (National Scientific Council 2008–2012). There is now ample evidence that early experiences can affect brain architecture and function (Johnson et al. 2016) having life time effects. Malnutrition and micronutrient deficiencies are highly prevalent in low- and middle-income countries (LMICs) and have been linked to children's development. In this chapter, we selectively review the evidence linking them to mental health and socioemotional behavior. We first discuss malnutrition then briefly discuss iron, zinc, iodine, and vitamin D deficiencies. We do not discuss eating disorders, refugees or children from residential institutions, all of which may include undernourished children with poor mental health.

Malnutrition

The definitions of malnutrition in early childhood depend on children's height and weight compared to the WHO Child Growth Standards, derived from an international sample of healthy children, taking into account age and gender (WHO 2006). Moderate malnutrition includes stunting which is height for age between -2SDs and -3SDs of the WHO references and occurs in 22.2% (151 million) of the under-fives in LMICs (WHO 2018). Moderate wasting is weight for the child's height between -2SDs and -3SDs of the references and occurs in 7.5% (51 million) of the under-fives (WHO 2018). Severe acute malnutrition (SAM) includes wasting below -3SDs and occurs in 2.5% of the relevant population (WHO 2018) and stunting below -3SDs. Stunting is considered to represent chronic poor nutrition and usually develops during the first 2 years when normal growth is most rapid. After that children's

heights generally track at the same relative level sometimes improving. Infections and inflammation also play a role in the etiology of stunting in particular environmental enteropathy (which is damaged intestinal mucosa) linked to contaminated environments. Wasting occurs with acute nutritional deficiency or illness and can be corrected rapidly whereas stunting is difficult to correct. Underweight (low weight for age) is a mixture of stunting and wasting and is also divided into moderate or severe.

Macronutrients (protein and calories) are deficient in severe malnutrition, some micronutrients (vitamins and minerals) are also likely to be deficient. Micronutrient deficiencies may also occur alone.

Environment of Malnourished Children

Malnourished children usually come from poor backgrounds with parents who have low educational levels and provide poor home stimulation. It is well established that poverty is associated with poor levels of cognition and language in children (Brooks-Gunn and Duncan 1997; Hamadani et al. 2014), but it may be less well appreciated that it is also associated with poor mental health (Yoshikawa et al. 2012). Poverty is also associated with maternal depression, another risk factor not only for malnutrition in the offspring but also for poor mental health (Wachs et al. 2009). Malnourished children also have less responsive mothers but it is unclear whether this is secondary to the children's apathetic behavior or precedes it (for review see Grantham-McGregor 1995).

In most studies of nutritional deficits and mental health, there is the possibility of confounding with unmeasured poverty-related factors. Most researchers attempt to control for socioeconomic conditions but it is unlikely that all factors that may affect child development are controlled. Nutritional supplementation studies probably provide the most robust evidence but very few have looked at mental health outcomes.

Assessment of Behavior and Mental Health

Socioemotional development and mental health in young children can be assessed by mothers' and teachers' reports or self-report in older children; however, few instruments have been standardized for LMICs. Usually questionnaires developed for high-income countries are adapted for the local context, but adaptation can reduce validity. Occasionally instruments are developed for the study but when they comprise very few items their validity is doubtful. Direct observations may be more valid in young children, especially when done in the children's normal environment.

Severe Acute Malnutrition, Mental Health, and Behavior

Children with SAM have been observed to be more apathetic, less active, exploring, and happy than better nourished children. It has been hypothesized that this type of

behavior, known as "functional isolation," is one mechanism leading to poor cognitive development. It may also play a role in mental health. Many early studies showed that young children with SAM (Grantham-McGregor 1995) have deficits in cognition, language and motor development, and school achievement but few examined mental health.

Two Caribbean studies assessed mental health (Grantham-McGregor 1995). In Barbados, children with SAM in early childhood were found at age 5–11 years and 9–15 years to have attention difficulties, be more aggressive, and make poorer relations with peers and teachers than their classmates. At 11–17 years, their mothers reported executive function deficits (including attention) and the children reported more conduct disorder and more depressive symptoms than healthy controls (Galler et al. 2010, 2012). In Jamaica (Richardson et al. 1975), children with SAM in early childhood were withdrawn, solitary or unsociable at home, and unhappy at school compared with matched controls at 5–10 years. The teachers reported the children had poorer attention, got along less well with their peers and teachers than their classmates. The findings were similar in both studies with persistent behavior and mental health problems.

Moderate Malnutrition, Mental Health, and Behavior

Stunting is highly prevalent and many studies have shown an association between stunting and poor child cognition, language and motor development, and school achievement. The association is strongest with growth in the first 2 years, which appears to be a sensitive period (Black et al. 2017). It is likely that any association between malnutrition and mental health will also have its origins in early childhood. However, relatively few studies have examined socioemotional behavior or mental health.

A review of stunting and child development (Sudfeld et al. 2015) found 56 studies but only 13 reported socioemotional development. While the researchers concluded that stunting was associated with poor cognition, language, and motor development, they were unable to conclude on socioemotional outcomes due to few studies with inconsistent findings.

Several cross-sectional studies have shown associations between nutritional status and socioemotional development. In Bangladesh, moderately underweight children aged 6–24 months (Baker-Henningham et al. 2009) were reported to be less sociable, have poorer attention, more negative emotionality, and be more fearful than matched better-nourished children. Furthermore, during developmental assessments, the undernourished children were rated by the examiner to be less responsive, less cooperative, to show more negative affect, and vocalize less than the better nourished group. Several early studies found that moderately underweight children are less likely to have secure attachments, than better nourished children (Grantham-McGregor 1995). In Brazil, lower height for age in children aged 9 years (Brito and Onis 2004) was associated with hyperactivity, conduct problems, impulsivity, and inattention. However, few children were moderately stunted. It is possible that the shorter children had been stunted in early childhood.

Longitudinal studies provide information on timing of the relationship. In 1,000 2-year-old children in South Africa (Avan et al. 2010), stunting was significantly associated with child behavior problems, whereas wasting and weight for age were not. The same children were reassessed at 4 years and no association between stunting at 2 years and "social maturity" was found (Casale et al. 2014).

In Jamaica, stunted and non-stunted 1-year-old children were observed in their homes over 4 days. The stunted children were found to be more apathetic, fussier, less happy, less active, and have fewer ways of exploring their environment with less enthusiasm than the non-stunted children (Gardner et al. 1999). This type of behavior is similar to that shown by children with SAM. At age 11–12 years (Chang et al. 2002), the stunted children had more conduct difficulties at home and tended to have fewer prosocial behaviors at school ($p = 0.06$). At 17 years, the stunted group children were more depressed, anxious, and had lower self-esteem and were more hyperactive than the non-stunted (Walker et al. 2007). It seems that the behavior and emotional differences in early childhood were precursors of adolescence mental health problems (Table 1).

Some studies have looked at linear growth rather than stunting. In Belarus (Yang et al. 2011), growth in the first 12 months in 11,899 children but not later growth was associated with reduced externalizing behaviors at 6 years of age, suggesting that early growth is the most likely to affect mental health. In contrast in 8,389 Chinese children (Huang et al. 2013), there was no relation between growth in the first 4–7 years of life and behavior problems. Timing may explain the failure to find an effect of growth over 4 years, analogous to the effect of growth on cognition which is strongest in the first 2 years.

A large study in the Philippines found increased risk of suicidal ideation at 18 years of age associated with lower linear growth in the first 24 months (Cheung and Ashorn 2009). In contrast to most other studies, three African cohort studies of growth from birth to 18 months (Prado et al. 2016) failed to find associations of growth with personal-social development or socio-emotional development. Socio-emotional development was assessed by an instrument developed in Kenya.

Effects of Interventions on Behavior and Mental Health

Almost all studies of macronutrient supplementation focused on other aspects of child development. The stunted children in the above Jamaican study were randomized to four groups, home visits with psychosocial stimulation, nutritional supplementation, both treatments and control for 2 years. There was no supplementation effect on behavior or mental health. Stimulation had no effects on mother or teacher-reported behavior at 11–12 years but had marked benefits at 17 years to depression, anxiety, self-esteem, and attention (Table 1) (Walker et al. 2006). Why the stimulation effects were not apparent earlier is unknown. It is possible that mental health improves slowly secondary to the children's improved cognition and school achievement. Concurring with this hypothesis, when we controlled for IQ differences, only

Table 1 Longitudinal Jamaican study of stunted and non-stunted children

Study	Sample	Measurement	Results: stunted non-stimulated compared with non-stunted	Results: stimulation effects[a]
Meeks Gardner et al. (1999)	Subsample: aged 12–24 months, 26 non-stunted, 78 non-stimulated stunted	Observations at home at baseline and 6 months later	Children: increased fussiness and apathy, less active, less enthusiastic exploring, less happy. Caretakers: made fewer positive vocalisations	NA
Chang et al. (2002)	11–12 years: all stunted children n =116 regardless of present height and 80 non-stunted	Rutter's Parent (A) and Teacher (B) Scales	Increased conduct disorder at home $p < 0.05$	NS
Walker et al. (2006, 2007)	17 years, 55 non-stimulated stunted children and 64 non-stunted children	Short Mood and Feelings Quest	More depression, $p < 0.05$	Reduced depression $p < 0.05$
		Manifest Anxiety Questionnaire	More anxiety, $P < 0.005$	Reduced anxiety $p < 0.01$
		How I think about myself	Worse self-esteem $P < 0.05$	Improved self-esteem $p < 0.05$
		Behavior and Activities Checklist	Anti-social behavior NS	NS
		Conners' Parent Rating Scale	Attention deficit NS Oppositional behavior NS Hyperactivity $p < 0.05$ Cognitive problems NS	Improved attention $p < 0.05$ NS NS NS

Note: Stunted children participated in an RCT of stimulation, supplementation, and both treatments. Supplement had no effect on any behavioral outcomes; therefore, only differences between non-stimulated stunted and non-stunted children are shown
NA not applicable, *NS* not significant
[a]No significant supplement effect

anxiety in the nonstimulated stunted group remained significantly different from the non-stunted group.

Two other RCTs of psychosocial stimulation in malnourished Bangladeshi children, (Hamadani et al. 2006, 2019) reported improved behavior ratings during

developmental assessments at endline. In both studies, the treated children were more cooperative and responsive to the examiner, vocalized more, and had a more positive affect than non-intervened malnourished children. Children in the first study were followed up at 17 years when the stimulated participants and their mothers reported fewer behavioral difficulties and better prosocial behavior than the control group (Hamadani personal communication).

Limited data suggests that psychosocial interventions can improve malnourished children's mental health whereas there is insufficient evidence on the effects of supplementation. The World Health Organization recommends that all malnourished children participate in psychosocial interventions. There is ample evidence that they benefit in cognitive development and it is now apparent that their mental health is also likely to benefit providing added justification. These interventions can be delivered by home visiting or mothers groups and be run by paraprofessionals and focus on helping the mothers interact and play with their children in a way to promote their development. They also provide social support for the mothers and some also lend play materials (Hamadani et al. 2019).

Summary

The limited available evidence indicates that both SAM and moderate stunting in early childhood are associated with altered behavior including apathy, fussing/unhappiness, less exploring, less vocalizing, and insecure attachment. At school age, they have multiple behavior problems including poor social relations and attention, hyperactivity, aggression, and conduct disorder. In late adolescence, their mental health problems include depression, anxiety and low self-esteem, oppositional behavior, and hyperactivity. It is unclear why a few studies found no differences but variations in the severity and age of malnutrition or poor growth, and problems with measuring socioemotional behavior may partly explain it. Early childhood psychosocial interventions have been shown to be effective in reducing the problem but few children have access to them.

Iron Deficiency Anemia

Iron is a component of hemoglobin and is required for brain development particularly myelination and is a component of certain neurotransmitters, including dopamine, norepinephrine, and serotonin. Anemia in children is defined as hemoglobin $<$110 g/dl and severe anemia as $<$70 g/dl; the prevalence in children $<$5 years is estimated to be 18.1% and 1.5%, respectively. The prevalence of all anemia attributable to iron deficiency varies by region and is 63% in Europe and 34% in Africa, where other factors play a role (Black et al. 2013). Children with iron deficiency anemia (IDA) have abnormal cognitive, visual, and auditory evoked potentials and quantitative EEGs and sleep patterns (Walker et al. 2011; Black et al. 2013).

Children with IDA have been frequently shown to have poor motor, cognitive, and language development and school achievement (Black et al. 2013;

Walker et al. 2011), but there are fewer studies of mental health. It is generally accepted that iron deficiency affects cognition in school-aged children; however, there are few rigorous randomized controlled trials (RCTs) on the effects of iron supplementation in children under 3 years and there is lack of consensus as to whether the relationship is causal (Black et al. 2013; Pasricha et al. 2013). Numerous cross-sectional studies have shown that children under 2 years with IDA have altered socioemotional behavior which is similar to that found in malnourished children, described above. They have been observed to stay closer to their mothers, to be wary, hesitant, fearful, more tired, sleep more, play less, and be less happy (for review see Grantham-McGregor and Ani 2001). Four year old Indian children with IDA showed similar behavior (Lozoff et al. 2007). Furthermore, mothers of infants with IDA have been shown to be less stimulating and responsive than the mothers of non-anemic infants (Armony-Sivan et al. 2010). There is also limited evidence that children with IDA have more insecure attachment than non-anemic children (Wachs et al. 2011).

In older children, there is less data on behavior problems. Some studies have shown that children with mental health problems are more likely to have nutritional deficiencies including iron deficiency than children without problems (Bener et al. 2014), but it is possible that the mental health problem precedes the iron deficiency. In a stronger design in Taiwan, (Chen et al. 2013) children and adolescents with a diagnosis of IDA were identified from a large national survey and compared with age and gender-matched controls for risk of psychiatric disorders. The IDA group had an increased risk for many behavioral disorders including unipolar depressive disorder, bipolar disorder, anxiety disorder, autism spectrum disorder (ASD), and attention-deficit hyperactivity disorder (ADHD).

Longitudinal Studies

There are few longitudinal studies examining socioemotional behavior. In China, 4-year-old children who had chronic IDA in infancy but were no longer iron deficient still had behavioral differences, showing less tolerance of frustration, more passive behavior, and physical self-soothing than children who were fully treated for anemia by 24 months of age or were non-anemic throughout infancy (Chang et al. 2011). In Mauritius, 3-year-olds were classified as malnourished not based on the standard anthropometric criteria but on clinical signs, including moderate to severe anemia, had more externalizing problems than non-malnourished children at 8–17 years (Liu et al. 2004). They were highly likely to have been deficient in iron and possibly other micronutrients.

In Costa Rica, infants who had chronic, severe iron deficiency in infancy were followed up throughout childhood. Infants with IDA stayed closer to their mothers were more likely to be carried and showed lower levels of positive affect. At age 5 years (Corapci et al. 2006), they showed less activity, positive affect, and talking than children who were not iron deficient in infancy. Mothers of previously iron-deficient children were also less responsive to the child. At 5

and at 11–14 years, their parents and teachers rated them as having more externalizing and internalizing problems (anxiety/depression, social problems) and attention problems (Corapci et al. 2010). However, over 15 years there were no parental or teacher reports and the participants themselves did not report more problems than the controls. This longitudinal profile of socioemotional development problems and then mental health disorders suggests that the abnormal behavior in early childhood leads to mental health problems in later childhood and is similar, except for the lack of extension into late adolescence, to that found in malnourished children.

Effects of Interventions

There is little information on the mental health response to iron treatment. Following a preventative trial of iron supplementation in infancy (Lozoff et al. 2014), at age 10 years the supplemented children were rated by examiners as more cooperative, confident, persistent after failure, coordinated, and working harder after praise compared with the no-added-iron group. In a social stress task, supplemented children also smiled and laughed more and needed less prompting to complete the task. However, the initial trial had design problems.

A large trial of micronutrient supplementation (which contains iron, zinc, and vitamins) in poor Chinese school children aged 10–12 years (Zhang et al. 2013) found improved anemia and anxiety measured by self-report on an adapted version of the Children's Manifest Anxiety Scale. However, there was no placebo and it is uncertain that iron was responsible for the improvement. Finally, there is little and conflicting information on the effects of psychosocial stimulation on socioemotional development or mental health in children with IDA.

In summary, although there is considerable data showing altered socioemotional behavior in the young children with IDA, there is limited data suggesting mental health problems in older children and few RCTs of treatment. Studies looking at mental health effects of IDA are needed.

Micronutrient Deficiency, Mental Health, and Behavior

Other micronutrient deficiencies have also been associated with behavioral difficulties in children and adolescents. Recent studies have linked nutrient deficiencies to internalizing and externalizing behaviors, autism spectrum disorders, and attention-deficit hyperactivity disorder (Kieling et al. 2011). Tables 2, 3, and 4 below provide information on a selected group of studies on zinc, iodine, and vitamin D deficiencies and socioemotional development and mental health. Observational studies are presented first followed by trials. Most of the studies have been conducted in developed countries with varying sample sizes and study designs.

Table 2 Studies of the association of moderate iodine deficiency with mental health in children

Location of study and reference	Sample	Study design	Outcomes assessed	Findings
Italy Vermiglio et al. (2004)	27 mother-child pairs 16 mother-child pairs from an iodine-deficient area 11 mother-child pairs from an iodine-sufficient area	Prospective cohort study	Attention-deficit/ hyperactivity disorder (ADHD) measured at 8–10 years old	Eleven of the 16 children from the iodine deficient area were diagnosed with ADHD
Norway Abel et al. (2017a)	48,297 mother child pairs recruited during pregnancy	Prospective birth cohort assessed iodine intake in pregnancy	Child behavior assessed by the child behavior checklist at 3 years	Low maternal iodine intake in pregnancy was associated with increased internalizing and externalizing behavior problems
Norway Abel et al. (2017b)	77,164 mother child pairs recruited during pregnancy	Prospective birth cohort assessed iodine intake in pregnancy and supplement taking	Attention-deficit/ hyperactivity disorder (ADHD) symptoms by maternal report at 8 years	Insufficient iodine intake during pregnancy was associated with increased child's risk of ADHD symptoms, but not diagnosed ADHD, iodine supplement no benefit
Australia Zhou et al. (2015)	59 pregnant women	Randomized controlled trial Supplement: 150 ug iodine daily from 20 weeks to end of pregnancy (~38 weeks)	Socioemotional and adaptive behavior on the Bayley Scales of Infant and Toddler Development (Bayley III) at 18 months	There was no significant effect of iodine supplementation on infant social-emotional behavior

Iodine Deficiency

Iodine is a mineral important for the synthesis of thyroid hormone, which is essential for fetal and postnatal growth and brain development (Zimmermann 2009). There is a successful global program of fortification of commonly consumed food items. Despite the program, mental impairment in children linked to iodine deficiency is

Table 3 Studies of the association of zinc deficiency with mental health in children

Location of study and reference	Sample	Study design	Outcomes assessed	Findings
Egypt Metwally et al. (2016)	322 breast-fed, 240 bottle-fed, and 93 mixed-fed infants from 6 to 24 months	Cross-sectional study serum zinc measured	Socioemotional outcomes measured by Bayley Scales of Infant Toddler Development (Bayley III)	Subnormal levels of zinc were significantly associated with having a low socioemotional composite score
Brazil Ashworth et al. (1998)	205 low birth weight term infants	Prospective double-blind part randomized efficacy trial 1 mg or 5 mg zinc supplement given for 8 weeks	At 12 months behavior ratings were assessed Responsiveness Emotional tone Activity level Cooperation Amount of vocalization	Significant improvement in behavior rating: Responsiveness to tester
India Mathur and Agarwal (2015)	100 preterm neonates	Open label randomized controlled trial *No placebo* 2 mg/kg elemental zinc supplement given once daily until 3 months corrected age *Tester not blind*	Neurodevelopment assessed at 40 weeks and 3 months using the Amiel-Tison method: Alertness/ attention Hyper-excitability Insufficient sleep Excessive crying Frequent startling	Non-supplemented infants were more likely to show signs of hyper-excitability at 40 weeks and 3 months than the intervened infants also more likely to have deficits in attention
Bangladesh Hamadani et al. (2002)	168 mother-child pairs	Double-blind randomized controlled trial 30 mg zinc supplement given daily for 5 months	Modified Wolke's Mother and Baby Scales Activity Emotional tone Responsiveness Approach Cooperation Vocalizations	No significant associations found with child behavior
Turkey Uckardes et al. (2009)	226 third grade primary school children	Double-blind randomized, placebo-controlled trial 15 mg zinc supplement given daily for 10 weeks	Conners' Rating Scale for teachers and parent scores	Parent report showed decreases in attention deficit, oppositional behavior and hyperactivity. However there was no significant

(continued)

Table 3 (continued)

Location of study and reference	Sample	Study design	Outcomes assessed	Findings
				treatment effect with supplementation
Guatemala DiGirolamo et al. (2010)	674 children in public school	Randomized, double-blind controlled trial 10 mg zinc supplement given for 6 months	Children's Depression Inventory (CDI) Revised Children's Manifest Anxiety Scale (RCMAS) Behavior Assessment System for Children (BASC)	There was no significant association between zinc concentration and parent reports of behavior

estimated to affect 18 million children, with 38 million being born with a high risk of iodine deficiency mostly mild to moderate (Nutrition International 2009; UNICEF 2008). It is well established that severe iodine deficiency during pregnancy causes cretinism and cognitive deficits in the offspring (Melse-Boonstra and Jaiswal 2010). There is less certainty about the effects of moderate to mild iodine deficiency, which is prevalent even in high-income countries. Similar to the situation with malnutrition, most studies of iodine deficiency have focused on cognitive development and many observational studies have shown associations of moderate iodine levels in pregnancy with poor cognition in the offspring, e.g., Bath et al. (2013). A few prospective studies of iodine intake in pregnancy or living in iodine-deficient areas (Table 2) have reported that low iodine is associated with increased internalizing and externalizing behaviors or increased ADHD in the offspring. However, one RCT with iodine supplementation found no benefit. Furthermore, taking iodine supplements in early pregnancy was not beneficial and possibly harmful (Abel et al. 2017b). There is therefore a need for carefully run randomized controlled trials.

Zinc Deficiency

Zinc is a mineral involved in cellular metabolism and is required for normal growth and development (Bailey et al. 2015). It is an important nutrient in brain development and is especially important in DNA and RNA synthesis (Nyaradi et al. 2013) and has been linked to the dopamine system. Zinc deficiency is estimated to affect 17% of the global population using dietary intake information (Black et al. 2013). Evidence on the effect of zinc supplementation on cognitive development in children is conflicting (Black et al. 2004; Hamadani et al. 2002; Tamura et al. 2003).

Table 4 Studies of the association of Vitamin D deficiency with mental health in children

Location of study and reference	Sample	Study design	Outcomes assessed	Findings
Iran Ataie-Jafari et al. (2015)	1095 school students, 14.7 ± 2.6 years	Cross-sectional study	Global School Based Student Health Survey Questionnaire (self-report)	Students who were classified as vitamin D deficient had higher reported levels of sadness/depression, worry, and poor quality sleep
Germany Husmann et al. (2017)	9068 children and adolescents who were participants of the German Health Survey	Cross-sectional study	Strengths and Difficulties Questionnaire (SDQ), both parent report and self-report	There was a weak inverse association between 25(OH) D concentration and the total difficulties scales of the SDQ. This was mainly due to emotional and peer relationship problems
England Tolppanen et al. (2012)	2759 at 10.6 years 2752 at 13.8 years	Prospective cohort study	Depressive symptoms assessed by the Mood and Feelings Questionnaire (MFQ)	Children who were 25(OH) deficient or insufficient were at increased risk of higher depressive symptoms by 20–30% at 13.8 years
Spain Morales et al. (2015)	1650 mother-child pairs	Prospective cohort study	Teacher report of ADHD-like symptoms at 4.5 years	Higher maternal circulating levels of D_3 are associated with lower risk of developing ADHD-like symptoms in childhood
Greece Daraki et al. (2018)	487 mother-child pairs	Prospective cohort study	McCarthy Scales of Children's Abilities, Strengths and Difficulties Questionnaire and attention deficit hyperactivity disorder (ADHD) at 4 years	Exposure to high 25(OH)D levels in early pregnancy was associated with reduced number of hyperactivity-impulsivity and total ADHD-like symptoms as well as total behavioral difficulties at pre-school age

(continued)

Table 4 (continued)

Location of study and reference	Sample	Study design	Outcomes assessed	Findings
Norway Grung et al. (2017)	50 adolescents, 13–14 years old	Randomized double-blind placebo-control trial supplement given daily, 38 ug	Youth self-report version of the child behavior checklist (internalizing and externalizing behaviors) and executive function	There was no significant treatment effect of vitamin D on behavior

Several observational studies have shown associations between zinc levels and socioemotional behavior and mental health especially depression (Metwally et al. 2016; DiGirolamo et al. 2010). For example, children with ADHD have low zinc levels (Arnold et al. 2011) but this may not be causal. Two early RCTs of supplementing infants showed an increase in activity levels or playing (Ashworth et al. 1998). However, other randomized trials of zinc supplementation have generally shown no significant treatment effects or only one of several behavior ratings benefitted (Ashworth et al. 1998) (Table 3). One study (Mathur and Agarwal 2015) showed a benefit in neonates but had study design problems.

Zinc supplementation trials in children with ADHD have had mixed results (Uckardes et al. 2009; Arnold et al. 2011).

There is a need for rigorous RCTs to determine whether the relationship between zinc deficiency and mental health is causal.

Vitamin D Deficiency

Vitamin D is involved in brain development as well as other functions. Deficiency and insufficiency is considered a global health problem with children and pregnant women at highest risk (Holick 2017). Vitamin D or 25-hydroxyvitamin D (25(OH) D) deficiency has been linked to mental health disorders and most studies have been conducted in developed countries (see Table 4). A meta-analysis (Wang et al. 2016) of 11 case control studies of children with autism spectrum disorders (ASD) found that in each study, children with ASD had significantly lower 25(OH) D levels. The researchers speculated that vitamin D is involved in the etiology of ASD; however, it is equally possible that ASD precedes the deficiency. Observational studies have found that low serum levels of 25-hydroxyvitamin D are associated with depressive symptoms and total behavior problems in children and adolescents (Tolppanen et al. 2012). Deficiency in pregnancy is associated with ADHD, hyperactivity, and total behavioral difficulties in the offspring (Morales et al. 2015; Daraki et al. 2018). However, there was no treatment effect in a vitamin D supplementation trial with adolescents (Grung et al. 2017). More trials are necessary before conclusions of a

causal relationship between vitamin D and mental health can be made and treatment recommended.

Conclusions

Poor mental health associated with malnutrition and iodine and iron deficiencies is clearly a problem that has been largely overlooked. There are relatively few studies that are generally observational so that the difficulty of separating the role of poverty from nutritional deficiencies remains. Measurements have also been problematic and different studies have examined different aspects of socioemotional development, often not rigorously. The use of internationally agreed instruments to measure mental health and socioemotional development would be helpful. The effect of zinc and vitamin D deficiency is less certain and controversial.

It is clear that all malnourished children need psychosocial interventions to improve both cognition and mental health. There is a need for more research on the mental health sequelae of malnutrition and micronutrient deficiencies especially randomized controlled trials of supplementation.

Cross-References

▶ Socioeconomic Inequalities and Mental Health Problems in Children and Adolescents

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Infectious Diseases

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Contents

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Abstract

Infections are implicated as causes of mental illness in both prenatal and postnatal life. Intellectual disability in children, and schizophrenia in adults, can result from infective agents. Children's mental development and welfare can both be compromised by infective causes of disease. This chapter describes prenatal and postnatal effects of viruses, bacteria, protozoa, and fungi on mental life. Research has made great advances in understanding how to prevent and treat them. Delivery of effective interventions in poor countries is hampered by violence and deficiencies in services for mothers and children.

Keywords

Schizophrenia · Intellectual disability · TORCHES · Neurodevelopmental disorders · Obsessions · Allostatic load · HIV · Malaria · *Streptococcus* · Encephalitis

Introduction

Infections are implicated as causes of mental illness in both prenatal and postnatal life. Worldwide, they are still major causes of death in children and young people in low income countries. They also have major influences on neurological and psychiatric morbidity. Their effects are particularly severe when they are not countered by functioning immune systems. Results in those who survive include intellectual disability, neurodevelopmental disorders, and probably emotional and behavioral problems, obsessions, and schizophrenia.

Intellectual Disability and Schizophrenia Spectrum

Congenital Infections: TORCHES

TORCHES is a mnemonic to remind clinicians of the importance of detecting and where possible preventing congenital infections: TO(toxoplasma); R(rubella); C(cytomegalovirus); HE(herpes); S(syphilis). All can cause intellectual disability. Human immunodeficiency virus (HIV), varicella, and parvovirus have similar implications.

Toxoplasmosis

Toxoplasma gondii is a parasite very commonly present in many animals including cats and humans. Transmission is by excretion of cysts in feces and ingesting them via food that has been contaminated and not thoroughly cooked. In healthy adults the

illness produced, if any, is minor and often overlooked. People may have a few weeks or months of mild, flu-like illness such as muscle aches and tender lymph nodes. A small number of people may develop eye problems (chorioretinitis).

A major problem, however, arises if a pregnant mother acquires the infection. Transmission through the placenta to the child can then lead to the child's being affected by *congenital toxoplasmosis*. The result can be a range of psychiatric and neurological problems, including intellectual disability and probably schizophrenia later. Medical investigation of children with intellectual deficits usually includes screening for congenital infections (TORCHES). Diagnostic testing usually involves serological evidence of antibodies in the child, or molecular tests on amniotic fluid for the presence of the DNA from the parasite.

In different countries, the relative public health importance of screening and treatment for congenital disease is considered differently. The rate of infection in human adult populations varies from about 9% in the USA to more than 60% in warm, low-lying regions where the cysts can survive for long periods.

Testing for antibodies in the mother postnatally does not help much in diagnosis or control, because in many parts of the world a majority of people is infected. Testing mother prenatally is justified because if she does not have antibodies, she does not have protection against new infection. In that event, there is a major risk to the fetus, which would therefore need to be treated, e.g., with spiramycin. An unprotected mother may also be advised to be careful in preparing food, and to avoid contact with animal excrement – especially cat litter boxes.

If the infant survives, the brain is often involved in the disease. There is a classic triad of chorioretinitis, intracranial calcifications, and hydrocephalus. The fuller range of problems and their treatment is described by McAuley (2014). Treatment of infants with congenital toxoplasmosis usually includes pyrimethamine/sulfadiazine, for a prolonged course. Infants are also sometimes given steroids if their vision is threatened or if the protein level in the spinal fluid is high.

Children who escape the classic signs of disease in early life may still have cysts in their brain. These can be activated months or years later, e.g., by acquired immune deficiency. The result can be encephalopathy, intellectual disability, or epilepsy.

There is no one pathognomonic neuropsychiatric result of toxoplasmosis, whether congenital or acquired. Associations between toxoplasma antibodies and psychiatric illnesses in adults have been reported. Schizophrenia has been the most widely studied condition. A metanalysis by Torrey et al. (2006) confirms higher levels of antibodies to toxoplasma in people diagnosed with schizophrenia than in controls. The association has not yet been shown to reflect causal pathways, but the effect size (odds ratio of 2.7) is comparable with that for influenza and other potential pathogens, or indeed for other defined environmental influences on schizophrenia.

There is an intriguing possibility of manipulation of host behavior by toxoplasma parasites. Infected rodents tend to lose their fear of novel situations. In particular, infected rats lose their typical aversion to the odor of cat urine and develop a perverse attraction to it. This could be seen as an advantage to the parasite, since cats are the only definitive hosts and it is only in cats that they reproduce sexually.

Congenital Rubella

If a pregnant woman is infected with the rubella virus, there is a very strong risk that the illness will be transmitted to the fetus. The consequences after the child is born are a range of abnormalities. The classic triad of the congenital rubella syndrome (CRS) is sensorineural deafness, structural abnormalities of the heart, and a range of eye problems including cataracts and retinopathies. Pathology elsewhere is also frequent. The severity depends on the stage of pregnancy at which they were infected. The first and second trimesters are the worst, and infection in the first 12 weeks of gestation carries around an 80% risk of involving the fetus.

Mental effects are common, and as diverse as with other severe adversities in very early life. Intellectual deficit and microcephaly are frequent. Schizophrenia spectrum disorders were more frequent in a birth cohort with early exposure to rubella (20%) (Brown 2006). Those who developed a psychotic illness in the schizophrenia spectrum were more likely than controls to have shown premorbid motor and cognitive delays.

Prevention by vaccination should be universal. In the UK, the NHS provides it in combination with vaccines against mumps and measles (MMR), as a single injection to babies within a month of their first birthday. A second injection follows shortly before starting school, usually at 3 years and 4 months.

Congenital Cytomegalovirus

Cytomegalovirus (CMV) is a ubiquitous virus that infects the majority of humans. Primary infection in individuals with normal immune function usually produces no symptoms at the time but enters long latency in various host cells unless and until immune function is suppressed and no longer keeps it under control. If, however, a pregnant mother, who is not protected by previous infection and immunity, develops the infection, the fetus is usually infected too. In poorer countries, unprotected mothers are unusual because of high rates in the community. Routine maternal screening for CMV infection during pregnancy is not recommended. Vaccines are not yet available, and CMV may well be a cause of many cases of developmental delays that are not yet recognized as such (Griffiths & Walter, 2005).

If maternal infection is suspected, perhaps because of a mild feverish illness similar to glandular fever, then serological testing can confirm it and the fetus can be protected with hyperimmune globulin. Molecular testing can detect the DNA in blood from the neonate.

Mothers infected during pregnancy have an approximately 50% chance of transmitting it to the fetus, who then has about a 30% chance of showing signs of it after birth. Multisystem problems result; hearing impairment and intellectual disability are frequently the key outcomes. Hearing loss can be significantly decreased by ganciclovir given in the first week. Vaccines are pressingly awaited (Bernstein 2017).

Congenital Herpes

The herpes simplex virus, considered below as a possible cause of a severe encephalitis in childhood, can also be transmitted from mother to child. The usual source of infection is towards the end of pregnancy when the baby is passing through the birth canal. Correspondingly, it behaves in a similar way to postnatally acquired herpes, with a skin rash and the possibility of encephalitis or disseminated illness involving the whole body. Signs usually appear in the first month of life. When the brain or whole body is affected, the outlook is grave. All infected babies should receive an antiviral such as intravenous acyclovir.

Congenital Varicella

Varicella is a herpes-type virus responsible for the frequent childhood illness of chickenpox. Most trans-placental infections are asymptomatic, but they can cause the rare congenital varicella syndrome (CVS) or neonatal chickenpox, both of which are potentially serious illnesses, with high rates of mortality and morbidity (Ahn et al. 2016). CVS is characterized by multisystem abnormalities including skin lesions, neurological defects, eye diseases, limb hypoplasia, and/or skeletal anomalies. They may be detected prenatally from a detailed ultrasound scan.

Most pregnant mothers will be immune because of previous illness or vaccination. If one is in contact with a case of chickenpox, her immune status should be tested. If she has not been vaccinated and is seronegative, then treatment should be given (with varicella zoster immunoglobulin and/or antiviral drugs) to reduce the risk to the fetus.

Congenital Syphilis

Syphilis is caused by the spirochaete bacterium, Treponema pallidum, which remains sensitive to penicillin. The fetus can be infected from the mother at any stage. Serological testing is effective for diagnosis. Pregnant women with syphilis should be treated promptly, and this is an effective intervention for the fetus, especially if given before the 16th week of gestation. The postnatal manifestations are manifold, and many of them only appear in later childhood. Early signs include seizures, rhinitis, and generalized skin rash. If not detected and treated early, syphilis can enter a latent stage, emerging later with damage to brain, bones, teeth, eyes, and ears. Neurosyphilis can be detected by analysis of cerebrospinal fluid. Penicillin cannot be expected to reverse damage done, but should prevent it.

Congenital and Early-Acquired HIV

Human immunodeficiency virus causes the syndromes of acquired immune deficiency. Mother-to-infant transmission is the commonest route through which

children are infected. The child of an infected mother has a 25–40% chance of acquiring the infection if there is no medical intervention. Transmission can be transplacental, in the course of delivery, or via breastfeeding. It can be drastically reduced by effective antiretroviral therapy (ART) given in pregnancy. Delivery by Caesarian section can reduce infant transmission from the birth canal; breastfeeding by an infected mother is not advised unless no other feeding option is available.

Infection of children is therefore usually a consequence of ineffective antenatal care. It is still common in regions where antenatal health services are weak.

WHO estimates that, worldwide, 1800 children – the vast majority of them newborns – are infected with HIV each day. Rates are especially high in sub-Saharan Africa, where 13–45% of pregnant women have serological evidence of HIV infection. 90% of babies who acquire the disease from infected mothers are found in sub-Saharan Africa. The commercial sex worker industry in countries such as Thailand and the Caribbean Islands is responsible for high levels of HIV transmission to young women and girls.

Investigations to detect HIV in the young are described by the Panel on Antiretroviral Therapy and Medical Management of HIV-Infected Children (2017). They emphasize a need in early childhood to use viral assays, e.g., with polymerase chain reaction, as well as testing for antibodies, because maternal HIV antibodies can persist in infants for a year or more and may not mean that the infant has been infected as well as exposed.

Children and adolescents may also be infected by transfusion of contaminated blood, drug injection, and sexually. In these later-infected children, neurodevelopment is usually like that of their age peers in the early stages.

Whatever the source, the HIV virus primarily infects CD4 T- helper cells, which are part of the immune system. It attaches to the host cell by its surface glycoproteins. If CD4 cells become depleted, they no longer signal to the immune system's killer cells and the body becomes vulnerable to a wide range of infections that it would otherwise have been able to fight. Affected children and young people are therefore subject to unusually frequent and severe bacterial, fungal, and viral infections. Failure to thrive and wasting appear. Delays in achieving developmental milestones also appear, sometimes because of an encephalopathy. In older children, mental problems such as poor concentration and memory also result from brain involvement.

HIV encephalopathy results directly from HIV invasion of the brain – especially the microglia rather than the nerve cells themselves. Progressive white matter degeneration and brain atrophy can follow and lead both to neurological symptoms and to developmental delays. Signs include microcephaly, motor disorders, and developmental regression. Neuroimaging changes include cranial ultrasound altered signals from lenticulostriate vessels, computerized tomography evidence of calcifying microangiopathy, and/or magnetic resonance evidence of white matter lesions and central atrophy.

The differential diagnosis of an encephalopathy in infected children is important as ART is usually effective. Other causes could be the effects of maternal substance abuse, other CNS congenital infections, and inborn errors of metabolism.

Schizophrenia

There is a long history of speculation about the possibility that adult schizophrenia might result from pregnant mothers' exposure to viral infections. The epidemiological evidence has been conflicting: some studies do and some do not find that the timing of an influenza epidemic in pregnant mothers is related to rates of non-affective psychosis in adult life. Season-of-birth effects have sometimes been found – but an excess of psychosis in people born in the summer births does not automatically imply that a greater likelihood of influenza in early stages of pregnancy is responsible. It may represent a well-known and nonspecific risk of being among the youngest children in the class.

Stronger evidence came from epidemiological studies that included antibodies to influenza as markers to previous infection. Brown and colleagues found in a birth cohort that serologically documented influenza exposure during early to mid-gestation was associated with a threefold increased risk of later schizophrenia; first trimester exposure to influenza conferred a sevenfold increased risk (Brown 2006). Later research has included more studies and found inconsistent results for any relationship between antibodies to influenza and schizophrenic types of psychosis in adult life (meta-analysis by Selten and Termorshuizen 2017). The evidence on the outcome of prenatal exposure to influenza remains flawed and inconclusive.

There is better evidence on the effect of postnatal infections. Cohort studies about their association with schizophrenia have received a competent meta-analysis (Khandaker et al. 2012). When the child has suffered an infection of the central nervous system, their risk for schizophrenia is almost doubled (relative risk 1.8). It appears that viral meningitis or encephalitis is a bigger risk than bacterial infections. Cytomegalovirus, mumps, and varicella zoster were the main culprits in the one study that defined the causative agents. It does not appear, however, that the risk is specific to schizophrenia.

Impact of Infective Encephalopathies on Young People's Mental Development: Herpes, HIV, Malaria, and Cysticercosis

Several virus infections can cause severe encephalitis in postnatal life. Measles, mumps, rubella, and chickenpox can all be reduced by vaccination. Other viruses can cause it. These include herpes simplex virus, West Nile virus, tick-born encephalitis, and rabies.

Herpes simplex encephalitis, for instance, has devastating effects (Whitley and Kimberlin 2005). In the absence of effective antiviral treatment, about 70% of patients die. This very high rate should be reduced by Acyclovir to less than 20% – but this is still very high, and a large minority of those who recover will have persisting neurological disability. Typically, the virus infects through damaged mucosae and migrates up nerve axons (e.g., olfactory nerve) to cause localized brain damage (e.g., in temporal lobes). The acute clinical presentation is not specific to the cause, but typically involves fever, diminished consciousness, intense headache,

personality change, and focal neurological signs including dysphasia, seizures, and paralyses. Localized lesions may be seen on magnetic resonance imaging. Diagnosis, which used to be based on brain biopsy, is now made from molecular tests (e.g., via a polymerase chain reaction) for the presence of herpes DNA in the cerebrospinal fluid.

Long-term neuropsychiatric sequelae of this and other encephalopathies involve language, memory, and personality changes, but with no pathognomonic profile. Case histories have suggested that autistic syndromes can result. There is, however, no good evidence for the widely circulated suspicion that herpes infection is a frequent cause of autism spectrum disorder or a cause in those without evidence of central nervous system infection.

HIV Chronic Effects

The consequences of infection with HIV are described above for the development of encephalopathy. The risks of HIV, however, are not only for neurodevelopment and mental disorders; and not only for other bodily systems; but for the whole ecology. This generalization has applied with particular force in the case of AIDS. Many children have been orphaned by disease in their parents. Impoverishment, bereavement, illness in caregivers, stigma, associated traumas such as rape, and a lack of access to education and health care – all combine to produce complex pathogen-pathogen interactions. All are considered to be risks for mental health in young people. Even children who have been exposed but not infected are at risk for adverse cognitive and psychiatric outcomes – especially when they live in poor regions.

Social influences have altered the spread of AIDS, its impact, and the means of coping (Gayle and Hill 2001).

The spread of the pandemic has been accelerated in some parts of the world by preexisting vulnerabilities. A high prevalence of sexually transmitted diseases (STD), low rate of male circumcision, the unequal status of women, migration, poverty, and patterns of social mixing have different profiles in different countries and consequently different impacts.

The financial costs of treating the HIV/AIDS pandemic have been high enough to impact on national budgets, and therefore on public health interventions more broadly.

Prevention successes in countries such as Senegal, Uganda, and Botswana have involved social changes such as mass communication, STD treatment, increased access to condoms, and increased access to HIV testing. Among young people, mass media, digital social platforms, outreach, counseling, and peer education have assumed particular importance.

The advent of antiretroviral drugs has had a profound effect, and for many they have transformed the outlook to one of a normal life span, albeit one of chronic illness and a need for long-term medication. Nevertheless, many young people, and

especially those living in sub-Saharan Africa, do not have access to the drugs; and many more still lack the educational, social, and mental health support that is called for.

Other types of infections, and not only from viruses, can affect the brain directly: malaria, TB, cysticercosis.

Malaria

Cerebral malaria is another very common and very serious risk for neurological and psychiatric disorders. Like HIV, malaria is a major cause of death and chronic ill health in tropical countries where medical resources are inadequate. It causes both serious illness in children and impairment of caregiving through effects on adults.

Plasmodia species are parasitic protozoa that live within red blood cells. *Plasmodium falciparum* is especially likely to cause severe disease and neurological involvement. Transmission is usually through the bite of a female Anopheles mosquito, but can also result from blood transfusion and congenitally. It is a multisystem disorder that can cause metabolic acidosis, acute pulmonary edema and respiratory distress, breakdown of red blood cells, circulatory collapse ("shock"), and acute kidney failure.

Cerebral malaria typically presents impaired consciousness (including coma or delirium), prostration, and multiple convulsions. The neurological changes are widespread, severe, and not fully understood. Infected red blood cells become likely to stick together and to cells in the walls of blood vessels. There is a consequent reduction in blood flow through small vessels, and problems in delivery of nutrients to affected brain tissue and vessel walls, followed by hemorrhage and little strokes. The blood-brain barrier may be damaged. As with other infections, inflammatory changes in the brain release cytokines and neurotoxins such as nitric oxide.

The widespread nature of brain involvement is reflected, in about a quarter of children after cerebral malaria, in psychological deficits of various types. Nearly all brain functions can be involved. Motor coordination, executive function, language, attention, and learning difficulties have all been described (Boivin et al. 2007).

Prolonged epileptic seizures in the acute stage predict persisting neurocognitive dysfunction. Antimalarial drugs bring their own risks of neuropsychiatric disorders, including abnormalities of perception.

After recovery from acute episodes of malaria, a minority of patients can develop a "post malaria neurological syndrome" (PMNS). No parasites are necessarily recovered. The neuropsychiatric signs are variable and can be severe: they can include an acute confusional state, psychosis, visual hallucinations, catatonia with waxy flexibility, generalized convulsions, and tremor (Mai et al. 1996).

Tuberculous infection of the brain or meninges is often lethal and for those who recover the neurological complications can be devastating (Chin and Mateen 2013).

Cysticercosis is a major cause worldwide of epilepsy. It results from ingesting eggs of the pork tapeworm. The eggs then develop into larvae and invade host

tissues, including muscles, eyes, skin, and brain. In the brain they are multiple small lumps, 0.5–2 cm in size, and can readily be seen on computerized tomography or magnetic resonance imaging. In countries where humans and pigs live close to each other, cysticercosis is a very common cause of epilepsy.

Common Emotional and Behavioral Disorders

There is some evidence that severe infections of many types constitute a risk not only for intellectual and psychotic disorders, but also for the frequent conditions of neurodevelopmental disorders, anxiety, depression, and oppositional disorders. A recent population study, of more than a million people born in Denmark between 1995 and 2012, has used case registers to estimate the frequency of psychological sequelae of severe infections requiring admission to hospital (Köhler-Forsberg et al. 2019). The results were in keeping with an association between the infections and mental disorders later. The risks of a later mental disorder (diagnosed in hospitals) were increased by 84% and those for use of psychotropic medication rose by 42%.

Even less severe infections (defined as having been treated in the community with anti-infective agents) increased the risks somewhat: by 40% for diagnosed mental disorder and 22% for psychotropic drug use. The increased risk applied to a wide range of neurodevelopmental and other disorders, including obsessive-compulsive disorders, tics, personality and behavior disorders, intellectual disability, autism spectrum conditions, and ADHD.

The possible reasons for these risks are many and various. Some of them do not require a causative relationship. Genetic risks for mental disorder might also increase susceptibility to infections. Both infections and mental disorders could be part of chronic social adversity. Case register designs will be subject to confounding from help-seeking behavior.

The Köhler-Forsberg et al. study cited above addressed these potential confounders by examining the risks for siblings who did not have infections. In this analysis, they found that the increase of risk for mental illness following hospitalization fell to 21% (from 84%). The risk was diminished, but not zero.

Infections probably cause common emotional and behavioral disorders through a variety of mechanisms: brain damage, chronic psychosocial adversity, inflammation, and immune reactions. They are considered separately below.

Chronic Psychosocial Adversity

Impoverishment, bereavement, and family turmoil can all follow in the wake of infections, whether they primarily affect the child or the family. They can all lead

to high levels of oppositional and conduct problems, substance misuse, imprisonment and subsequently even more impoverishment and reduction of opportunities.

Brain Damage

Infective agents can cross the blood-brain barrier and produce meningitis (inflammation of the membranes that surround the brain) and encephalopathies (in which the substance of the brain itself is compromised).

Effects of Chronic Illness

Systemic effects of chronic illness include debilitation, restriction of education, and poor concentration.

Inflammatory and Immune Effects

Metabolic and immune consequences of infection may directly compromise brain function (Danese et al. 2011). Infection is associated with increase in levels of proinflammatory cytokines. Experimental administration of lipopolysaccharide to adults and animals triggers a release of cytokines that cross the blood-brain barrier and promote an inflammatory response. The results in brain function include reduction in verbal and nonverbal memory, reduction in ventral striatal responses to reward, and enhanced amygdala activation in response to fearful faces (Schedlowski et al. 2014). These could mediate impairments in social learning and managing anxiety.

Neural and Neuroendocrine Effects

Neuroendocrine changes can be seen during infections in the system of hypothalamus, pituitary, and adrenal hormones mediating stress responses (the HPA axis). Adrenocortical steroids increase. The autonomic nervous system reacts to stress with release of catecholamines from sympathetic nerves and the adrenal medulla.

These metabolic, neuroendocrine, and immune reactions to the stress of infections interact with each other (Danese and McEwen 2012). For instance, chronically elevated cortisol is associated with insulin resistance, hyperlipidaemia, and altered effects of interleukin and other immune components. The concept of allostasis ("achieving stability through change") refers to all the bodily changes involved in preparation for and adjustment to altered environments, especially stress (Hantsoo et al. 2018). "Allostatic load" refers to chronic overactivation of these regulatory systems and their cost to the functioning of organs including the brain.

Iatrogenic Change

Anti-infective agents may lead to a disturbed microflora of the gut and alterations in the blood-brain barrier.

PANDAS and PANS

One specific form of immune mediation is through antibodies to beta-haemolytic streptococci that cross-react with brain structures such as basal ganglia. Choreiform syndromes after streptococcal infection (Sydenham's chorea) are often accompanied by obsessional, anxiety, and ADHD-type symptoms.

Clinical researchers saw a clear analogy with a newly described syndrome of explosive onset of obsessional, tic, and other neuropsychiatric symptoms. Some researchers created the terminology of "Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS)" (Swedo et al. 1998). Wide clinical interest was awoken by the possibility of testing for antibodies and treatment with antibiotics, immunosuppressive drugs, and transfusions. An initial vogue for the approach did not survive a lack of replicated trial evidence for their value.

PANDAS proved quite difficult to diagnose reliably. The criteria were: the presence of obsessive-compulsive disorder and/or a tic disorder, with an acute onset between the age of 3 years and puberty, running an episodic course associated with group A beta-haemolytic streptococcal infection, and involving a range of neurological abnormalities.

The difficulty in diagnosis came from uncertainty about the link with the *Streptococcus*. Autoantibodies were not consistently detected, so the clinical evidence came from throat cultures. If, as is often the case, these were uninformative then clinicians relied on antistreptolysin tests with uncertain relationships in time to the putative symptoms.

Nevertheless, the observations remained of children with very abrupt onset or worsening of neuropsychiatric symptoms. The concept changed to "PANS" – Paediatric Acute onset Neuropsychiatric Syndrome (Swedo et al. 2012). This describes a condition whose hallmark is a very rapid, even explosive, onset of obsessive-compulsive symptoms (or sometimes of severely restrictive eating disorder); together with several other acute neuropsychiatric problems – e.g., at least two out of a list of: (1) anxiety; (2) emotional lability and/or depression; (3) irritability, aggression, and/or severely oppositional behaviors; (4) behavioral regression; (5) deterioration in school performance; (6) sensory or motor abnormalities; and (7) somatic signs and symptoms, including sleep disturbances, enuresis, or urinary frequency.

Such presentations are indeed distinctive and serious, but they are not markers to a single etiology. Case series have been reported at the clinical level (Johnson et al. 2019). The suggestion is to direct clinicians to a search for specific illnesses that may present in this way – including systemic lupus, NMDAR encephalitis (with antibodies to the *N*-methyl-D-aspartate receptor), cerebral vasculitis and, indeed, streptococcal infection. Treatment is either symptomatic (psychotropic drugs and/or CBT) or directed at an underlying pathology if one is detected.

Conclusions

Viral, bacterial, and parasite infections can all affect the brain and produce mental disorders. When they affect a fetus in the womb their effects are sometimes devastating and can include death, intellectual deficit and possibly later psychosis. In postnatal life their effects are mitigated by competent immune systems but can still include serious neurodevelopmental, emotional, and behavioral problems. They continue to present a major risk to life and mental health in countries with weak health services for mothers and children. In many low- and middle-income countries (especially some in sub-Saharan Africa), effective prevention and treatment could be available and cost-effective but are often underprovided.

Cross-References

► Mental Health Strategy and Policy

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Part VI

Neurological Conditions

Epilepsy

27

Frank M. C. Besag

Contents

Abstract

This chapter will begin with some general information on epilepsy and stigma worldwide. This will be followed by epidemiological data on psychiatric and behavioral disorders in children. The main psychiatric disorders in childhood epilepsy: attention-deficit hyperactivity disorder, autism spectrum disorder,

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anxiety, depression, and psychosis will be discussed in turn. The psychiatric and behavioral disturbances associated with specific childhood epilepsy syndromes will be presented. The evidence for psychiatric effects of antiseizure medications and epilepsy surgery will be presented and a systematic approach to assessing and managing the child with epilepsy and psychiatric disturbance will be discussed.

Keywords

Seizures · Antiseizure medications · Autism spectrum disorder · Attention deficit disorder · Stigma · Anxiety

Introduction and Background

General Comments on Epilepsy

The WHO factsheet on epilepsy provides useful general information on the condition from an international perspective. There is a wealth of information on websites such as www.ilae.org, www.ibe-epilepsy.org, and on various national websites such as www.epilepsy.com, www.epilepsysociety.org.uk, and www.epilepsyaustralia.net. With regard to treatment, studies based in real practice, such as the SANAD studies, provide valuable treatment guidance, indicating best effectiveness of lamotrigine for partial (focal onset) seizures and valproate for generalized seizures; however, valproate should be avoided in females of child-bearing potential because of the risk of congenital malformations, leaving levetiracetam and lamotrigine as drugs of choice in most cases, or ethosuximide in childhood absence seizures. Assessments of cost of epilepsy treatment in lower-income countries are available (Newton and Garcia 2012). Although these are focused on adult treatment, most of the principles apply to children as well. For many individuals in lower-income countries, problems with cost and supply imply that often phenobarbital is the only available antiseizure medication, although, especially in higher doses, this drug can be associated with sedation and, in children, behavioral disturbance. Phenytoin is also relatively cheap but associated with many adverse effects. Carbamazepine and valproate are usually available in resource-poor countries but too expensive for a large proportion of the population.

Childhood Epilepsy and Psychiatric Disturbance

The prevalence of epilepsy in children in the developed world is around 6 per thousand (Sillanpää 1992). Figures in the developing world are likely to be much higher, although accurate data are more difficult to obtain. In Rwanda, the prevalence of epilepsy has been estimated as 49 per thousand and the onset of epilepsy before the age of 2 years was reported in 32% of cases. A high proportion of cases had a history of head trauma and premature delivery (Sebera et al. 2015).

There are several epidemiological studies on the prevalence of psychiatric disturbance in children with epilepsy, mainly based in Europe, Scandinavia, and the USA (Rutter et al. 1970; Davies et al. 2003; Hoie et al. 2008; Russ et al. 2012; Reilly et al. 2014). They have indicated that psychiatric disturbance occurs in around 35–50% of children with epilepsy. The behavioral or emotional disturbance may be more problematic than the epilepsy itself. In addition, an issue that is of major importance, not only in developing countries but worldwide, is the problem of stigma. Ignorance and superstition about epilepsy can be more damaging to the child and family than the epilepsy itself.

Stigma and Resource Implications

Although the issues of psychiatric and behavioral disturbance in children with epilepsy are of major importance, before even beginning to consider the various types of disorder that can occur, it is important to consider the context. In 2010, the late Hanneke de Boer, past president of the International Bureau for Epilepsy, wrote: "The most significant problems people with epilepsy encounter in daily life are not related to the severity of the condition, but stem from concepts of epilepsy held by the general public." Writing about how stigma affects people with epilepsy of all ages she commented that they "may still experience serious limitations to their enjoyment of economic, social, and cultural rights and have many unmet needs, in the areas of civil rights, education, employment, residential and community services, and access to appropriate healthcare" (de Boer 2010). She drew attention to the issue of epilepsy stigma worldwide as being a major factor affecting quality of life. Ba-Diop et al. (2014) drew attention to the particular problems in sub-Saharan Africa. The prevalence of epilepsy, estimated from door-to-door studies, was almost double that in Asia, Europe, and North America. They drew attention to the risk factors of birth trauma, central nervous system infections, and traumatic brain injury. The so-called treatment gap, which is the difference between the proportion of those who should be receiving treatment and those who are actually receiving treatment in low-income and middle-income countries has been estimated as being around 75%. The reasons for the treatment gap appear to be largely economic and social. There is much yet to be achieved in the field of epilepsy, particularly in developing countries, where many cases of epilepsy could be prevented by reducing the factors just stated. Newton et al. (Newton and Garcia 2012) have emphasized that the mortality associated with epilepsy in low-income countries is substantially higher than in the developed world and seems to be related to untreated epilepsy, for example, as a result of falls or prolonged seizures. However, they pointed out that the reasons for the high mortality have not been examined adequately.

Radhakrishnan et al. (Radhakrishnan 2009) have stated that of the 50 million people with epilepsy worldwide, 80% reside in resource-poor countries which are ill-equipped to tackle the medical, social, and economic challenges of the condition. It was pointed out that even in those who are diagnosed and started on treatment, many soon discontinue the treatment; this is probably due to cost, lack of availability,

superstition, and cultural beliefs. They pointed out that much of the burden of epilepsy in resource-poor countries could be decreased by educating the public about positive features of life with epilepsy. It is, perhaps, not surprising that stigma is an important factor affecting not only quality of life but also actual delivery of care in resource-poor countries because of superstition and lack of adequate education as well as the lack of economic resources. However, there are also many studies in developed countries that have established that stigma is a worldwide problem and is not confined to developing countries. For example, Austin et al. (2014) collected data on 173 children and adolescents with epilepsy between 9 and 14 years of age. Stigma was assessed using a self-report scale. Increased perception of stigma was significantly associated with: greater need for information and support, more fear and worry related to having epilepsy, greater seizure severity, and younger age. The first two of these are amenable to psychosocial interventions. Some authors have chosen to entitle their papers with terminology that is thought-provoking. For example, Benson et al. (2015) carried out a small study aiming to identify contextual factors that were challenges for children with epilepsy when disclosing the diagnosis. The title of the paper was: "'I don't want them to look at me and think of my illness, I just want them to look at me and see me': child perspectives on the challenges associated with disclosing an epilepsy diagnosis to others." Chong et al. (2016) carried out a systematic review of qualitative studies of children's experiences of epilepsy. They examined 43 articles on 951 young people aged 3–21 years across 21 countries. They identified six themes related to stigma: loss of body control, loss of privacy, inescapable inferiority and discrimination, therapeutic burden and futility, navigating healthcare, and re-contextualizing to regain normality. They concluded that children with epilepsy experience vulnerability, disempowerment, and discrimination.

The International League Against Epilepsy has pointed out that there has been considerable discrimination against people with epilepsy, much of which has also been in developed countries within living memory. For example, people with epilepsy were forbidden to marry in 17 states of the USA until 1956 and the last state to repeal this law did so in 1980. In 1956, 18 states provided for sterilization, on eugenic grounds, for people with epilepsy. In the United Kingdom, a law prohibiting people with epilepsy from marrying was repealed in 1970. Until the 1970s, it was still legal in the United States to deny people with seizures access to trains, restaurants, theatres, recreational centers, and other public places. Against this background, it is perhaps not surprising that stigma against epilepsy still remains, not only in developing countries but also in so-called developed countries.

Wilmshurst et al. (2018) drew attention to the May 2015 World Health Assembly (WHA) approved Resolution on the Global Burden of Epilepsy. That report addressed the question of how to improve care of children with epilepsy worldwide. It was pointed out that children with epilepsy have unique needs and face unique challenges from stigma at all levels of society. Public awareness initiatives are needed to improve the inclusion of children with epilepsy in society and to reduce stigma. Although there are numerous studies in various countries drawing attention to stigma and prejudice against epilepsy, there is a lack of research showing that

public awareness campaigns make a difference. Some studies have, however, shown that the negative perceptions of epilepsy are related to educational level. For example, Ali et al. (2011) reported that, in Jamaica, people with postsecondary education were less likely to believe that epilepsy is a mental disorder (9% vs. 24.8%, $p < 0.001$), is due to demonic possession (8% vs. 18.2%, $p < 0.01$), or is contagious (2.5% vs. 23%, $p < 0.001$). A few studies have shown that intervention can make a difference. In Zambia, Elafros et al. (2013) facilitated peer support groups for men, women, and young people. Of the 34 young people who attended six or more meetings, internalized stigma decreased significantly ($p < 0.02$), whereas in adults there was a nonsignificant decrease. In the Czech Republic, Brabcova et al. (2017) evaluated two interventions to reduce epilepsy-related stigma in children 9–11 years. Eighty-nine children watched a video and 93 children had a story read to them by an instructor. Both groups were tested on the Stigma Scale of Epilepsy before, immediately after, and 6 months later. In the 6 month follow-up, stigma was significantly decreased ($p < 0.001$) in both groups.

Epidemiological Studies of Psychiatric and Behavioral Disturbance in Children

The Isle of Wight study in the UK (Rutter et al. 1970) paved the way for the systematic study of psychiatric disorders in children with epilepsy. This indicated that the rate of psychiatric disorder in complicated epilepsy (children with lesions above the brainstem) was 58% whereas the prevalence in uncomplicated epilepsy was 38%. The rate in control children was 7% and in children with physical disability was 11%. Davies et al. (2003) in their study based on the 1999 British Child and Adolescent Mental Health Service survey found remarkably similar rates to those reported in the Isle of Wight study. Hoie et al. (2008) in an epidemiological study in 6–12 years old children in Norway reported that 45% of children with epilepsy had psychosocial problems compared with 10% of controls. The rate of executive function problems was 31% in children with epilepsy, compared to 11% in controls. Alfstad et al. (2011) in a population-based study in Norwegian children aged 8–11 years used the strengths and difficulties questionnaire, parent form. Of 110 children with epilepsy, 38% had psychiatric symptoms compared with 17% of controls. Russ et al. (2012) using data from the 2007 National Survey of Children's Health on 91,600 children from birth to 17 years, including 977 children with epilepsy or seizure disorder, reported the following figures in the children with epilepsy: ADHD 23% (6% in controls), anxiety 17% (3% in controls), conduct problems 16% (3% in controls), depression 8% (2% in controls), and autism spectrum disorder 16% (1% in controls). All of these results were statistically significant ($p < 0.05$). Developmental delay in the children with epilepsy was 51% (3% in controls). More recently, in a community-based study in schools in Sussex, UK (the CHESS study), Reilly et al. (2014) reported the following figures: ADHD 33%, autism spectrum disorder 21%, developmental coordination disorder 18%.

The results from all the studies are highly consistent, indicating that psychiatric and behavioral problems are common in children with epilepsy. However, it is important to note that not all children with epilepsy have behavioral or psychiatric problems.

Attention Deficit Hyperactivity Disorder (ADHD)

ADHD is common in children with epilepsy. Numerous studies and reviews have indicated that it occurs in around 30% of children with epilepsy compared to 3–6% in controls (Davies et al. 2003; Hermann et al. 2007; Fastenau et al. 2009; Russ et al. 2012; Reilly et al. 2014). In contrast to the general population, in which ADHD is much more common in boys, the prevalence of ADHD in children with epilepsy occurs equally in boys and girls.

Despite the fact that ADHD is so common in children with epilepsy and despite the major additional problems that arise from the core features of this condition: inattention, impulsivity, and overactivity, there seems to be a reluctance to treat it because of a mistaken perception that ADHD treatment causes seizure exacerbations. However, before treating with ADHD medication, it is important to assess the child carefully to determine what the cause of the ADHD is. The possible causes have been summarized by the current author in previous publications (e.g., Besag et al. 2016c). The epilepsy-related causes include frequent epileptiform discharges and adverse effects of medication. As is the case for children without epilepsy, anxiety can mimic the features of ADHD: it is not uncommon for children with anxiety to have poor concentration, impulsivity, and overactivity. If anxiety is the cause, then specific treatment for this may be indicated (see next section). If frequent epileptiform discharges are responsible for the features of ADHD, a review of antiepileptic medication might be more appropriate than implementing ADHD medication.

Anxiety

Anxiety in childhood epilepsy has been reviewed by Dunn et al. (2016). Estimates of the prevalence of anxiety in children with epilepsy vary between 15% and 36%. Russ et al. (2012) in their nationwide survey in the United States reported anxiety in 17% of children with epilepsy, 9% of children with past seizures, and 3% of controls. Reilly et al. (2014) in their study in Sussex schools reported rates of 13% for anxiety. These authors pointed out that only 1% of these children had been previously diagnosed with anxiety, highlighting the major issue of underdiagnosis.

The causes of anxiety in children with epilepsy include the unpredictability of seizures together with the possibility of injury, specific epilepsy-related phenomena, and antiepileptic medication. In adults, anxiety has been associated with the antiseizure medications felbamate, levetiracetam, and zonisamide (Mula and Sander 2007; Weintraub et al. 2007). In a recent publication on prodrome, which is that

period, typically lasting from minutes to days, before a seizure or cluster of seizures, a mean of 8.6% of adults with prodrome in reported series experienced anxiety (Besag and Vasey 2018). Figures for children are not available. Aura is a brief period of subjective change, typically lasting seconds before a seizure. It represents localized seizure activity in full consciousness (focal aware seizure). Anxiety is a common manifestation of aura. Rarely, auras may be repeated multiple times in a single day and can be associated with extreme anxiety. This can be treated with an as-required oral benzodiazepine, such as diazepam or clobazam, given as an antiepileptic drug to terminate the repeated auras.

As has already been noted, autism is relatively common in children with epilepsy; anxiety is very common in children with autism and can be treated effectively with low-dose risperidone, which does not appear to exacerbate seizures.

Depression

Dunn et al. (2016) also reviewed depression in children with epilepsy. They quoted reported figures of 8–35%. Berg et al. (2011) reported depression in 13% of children with epilepsy. Russ et al. (2012) quoted a figure of 8% in those with current epilepsy and 7% of children with past seizures, compared with 2% in controls. The study by Reilly et al. (2014) reported a rate of 7% for depression in children with epilepsy. As for anxiety, these authors pointed out that only 1% of the children had previously been diagnosed with depression. This indicated that both anxiety and depression are grossly under-diagnosed in children with epilepsy. In adults, depression has been associated with antiepileptic drugs acting through the GABA mechanism, including phenobarbital, tiagabine, and vigabatrin. Depression has also been associated with levetiracetam, topiramate, and zonisamide (Kanner and Dunn 2004).

It is, perhaps, not surprising that hopelessness, an important determinant of depression, is frequently present in children with epilepsy (Wagner et al. 2009). Other factors that may be associated with depression in children with epilepsy, as listed by Dunn et al., include poor communication, inadequate support of the child, loss of autonomy, and maternal depression (Dunn et al. 1999, 2016).

There is a lack of data on treatment of depression in children with epilepsy. In cases where the depression is related to the seizures, better seizure control should be associated with improvement in depression. Clearly if antiseizure medication is causing the depression, then a medication review is indicated. In a pilot study of cognitive behavior therapy (CBT) for children with epilepsy, Blocher et al. (2013) reported a reduction in symptoms of both anxiety and depression. However, there are very few studies in children with epilepsy and depression. Although the results for antidepressant medication in the treatment of depression in children and teenagers generally are disappointing, there is no contraindication to the prescription of SSRI antidepressants. Again, based on adult data, and contrary to popular myth, these are not associated with seizure exacerbations in therapeutic doses (Alper et al. 2007).

Psychosis

There is increasing evidence of a shared genetic predisposition between psychosis and other conditions. Clarke et al. (2012) carried out a population study of 9653 families with 23,404 offspring born in Helsinki between 1947 and 1990. This showed that there was a shared risk between epilepsy and psychosis. Those with epilepsy had a 5.5-fold increased risk of having a psychotic disorder and almost 8.5-fold increased risk of developing schizophrenia. The clustering in families was taken to suggest a genetic link.

In keeping with psychosis in the general population, the condition is rare in children with epilepsy but is reported more frequently in teenagers. Most of the reports in younger children with epilepsy probably do not represent true psychosis; in these publications, vague behavioral disturbance not meeting strict criteria of psychosis is, almost certainly incorrectly, attributed to psychosis. Lax-Pericall and Taylor (2010), in a retrospective study of young people under 19 years of age, identified 17 individuals with psychosis. They commented that, compared to young people with psychosis who do not have epilepsy, those with epilepsy had a higher rate of neuropsychological problems such as intellectual impairment and autism. This again raises the question of whether the diagnosis was reliable in all of these cases. It is not uncommon for young people with autism to present with a history that resembles the abnormal phenomena of psychosis but which, on closer questioning, probably represents the construction of a fantasy world in an individual who finds it difficult to relate to the real world and not true psychosis. However, it is clear that psychosis can occur in teenagers with epilepsy; it can be postictal, interictal, induced by antiepileptic medication, or postsurgery. Ictal psychosis, that is brief psychotic features occurring during the seizure, has been described in adults by Kanemoto et al. (2012), but it is not clear whether this phenomenon can occur in young people. However, children with very frequent absence seizures may present with fragmented thought processes, reflected in highly fragmented language, which might resemble the "word-salad" of schizophrenia. This is not psychosis but is a direct manifestation of the epilepsy, which is amenable to antiepileptic treatment.

There is confusion around the terminology used for epilepsy-related psychosis. The term "interictal psychosis" should be reserved for psychosis that occurs between the seizures but with no clear time relationship to them. True interictal psychosis, strictly fulfilling this definition, can occur in teenagers with epilepsy. However, the more common situation that is described as being "interictal psychosis" is the individual with a past history of seizures who, years later, develops psychosis despite being seizure free. This form of so-called interictal psychosis can also occur in teenagers.

The term postictal psychosis refers to psychosis that comes on after a seizure or, more commonly, after a cluster of seizures. Postictal psychosis can certainly occur in teenagers. It is typically self-limiting, lasting for perhaps a few weeks, but if it is distressing or is associated with risk, it may warrant treatment. In adults, a "lucid interval" can occur between the cluster of seizures and the onset of the psychosis. It is unclear whether a similar lucid interval can occur in teenagers with epilepsy.

The phenomena of "forced normalization" and "reciprocal psychosis" or "alternative psychosis" have also caused considerable confusion. They are related but different phenomena. Forced normalization refers to the situation of EEG becoming better (fewer epileptiform discharges) and psychosis worse, with the implication that when the EEG is worse (more epileptiform discharges) the psychosis is better. The related but different phenomenon of reciprocal or alternative psychosis is: seizures better (less frequent) but psychosis worse, with the implication that when the seizures are worse (more frequent) the psychosis may be better or might resolve completely.

Certain antiepileptic drugs, notably topiramate and vigabatrin, can be associated with the onset of psychosis in teenagers with epilepsy. Whether this represents a direct effect of the antiepileptic drug or whether it represents "reciprocal psychosis" because of rapid seizure control may be difficult to determine. What has become clear from the work of Mula et al. (2003) is that starting the antiepileptic medication at a low dose and escalating the dose slowly is associated with a much reduced risk of psychosis, at least in adults. The paper by Mula indicated other factors that may predispose to antiseizure-medication-induced psychosis, namely, a family or personal history of psychiatric disorder.

Psychosis has also been reported following epilepsy surgery in both adults and teenagers. Again, whether this represents "reciprocal psychosis" remains uncertain.

If the psychosis is antiseizure-medication induced, then a medication review is necessary. In some cases, medication reduction may suffice. In cases of postictal psychosis, neuroleptic medication may be indicated, if the psychosis is distressing or is associated with risk to self or others. The chances of a serious seizure exacerbation with antipsychotic medication are small, provided the dose is kept relatively low. Even in the case of clozapine, the chance of seizure exacerbation appears to be dose/blood-level related (Varma et al. 2011).

The discovery that neuronal receptor antibodies such as anti-NMDA receptor antibodies or voltage-gated potassium complex channel antibodies can present with behavioral disturbance and seizures has introduced a new phenomenon into the world of epilepsy and the world of psychosis, namely, that both the epilepsy and the psychosis, in these specific cases, are potentially curable with effective immunological treatment. These important concepts have been discussed in detail in the landmark papers by Vincent, Dalmau, and others (Vincent et al. 2011; Dalmau et al. 2008). The latter paper reported a series of 100 cases of anti-NMDA antibody receptor encephalitis, which included both children and adults. Sudden, odd behavioral change, which may be accompanied by new-onset seizures, should raise the suspicion of neuronal antibody encephalitis and should prompt testing for the appropriate antibodies. The situation is illustrated well by a case report by Slettedal et al. (2012). A school-age girl (exact age not stated) presented with seizures affecting the left side of her face and left arm, together with the psychiatric presentation of anxiety, aggressive behavior, and delusions. Her condition worsened despite treatment with carbamazepine and chlorpromazine. Immunotherapy with steroids and intravenous immunoglobulin was not helpful but she improved immediately when treated with plasmapheresis. These authors described five phases of

anti-NMDA receptor encephalitis in this case: the prodromal phase, the psychotic phase, the non-responsive phase, the hyperkinetic phase, and gradual recovery.

Psychiatric Disorders in Childhood Epilepsy Syndromes

The childhood epilepsies do not represent a single condition but are a group of different syndromes, varying from the benign and self-limiting to the severe and life-impairing. The different epilepsy syndromes of childhood not only have a variety of outcomes in terms of seizure control but also vary greatly with regard to the behavioral and psychiatric manifestations.

Over 40 syndromes and related conditions have been described by the International League Against Epilepsy (Engel and International League Against Epilepsy 2001). The syndromes selected here are either relatively common or are of particular interest with regard to psychiatric outcome.

West syndrome is characterized by infantile spasms (flexor or salaam spasms, extensor spasms, or mixed spasms), the major EEG abnormality of hypsarrhythmia and usually intellectual impairment. There is a long history of reports of psychiatric disorders. For example, many years ago, Riikonen and Amnell (1981) reported that 28% of their patient group had psychiatric disorders with autism and hyperkinesis in equal numbers. The deterioration in cognition and behavior that occurs in babies with West syndrome appears to coincide with the onset of the hypsarrhythmia. There is increasing evidence that if this abnormality is treated promptly and successfully, the cognitive and behavioral outcome can be improved markedly. O'Callaghan et al. (2011) studied 77 infants with West syndrome and found that the earlier the onset of the spasms and the longer the delay to treatment, the worse the outcome in terms of Vineland adaptive behavior scales at 4 years of age. Bombardieri et al. (2010) found in those with tuberous sclerosis and infantile spasms, there was a statistically significant correlation between treatment lag and delay in cessation of the spasms on one hand and decreased developmental quotient ($p = 0.003$) and increased score of autistic features ($p = 0.006$). There are now many other studies that provide support for the importance of early effective treatment of the spasms/hypsarrhythmia in terms of cognitive and behavioral outcome.

The Lennox-Gastaut syndrome is a severe epilepsy syndrome characterized by several seizure types including tonic (stiffening) seizures and atypical absence seizures, together with slow spike-wave discharges on the EEG. It is associated with intellectual impairment and behavioral disturbance. In a major study some years ago, Roger et al. (1987) followed 338 patients into adulthood. 62.4% had an unfavorable outcome and 20.4% were said to have had neurological or psychiatric symptoms. Kieffer-Renaux et al. (2001) reported behavioral problems with onset in the first year of the seizure disorder, including hypokinesia, inability to pursue an activity for more than a few minutes, and autistic or psychotic features in some patients. Considering the importance of this syndrome, together with the clinical impression that it can be associated with major behavioral problems, it is surprising that there are relatively few good studies of the psychiatric outcome.

Benign childhood epilepsy with centrotemporal spikes/BECTS/Rolandic epilepsy is characterized by the onset of seizures typically at around 8 or 9 years of age in a child who is intellectually normal; the seizures may present at night with drooling and inability to speak. Tonic-clonic seizures may also occur. Although this syndrome is "benign" in terms of seizure prognosis, with most of the seizures resolving with or without treatment by the mid-teenage years, there are now very many studies indicating that it is far from benign in terms of cognitive outcome and that it can be associated with psychiatric disturbance such as ADHD. It should also be noted that this syndrome lies on the spectrum with the Landau-Kleffner/CSWS syndrome (see later). Massa et al. (2001) carried out a very detailed prospective study on 35 children who fulfilled strict criteria for BECTS. These children were recruited immediately after the first seizure. Problems were demonstrated in a number of different areas including educational performance, behavioral disorders, and attention deficit. Filippini et al. (2013) examined the long-term effect of epileptiform discharges on non-REM sleep in 33 children with BECTS who were monitored for 2 years. A high risk for residual verbal difficulties and abnormal neuropsychological development was significantly correlated with a greater frequency of epileptiform discharges during non-REM sleep.

In the past, it was debated whether this syndrome required antiepileptic treatment. However, the wealth of evidence implicating epileptiform discharges in poorer outcome would suggest strongly that treatment should be implemented promptly and that the child should be monitored, not only in terms of seizure outcome but also in terms of cognitive and behavioral outcome.

The Landau-Kleffner syndrome or acquired epileptic aphasia is characterized by apparently normal development followed by loss of language skills, almost certainly associated with the night-time abnormality of electrical status epilepticus of slow-wave sleep (ESES) or continuous spike-waves in slow-wave sleep (CSWS). It is hardly surprising that a child who was previously able to understand language and speak, who then loses these skills, might present with behavioral or psychiatric problems. The relationship between this syndrome and autism has been the subject of several publications (Nass and Devinsky 1999; Tuchman 2000; Deonna and Roulet 2006; Besag 2015). Again, there appears to be a strong argument for early effective treatment to prevent or even reverse the cognitive and associated behavioral/psychiatric impairment. Medical treatments have included steroids, sodium valproate, benzodiazepines, sulthiame, and intravenous immunoglobulin. The novel surgical technique of multiple subpial transection developed by Frank Morrell (Morrell et al. 1989) deserves special mention in this context, although subsequent studies have not tended to replicate the excellent results he reported in his original series. As discussed by the current author previously, there is, however, a dilemma. Some children with this syndrome will recover spontaneously whereas for others, if treatment is delayed, permanent language and behavioral impairments will result. On one hand, it is undesirable to subject children to an unnecessary surgical procedure but on the other hand, permanent deficits from delay in treatment should be avoided. It is also important to note that around one-third of the children with this syndrome do not present with obvious seizures, despite having the language loss and ESES.

The syndrome of continuous spike-waves in slow sleep or CSWS does not necessarily present with language impairment. It can present with a variety of other cognitive impairments and accompanying behavioral problems. The International League Against Epilepsy provides the following description of the syndrome. "There is a constant and severe deterioration in neuropsychological functions associated with the disorder, and language capacity can be particularly affected. Patients may also show a profound decrease in intellectual level, poor memory, impaired temporal spatial orientation, reduced attention span, hyperkinesis, aggressive behaviour and even psychosis…" The fact that language is not necessarily affected in this syndrome is illustrated strikingly by the case report of Eriksson et al. (2003) of an 8-year-old boy with occipital-temporal CSWS who had sporadic seizures. Attention and executive functions were apparently normal. There were no memory problems. He had normal global intelligence but with major deficits in visual perception. Cases such as this emphasize the importance of investigating children with any cognitive loss energetically. If no other cause is found, overnight EEG or at least a sleep EEG should be considered as mandatory.

Juvenile myoclonic epilepsy or Janz syndrome is characterized by the triad of absence seizures, myoclonic jerks, typically occurring in the early morning, and tonic-clonic seizures on awakening. It is remarkable that Janz and Christian, in their original 1957 publication (Janz and Christian 1957), gave such an accurate description of the behavioral effects of this syndrome. They described many patients as having attractive but unstable, suggestible and unreliable, rather immature personalities, often resulting in an inadequate social adjustment. Subsequently, Janz, in 2002, drew attention to the fact that these features could be explained by frontal lobe dysfunction and that neuroimaging confirmed this (Janz 2002). In a prospective neuroimaging study of maturational trajectories of brain, together with cognitive studies, Lin et al. (2014) showed that the cognitive abilities of young people with JME did not reach the level of healthy controls at 2-year follow-up assessment. At that stage, there were significant MRI abnormalities in cortical volume, thickness, and surface area in the frontal-parietal-temporal regions. Moschetta et al. (2011) studied personality traits in a mixed group of adults and teenagers. The patients with juvenile myoclonic epilepsy had significantly higher scores on novelty seeking ($p = 0.001$) and harm avoidance ($p = 0.002$) and significantly lower scores on self-directedness ($p = 0.001$). This indicated more impulsive personality traits. Juvenile myoclonic epilepsy is one of the syndromes in which there is the strongest evidence of an association with frontal lobe deficits, both in terms of behavioral measures and neuroimaging results.

Behavioral Effects of Antiseizure Treatment

Antiseizure Medications (ASMs)

The effects of ASMs on behavior and cognition in children have been reviewed by a number of authors, notably Aldenkamp et al. (2016) and Burns et al. (2018). In summary, there is evidence for adverse behavioral effects of phenobarbital, valproate, gabapentin, topiramate, levetiracetam, and zonisamide. Carbamazepine

appears to be neutral with regard to behavioral effects. Positive behavioral effects have been reported with lamotrigine.

Epilepsy Surgery

Our review on the behavioral effects of epilepsy surgery (Besag et al. 2016b) confirmed very mixed results. Although individual children may benefit or deteriorate from the behavioral point of view, no clear overall effects have been shown for resective surgery.

There was a very strong indication from earlier reviews (Goodman 1986; Lindsay et al. 1987) that hemispherectomy, namely, the removal or, more recently, the disconnection of an abnormal cerebral hemisphere, can be accompanied by marked behavioral improvement. Recent reviews have been more equivocal; there is a lack of studies that have employed strict behavioral measures before and after the surgery. Nevertheless, the consensus is that hemispherectomy, in carefully selected cases, can result in behavioral improvement that is of significant clinical benefit.

The novel surgical technique of multiple subpial transection developed by the late Frank Morrell, discussed earlier, effectively isolates the epileptic focus by transecting around it, without removing any brain tissue. As also stated earlier, the original series published by Morrell indicated that dramatic improvements in language function could result from multiple subpial transection in cases of acquired epileptic aphasia. Although the degree of improvement in the initial report has proved difficult to replicate, this technique can clearly be of great value, being accompanied not only by cognitive improvement but also by behavioral improvement.

Vagus nerve stimulation has been shown, in a number of adult studies, to be associated with long-term improvements in depression. Although several publications have reported behavioral improvement in children, detailed behavioral information has generally been sparse and the studies have, by the nature of the procedure, been open and without a control group. It is possible to carry out controlled studies by varying the stimulation parameters but there is a lack of such studies in children.

When evaluating the behavioral effects of surgery in children, it is important to ensure that long-term follow-up data are collected; benefits or, in some cases, adverse effects may not be evident in early follow-up data.

Prescription of Psychotropic Medication in Children with Psychiatric and Behavioral Disturbance

Before considering the prescription of psychotropic medication, it is very important to determine the cause of the behavioral or psychiatric disturbance. The current author has indicated, in a number of previous reviews, e.g., Besag (2016) and Sillanpaa et al. (2016), how important it is to determine the cause or causes of behavioral or psychiatric disturbance in the child with epilepsy before deciding on

appropriate management. A systematic approach is recommended, examining the behavioral disturbance against the following framework.

1. The epilepsy itself
2. Treatment of the epilepsy
3. Associated brain damage or dysfunction
4. Reactions to the epilepsy
5. Causes that are equally applicable to children without epilepsy

If, after careful assessment, it is decided that psychotropic medication is appropriate, there are very few contraindications related to the epilepsy. For example, as stated earlier, there is no evidence that stimulant medication used for treating ADHD exacerbates seizures, nor is there any evidence for selective serotonin reuptake inhibitors exacerbating seizures. Low-dose antipsychotic medication used for treating anxiety or irritability in children with autism spectrum disorder is also unlikely to exacerbate seizures, although high-dose antipsychotic medication can cause seizure exacerbations. Even in those cases, the possibility of the seizure exacerbation might be much more acceptable than, for example, an ongoing distressing interictal psychosis.

Again, there are few data in controlled studies of psychotropic medication in children with epilepsy but there is much anecdotal information. For a summary of recommendations based on current experience, see Besag et al. (2016a).

Conclusions

Several epidemiological studies have shown that psychiatric and behavioral disturbance in children with epilepsy are common, occurring in up to about 50%. As is the case for children without epilepsy, there is a strong link between behavioral disturbance and intellectual impairment. However, even for those without intellectual impairment, behavioral and psychiatric disturbance appear to be more common in some children with epilepsy. For any child with epilepsy who presents with behavioral disturbance, it is essential that a meticulous assessment is carried out to determine the cause or causes so that rational management can be implemented. The type of management will depend critically on the results of the assessment. The outcome can often be one of major benefit to the child and family. Although targeted intervention for psychiatric and behavioral disorders in children can be very beneficial, the greater worldwide challenge remains education to remove the effects of stigma which can often be far more damaging to the child and family than any direct manifestations of the epilepsy itself.

Cross-References

► Diagnoses
► Perinatal Psychiatry

► Services for Neurodevelopmental Disorders such as Autism Spectrum, Attention Deficit Hyperactivity Disorder (ADHD), and Tic Disorders

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Psychiatric Consequences of Traumatic Brain Injury in Children and Adolescents

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Contents

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Abstract

Traumatic brain injury (TBI) is one of the most important causes of mortality and morbidity of children and adolescents worldwide.

The psychiatric, psychological, and cognitive consequences of brain injury can be emotional, e.g., post-traumatic stress disorder or anxiety; neuropsychiatric, e.g., ADHD, decrease of IQ; and symptoms such as social difficulties and processing skills deficit which do not fit into a diagnostic category but are very impairing. Co-morbidity is usual.

Because of brain maturation, the consequences of TBI evolve as the child grows. In some instances, brain plasticity may help to regain skills or compensate; but, very importantly, in many instances the totality of the consequences of TBI may not be apparent until the child is older. It may then become clear that the young person has not developed a particular skill to the level expected in the general population (e.g., the young person's social skills may not be as sophisticated as those of other young people).

The severity of brain injury is one of the predictors of outcome, but other factors such as pre-injury aspects (child's function, psychiatric and cognitive abilities, and family function) and post-injury factors (family, environment) are also significant influences.

Traumatic brain injury is often referred to as a "hidden" disability, because some of the effects appear small but they may have a great effect on function. Psychiatrists and psychologists should undertake a careful assessment and, in many instances, assessments should be repeated periodically until the young person has reached full brain maturation.

Keywords

Brain injury · Axonal injury · Post-concussional syndrome · Moderate brain injury · Severe brain injury

Introduction: Terminology and Epidemiology

The terms head injury and brain injury are sometimes used interchangeably. However, they are not the same. A head injury is an injury to the head which may damage the scalp, skull, or/and brain. It is possible to have a head injury without a brain injury.

Brain damage/injury refers to a structural or physiological change in the nerve tissue of the brain to a pathological degree. It can be as a result of a force applied to the brain, so there could be a brain injury without a visible trauma to the head. "Acquired" brain injury refers to any damage to the brain that occurs after birth, as different from congenital disability.

Traumatic brain injury is one of the major causes of death and disability. It is estimated that over ten million people annually suffer from traumatic brain injury all

over the world. It would appear that 60% of traumatic brain injuries are due to road traffic accidents, 20–30% are due to falls, 10% due to violence, and another 10% are a combination of workplace and sports-related injuries. Over the 98% of childhood injuries occur in the poorest countries in the world, with injuries rates being five times higher than in industrialized countries; for example, in a study in Latin America there was an incidence rate of 566 children with traumatic brain injury per 100,000 and a mortality rate of 4.6 per thousand. This incidence rate was 2.97 times higher than the international average. Brain injury is the most frequent cause of disability and death among children and adolescence in the United States (Hyder et al. 2007).

The peaks of traumatic brain injury are in early childhood, late adolescence, early adulthood, and in the elderly. Falls are an important cause of brain injury in children; road traffic accidents and violence contribute to the majority of the injuries in young and middle age adults. Males have a higher incidence of traumatic brain injuries than females (Hyder et al. 2007). For children under the age of 15, road traffic accidents rank as the 11th cause of death and 10th cause of disability globally. The rate varies across countries: in Asia, road traffic injuries are the fifth cause of disability among children (WHO 2008).

Following the acute event, the child may recuperate well from the physical point of view. Unfortunately, the neurocognitive, psychological, and psychiatric aspects may be long-lasting; some may not become evident until years after the initial injury and some may be subtle but functionally disabling; brain injury is sometimes referred to as "hidden disability."

Appropriate assessment, diagnosis, and management of the cognitive and psychological consequences are essential, so children and their families can achieve the best possible quality of life.

Pathophysiology

The injury to the brain is a result of the initial injury and the cascade of events that follow. In motor vehicle accidents, the brain injury occurs initially because of the acceleration, deceleration, and rotating forces. Apart from the localized injury resulting in contusions of the brain, the axons of the nerve cells may break as a result of the movements; this is called **diffuse axonal injury** (considered a sign of severity when present). The brain tissue also may be severed by the blood vessels (Powell 2004).

Damage to the brain arteries may occur; additional injury occurs in the minutes afterward and is due to lack of oxygen to the brain. There may be further injuries to the brain as a result of bleeding. In the following hours, the brain may have edema; this may bring up the pressure in the brain and may cause further damage to the brain. In addition, edema in the brain may interfere with arterial circulation. In countries with Intensive Care Units, intracranial pressure is carefully monitored. Following a brain injury, there may be also changes in the chemistry of the brain that contribute to damage.

Hematomas can occur in the brain – intracerebral hematoma – or between the skull and the brain such as subdural or extradural hematoma. This could cause a chronic subdural hematoma. Post-traumatic hydrocephalus is also a possible complication. Epilepsy may be a consequence of the brain injury.

In the United States, skull fractures are present in about 5–25% of children that attend hospital with a head injury and are less commonly associated with epidural hematomas than head injuries in adults. Diffuse injury and cerebral swelling resulting in intracranial hypertension are more common in children than in adults. There is a high frequency of lesions in the frontal lobe white matter, orbital frontal region, and dorsal lateral frontal region (Max 2014): regions of the brain that are related to attention, planning and organization, and social understanding/pragmatics of communication.

Classification

There are two major types of traumatic head injury: Open and closed.

Open (penetrating) head injury: The scalp and skull is penetrated, for example, by a missile or projectile injury to the head. In this case, the damage seems to be localized. However, high velocity missiles can produce other lesions as a result of the energy they transfer to the tissues. In this case, the lesions may be similar to the ones seen in closed head injuries. Other damage may be produced by infection, the trajectory of the missile, or pressure effects such as swelling and bleeding. The chances of developing epilepsy following an open head injury are high.

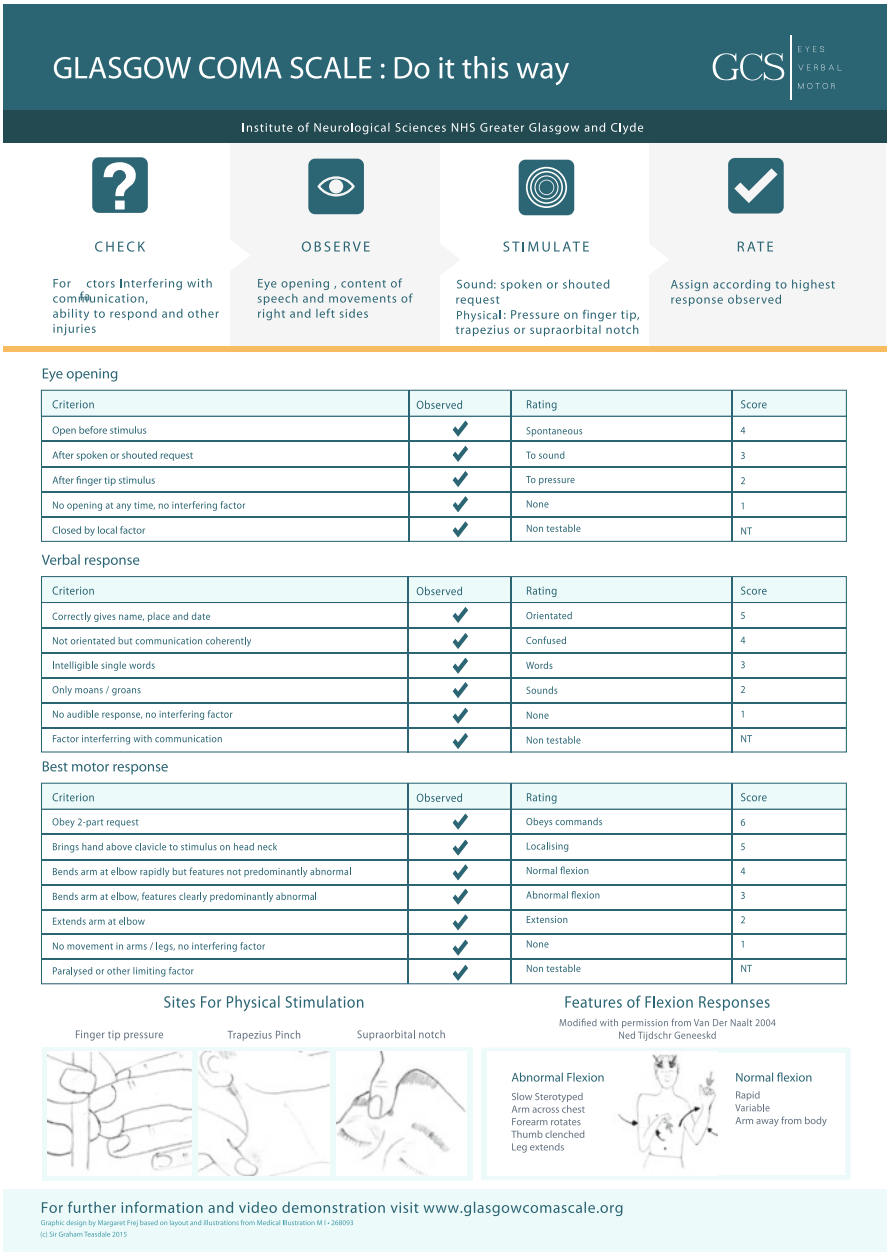
Closed head injury: The brain is injured as a result of a knock to the head or a sudden motion that causes the brain to rotate/move against the skull. The initial damage is due to the forces (direct or rotational). The point of the original impact is usually referred as the "coup" and the cerebral area opposite the blow is called "contrecoup or contracoup." The coup and contrecoup injuries account for localizable behavior alterations that accompany closed head injury.

Traumatic brain injury can be classified in many ways, including severity, mechanism of the injury, location, and type.

Classification of Brain Injuries Depending on Severity

The severity of the injury has a bearing on functional, cognitive, and psychiatric outcome, and therefore it seems worth summarizing the methods used to measure severity of injury and some of the difficulties that are associated with these methods.

The Glasgow Coma Scale (GCS) is used to classify the traumatic brain injuries. Other methods of describing severity are the degree of post-traumatic amnesia and the length of coma.



According to the Glasgow Coma Scale, brain injuries can be classified as:

- Mild/minor with GGS 13–15
- Moderate with GCS 9–12
- Severe with GCS less than 9

The GCS is available in various languages from www.glasgowcomascale.org. This website also provides information on appropriate use of the scale and mortality prognostic charts. The GCS needs to be modified for children who are less than 5 years old.

Post-traumatic amnesia (PTA) is the interval from injury until the patient is orientated and can form and later recall new memories. The classification of levels of severity (mild, moderate, severe) according to PTA criteria have changed over time, so it is important for clinicians to look at the definition when reviewing the literature.

Duration of loss of consciousness (LOC) is also used as an indicator of severity.

Other classifications include the Mayo system which contains various indices such as loss of consciousness, post-traumatic amnesia, skull fracture, and radiological abnormalities (see Friedland and Hutchinson (2013) for a review of classification).

Issues

Clinicians need to be clear whether brain injury did occur. This can be particularly difficult when mild brain injury is suspected as there may not be neuroradiological changes. Difficulty in remembering events before or after the accident may be attributed to brain injury; but it could be due to anxiety, alcohol/drugs intoxication, or medication administered to relive pain/anxiety at the time of the accident. The attribution of difficulties (attention, memory, fatigue) to brain injury may cause anxiety and contribute to perpetuating the symptoms.

Scales like GCS are used as a shorthand way of communicating the severity of the patient's condition. They have limitations and cannot substitute for a comprehensive assessment. The training of the examiner influences the reliability of the scale. Some components of the scale cannot be assessed in patients who are intubated, and therefore the total score should not be used in these cases. In addition, the classification into mild, moderate, severe is used to ascertain prognosis; people in the mild category according to GCS are thought to have a good prognosis, but there have been discussions regarding the cutoff point of 13 as the best discrimination between moderate and mild (Mena et al. 2011). Other factors such as LOC may influence the prognosis and a different cutoff point has been suggested to indicate severe injury in children (Chung et al. 2006).

Psychological and Psychiatric Outcomes Following Brain Injury

A number of mental health problems have been reported in children following brain injuries. These problems may be exacerbated by the physical consequences of the injury, injury circumstances, and social issues (proximal, e.g., family; distal, e.g., poverty); they could also be ameliorated by family and environment.

As severity is an important predictor of outcome, we will be dealing with mild head injuries and moderate/severe head injuries separately; however, in clinical

practice, it has to be appreciated that there is a continuum of severity, with no definite cutoff points.

Mild Brain Injury and Concussion

Mild brain injury affects millions of children worldwide. Seventy to ninety percent of the head injuries in children and adults are mild.

The term concussion is often used. Initially it was used in sports medicine, but now it is sometimes used to mean mild brain injury. Historically it has been used to describe patients briefly disabled following a head injury with the assumption that the disability was transitory (Sharp and Jenkins 2015). WHO (2016) in ICD-10 and ICD-11 classifies concussion under intracranial injuries and describes it as loss or diminution of consciousness due to injury (ICD-10 S06.0 ICD-11 NA07.0).

The terms concussion and mild brain injury are sometimes used interchangeably.

The Centers for Disease Control and Prevention define concussion as a "*type of traumatic brain injury—or TBI—caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement can cause the brain to bounce around or twist in the skull, creating chemical changes in the brain and sometimes stretching and damaging brain cells.*" It adds "*Medical providers may describe a concussion as a 'mild' brain injury because concussions are usually not life-threatening. Even so, the effects of a concussion can be serious."*

"Symptoms that children may report are headache or pressure in the head, nausea or vomiting, balance problems or dizziness or double or blurry vision, bothered by light or noise, feeling sluggish, hazy, foggy or groggy, confusion or concentration or memory problems, just not feeling right or feeling down. Parents may observe that the child cannot recall events prior to after the hit or fall, appears dazed, forgets instructions or is confused or is unsure of the game or whatever he is doing, moves gradually, answers questions slowly, loses consciousness even briefly, shows mood behaviour or personality change" (https://www.cdc.gov/headsup/basics/concussion_symptoms.html).

Signs and symptoms generally start soon after the injury. Some of the symptoms, however, may not show or start for hours or days. Parents and clinicians may want to consult the center for disease control and prevention website, cited above, for a more comprehensive review on concussions.

There are other definitions and the nomenclature which can be confusing, so clinicians trying to interpret the literature need to check the definitions. The American Congress of rehabilitation medicine (ACRM) definition is more specific, but it is not known if the same criteria apply to children and adults (1993). Ruff et al. (2009) have discussed different definitions and the difficulties in the diagnosis.

Typically the symptoms of mild brain injury are resolved within weeks, but children and adults may suffer from post-concussion syndrome (PCS) for months or longer.

Second impact syndrome may occur when the brain receives a second concussive blow before it has had the chance to recover from the first blow. It is a rare occurrence. This can result in severe swelling of the brain and may have disastrous effects, leading to permanent brain damage, or even death in some cases. Therefore, clinicians should advise families and children about return to sports and school after a mild brain injury.

Given the number of children involved and the relevance for sports, there have been various guidelines issued for management of concussion and return to play, school or college, which change from time to time. Among these guidelines are consensus statements on concussion in sports in October 2016 https://bjsm.bmj.com/content/51/11/838. The Centers for Disease Control provide online training https://www.cdc.gov/headsup/providers/index.html.

Psychological/Psychiatric Consequences of Mild Brain Injury

Depression, anxiety, post-traumatic stress symptoms, externalizing disorders, fatigue, and cognitive changes have been reported after mild brain injury, but most children recuperate within weeks although a minority of children have symptoms for much longer. Truss et al. (2017) reported that 16% of children reported post-traumatic stress disorder symptoms 2 weeks after concussion, but this declined to 6% after 3 months.

Post-concussional syndrome (or post-concussion syndrome) is defined in ICD10 (F07.2) as "*A syndrome that occurs following head trauma (usually sufficiently severe to result in loss of consciousness) and includes a number of disparate symptoms such as headache, dizziness, fatigue, irritability, difficulty in concentration and performing mental tasks, impairment of memory, insomnia, and reduced tolerance to stress, emotional excitement, or alcohol*" and recommends that at least three symptoms should be present for the diagnosis. https://icd.who.int/browse10/2016/en.

DSM-5 does not have a specific category for post-concussion syndrome, but symptoms of post-concussion syndrome can be found in different disorders among them "mild traumatic neurocognitive disorder due to traumatic brain injury."

It may last for months, but symptoms may persist for longer in a minority of children.

Sleep difficulties are reported as common following mild brain injury. Tham et al. (2015) reported that adolescents with mild head injury had poorer sleep efficiency than controls up to 1 year following mild head injury. In their study, subjective complaints of poor sleep were related to depressive symptoms in controls and adolescents with mild head injury. In clinical practice, when young people complain of sleeping difficulties after injury, they should be assessed for symptoms of PTSD, anxiety, and depression.

Assessment and Management Following Mild Brain Injury

Depending on the country of practice, the advice of a child psychiatrist may be requested following a mild brain injury.

In the UK, the National Institute for Health and Care Excellence published guidelines for head injury assessment and early management in 2017; the Centers for Disease control published a guideline in 2018 (Lumba-Brown et al. 2018b); and the British Medical Journal has provided best practice guidelines (Henry and Twitchell 2018) (https://bestpractice.bmj.com/topics/en-us/967). It is important to note that children take more time to recover from concussion than college students and professional athletes, and this should be taken into account in their planned return to play and school.

The majority of children with mid-TBI show no abnormalities on structural CT or MRI. The Pediatric mTBI Study followed up 251 children who attended a trauma center with mTBI for 6 months. There were only a few children (9.9%) who had neuroradiological changes on standard MRI at 6 months (Bigler et al. 2016).

Psychiatric assessment for mild, moderate, and severe brain injuries is described in section "Psychiatric Assessment of a Child Following Traumatic Brain Injury."

There are controversies in the management of concussion (e.g., how much rest and for how long) and new therapies are emerging. It has been suggested that there may be subtypes of concussion. For patients who present with vestibular symptoms (e.g., benign paroxysmal positional vertigo, balance problems, exercise induced dizziness, etc.), there appears to be some evidence that vestibular rehabilitation interventions may be helpful in adolescents with prolonged symptoms of dizziness and balance problems (Broglio et al. 2015; Park et al. 2018).

The UCLA longitudinal study of neurocognitive outcomes following pediatric mild brain injury (Babikian et al. 2011) found some deficits with memory, psychomotor processing speed, and language at 12 months, but these were not significantly different than deficits measured in other injury groups suggesting an unspecific association to having an injury.

Risk Factors for Persisting Symptoms Following Mild Traumatic Brain Injury

Some studies have tried to elicit the factors associated with persistent psychological symptoms, but conclusions are difficult because of small samples and other methodological issues.

A systematic review by Emery et al. (2016) and another systematic review by Lumba-Brown et al. (2018a) found some evidence for the following factors predicting persistence of symptoms during the first year:

1. *Hospitalization or severe post-concussion like symptoms soon after the injury.*
2. *The injury occurs early in life (<6 year olds).*
3. *Outcomes are assessed earlier after injury (suggesting resolution over time).*
4. *There are multiple previous mild TBIs.*
5. *Individuals have pre-existing psychiatric illness/behavioral emotional problems or neurological illness or learning disability.*

The issue of possible genetic predisposition has generated interest, with some studies reporting that the apolipoprotein Epsilon 4 seems to be a predictor of

outcome 6 months after the injury in some studies but the literature has contradictory results.

Lumba-Brown et al. (2018a) also looked at the factors associated with longer-term sequelae (more than 1 year) following mild TBI. The associations were not as strong as the associations when symptoms persisted for less than 1 year:

1. Neurocognitive impairment at 1 month post mild brain injury was associated with long-term cognitive impairment.
2. Greater severity of injury based on clinical characteristics, intra-cranial lesion on CT scan.
3. Poor pre-injury family function.

Moderate and Severe Brain Injury

Neurocognitive Deficits

It is well known that brain development continues after birth through childhood to early adulthood. There are changes in myelination of the brain, and during adolescence, there is a period of synaptic pruning which helps functioning of the brain among other changes.

During childhood, the brain is very plastic and is influenced by the environment. Therefore, during childhood, there is the possibility to compensate for some of the functional loss following a brain injury by other parts of the brain. The counterpart of this is that dysfunction of the brain or damage to the brain, even if transitory, may disrupt the normal trajectory of brain development and affect functions that have not yet been established. For example, the social skills of an adolescent are more sophisticated than the social skills of an infant, and brain damage in infancy may affect the development of social skills later. Therefore, consequences of a brain injury during childhood or adolescence may not be evident until the child is much older.

From the clinical point of view, it is important to continue the follow-up of children who have had moderate to severe brain injuries until the child has reached early adulthood.

The cognitive outcome following brain injury seems to be strongly related to injury severity.

A systematic review by Babikian and Asarnow (2009) found that, following moderate brain injury, children sustained several neurocognitive deficits including general intellectual functioning deficits, deficits in processing speed, attention, problem solving, as well as visual immediate and verbal delayed memory. Studies that followed children to 24 months post-injury or more showed that some deficits remained but there was also some recovery, with substantial improvement of intellectual functioning, particularly performance IQ and processing speed. There were, however, no changes in verbal IQ, attention and working memory, problem solving, or visual perceptual function.

Other studies have shown the influence of family factors in the recovery from moderate brain injuries with a more consistent and enriched environment helping

recovery (see below in Interventions for psychological/ psychiatric difficulties following brain injury).

It is important to note that as executive functioning (attention, inhibitory control, working memory, etc.) underpins many functions of intellectual ability, small impairments in this area can have large repercussions in general function.

Regarding the outcomes after severe brain injury, the same review showed significant impairments in general intellectual functioning with performance IQ more affected than verbal IQ. Executive functioning, especially processing speed and attention and verbal memory, was also severely affected. Studies which had a follow-up longer than 24 months continued to show significant impairment following severe brain injury in almost all neurocognitive domains. Some aspects of intellectual functioning worsened over time when children were compared with non-injured peers, indicating that, even though there may be some recovery of some aspects of intellectual functioning, the gap with non-injured peers widened for many functions including general IQ. The difficulties can persist. A 10-year follow-up by Anderson et al. (2012) of children who sustained a brain injury between 2 and 7 years showed that children with severe brain injury had continuing cognitive deficits.

The cognitive difficulties following brain injury can be coded in DSM-5 classification as major or mild-neurocognitive disorders due to traumatic brain injury. ICD-10 has the categories of mild cognitive disorder (F06.7) and other specified mental disorders due to brain damage and dysfunction and physical disease (F06.8).

Psychological/Behavioral Difficulties and Psychiatric Disorder Following Moderate/Severe Brain Injury

The rates of reported psychological difficulties and psychiatric disorders following moderate to severe brain injury varies across studies but is, in general, over 50% during the first 2 years after brain injury.

Some of the literature looks at emotional/behavioral problems using rating scales, and some of the literature uses psychiatric diagnosis. We will deal with emotional/behavioral problems first and diagnoses afterward.

Psychological Difficulties

A variety of problems have been reported following moderate to severe brain injury, among them are sleep difficulties, aggression, cognitive difficulties, social difficulties, and disinhibition. The problems may start immediately after the injury or later, but tend to be persistent unless there is appropriate intervention.

A systematic review by Li and Liu (2013) found that new depressive disorders occur in 10–25% of school-aged children after TBI, emerging up to 2 years later. 30–50% developed symptoms of ADHD soon after the injury. Not every paper finds an increase in behavioral difficulties following brain injury. Li and Liu state that papers that do not report behavioral and social problems tend to assess younger children whose impairments may be dormant.

Externalizing problems were present in 50% of children followed up following severe head injury in a study in South Africa by Dollman et al. (2017). The same

study reported difficulties with executive function and the need for special educational measures in a high proportion of their sample. In a 4-year follow-up, Schwartz et al. (2003) reported that 36% of children with severe head injury, 22% of children with moderate head injury, and 10% of the orthopedic controls had emotional behavioral difficulties as measured by the CBCL. Most children who had problems during the fourth year had problems during the first year.

Social impairments have been reported to be very frequent in children with traumatic brain injury. Anderson et al. (2017) reported social deficits to be present in 23% of children in their sample. Younger age at injury, severity of injury and current behavior problems, and family dysfunction and low intelligence were related to social impairment. Social impairment may be related to disinhibition, lack of awareness of social rules, lack of empathy, or other issues such as subtle cognitive difficulties. Careful analysis of the difficulties is necessary for appropriate treatment.

Sleeping problems are also frequently reported (Fischer et al. 2018), and it is important to assess whether they are related to anxiety, depression or PTSD.

Psychiatric Outcome

Max (2014) reports that following severe TBI, "novel" psychiatric disorder (a disorder that the child did not have prior to the injury) was present between 54% and 64% of children with severe brain injury. Following mild to moderate brain injury, 10–21% of the children showed "novel" psychiatric disorder compared with 4–14% of the children who experienced an orthopedic injury. Predictors of novel psychiatric disorder included severity of the injury, pre-injury psychiatric disorder (not the same disorder as the one after the injury), socio-economic status, pre-injury intellect or function, family function, and family history of psychiatric disorder.

In school-aged children, the most common new psychiatric disorder after severe brain injury is **organic personality change due to traumatic brain injury** (according to studies described by Max 2014). There are some methodological issues regarding the diagnosis of "personality change due to traumatic brain injury" in children as the diagnostic criteria are not widely agreed. Personality change was diagnosed when children had significant affective instability, aggression, disinhibited behavior, apathy, or paranoia. In the first year of follow-up after the injury, this type of problem was associated with frontal gyrus lesions. In the second year follow-up, personality change was significantly associated with frontal white matter lesions and pre-injury adaptive function. 40% of children after severe TBI had persistent personality change, and in addition approximately 20% had a history of remittent and or transient personality change. Personality change occurred in 5% of moderate traumatic brain injuries, but it was always transient.

Personality change is often co-morbid with other problems such as attention deficit hyper-activity disorder and oppositional defiant disorder.

The second most frequent psychiatric disorder after moderate/severe brain injury (according to Max 2014) was novel **attention deficit hyperactivity disorder (ADHD)**. It was also related to increased severity of injury; however, in samples with mild to moderate head injury ADHD was associated with family dysfunction,

(pre-injury family function and greater pre-morbid psycho-social adversity was associated with post-injury ADHD symptoms after the injury).

The third psychiatric diagnosis was **oppositional defiant disorder** or **conduct disorder**. These were reported to be present as a new disorder in 9% of children followed up for 1 year after admission to a rehabilitation center. In the first 12 months, they were related to social class and pre-injury family function. In the second year, they were related to severity of injury.

Other researchers have reported **ADHD and depression** to be the most common diagnoses after brain injury (Bloom et al. 2001). Li and Liu (2013), in a report of psychological/psychiatric disorders during the first 2 years following injury, report that depression and anxiety disorders often co-exist.

Post-traumatic stress disorder may occur as a full syndrome or sub-syndrome, and it may occur despite neurogenic amnesia. The symptoms are very common immediately after the injury and decline post-injury. Predictors of PTSD include pre-injury mood and anxiety disorder, greater injury severity, female gender, and early post-injury anxiety and depression. PTSD was related to poorer psychosocial outcome even when the severity of injury was controlled for (Kenardy et al. 2012).

Other anxiety disorders like OCD and disorders like hypomania have also been reported to occur after traumatic brain injury.

In addition, there is a particular constellation of symptoms called "Pseudobulbar affect." This is a condition characterized by episodes of sudden uncontrollable and inappropriate laughing or crying that last for several minutes and are totally out of proportion to the situation. It may occur after brain injury or other neurological conditions and the pathophysiology is unclear. The patient experiences the outburst of emotion as "out of his/her control." The symptoms can cause embarrassment and social isolation.

In the longer term, there is concern not only about persistence of the disorders if left untreated, but also about reports of a higher risk of suicide in adulthood (TBI during childhood (hazard ratio (HR) = 1.49), adolescence (HR = 1.57), and adulthood (HR = 2.53) (Richard et al. 2015) and higher risk of criminal behavior in adulthood (Jackson et al. 2017).

Risk Factors for Psychological Symptoms and Psychiatric Disorders

(See Trenchard et al. 2013 for further information.)

These can be divided into:

- *Individual child factors*
  - *Pre-morbid personality and function*: It is important to note that studies which have used standardized psychiatric interviews found that between one third and one half of the children had pre-injury psychiatric disorder, most frequently ADHD or externalizing disorders. Poor psychological outcome is also related to child with poor pre-morbid function and learning problems.
  - *Age at the time of injury*: Most studies follow up children older than 5 years old at the time of the injury; reports on outcome of younger children are infrequent but age at injury may be an important factor. A study by Chang et al. (2018)

following up children who had traumatic brain injuries in early childhood (less than 3 years old) found that they were at high risk of developing autistic spectrum disorder, ADHD, and developmental delay. Risk factors for these conditions included severe traumatic brain injury, repeated traumatic brain injury events, and TBI at a younger age. Other studies, however, report that children injured at a young age have good behavioral outcomes, but it may be that the length of follow-up is insufficient to capture the difficulties (Li and Liu 2013).

  - *Age at the time of the assessment:* Some of the psychological difficulties do not become obvious until the child is old enough to manifest the difficulties.
  - *Gender*: This may be relevant for some disorders like PTSD but not for most conditions.
- *Injury*
  - *Severity*: This may be relevant for some psychiatric disorders particularly; for example, organic personality change is seen mainly with severe brain injury.
  - *Location*: Frontal lobe damage may give rise to executive dysfunction, but it is important to note that different areas of the brain are interconnected and damage to areas other than the frontal lobes can also give symptoms of executive dysfunction.
  - *Particular circumstances surrounding the injury;* e.g., the child may feel responsible, he/she may have PTSD symptoms, there may be bereavements, etc.
- *Environment*
  - *Family*
    1. Family history of psychiatric disorder (there could be a genetic link for parental mental illness could affect parenting and coping)
    2. Family functioning pre-injury
    3. Family functioning post-injury

    There is a close link with psychiatric outcome and family function. Poor psychiatric outcome in the children is related to poor pre-injury family function, more stressors, and use of fewer sources of support. Family factors may be particularly relevant for some psychiatric disorders such as oppositional defiant disorder and ADHD.
  - *Education and peer group*. These factors can influence the child's ability to cope with his/her disability, and influence mood and behavior.
  - *Socio-economic variables*. Access to care may be extremely limited for some families due to economic status. Following an injury, families have to cope with an additional financial burden which adds stress and may influence the child's mood and behavior.
- *Interactions among the different variables.*

  The interaction between predisposing, perpetuating, protecting, and triggering factors associated with emotional behavioral difficulties after brain injury is complex.

  It has been proposed that various factors may have different roles/weights in influencing the outcome at different points in time – depending on other factors again. Kinsella et al. (1999) proposed that family and environmental factors were

particularly important in the post-acute period, while after 2 years the main factor predicting behavioral problems was injury severity. Other reviewers have also proposed that family function pre-injury is related to outcome in the first 2 years, and that the child's psychiatric symptoms are related to concurrent family function at follow-up. The effect size of family function may be different depending on the age of the child and the severity of the injury (Lax Pericall and Taylor 2014).

Psychiatric Assessment of a Child Following Traumatic Brain Injury

A child who has sustained a mild brain injury may not have been assessed in hospital. His caregivers may not have judged this necessary or may not even know about it. It is therefore important for psychiatrists to enquiry about the possibility of a head injury in all assessments.

It is likely that, if the injury was mild, it has not had consequences at all for the child and that the presenting concerns are related to a completely different matter, but it is always worth enquiring.

Ideally, the assessment of psychological/emotional/behavior difficulties of a child following a brain injury should be multidisciplinary.

In general, the assessment of children who have sustained a traumatic brain injury follows the same principles as with other children. Some clinicians may use structured interviews, but many clinicians use semi-structured interviews. Below are some issues useful to assess when the interview takes place in the subacute period, during the neurorehabilitation phase or afterward.

Presenting Concerns

The list of presenting concerns should be elicited as well as a careful history regarding the frequency, severity, and circumstances around the presenting concerns.

- Physical consequences of the injury fatigue, headaches, dizziness, loss of function, vertigo, sensory issues.
- Changes in personality or behavior or emotions following the brain injury noticed by the parents and/or school.
  The retrospective recall of the parents of how the child was like prior to the injury may be subjected to emotional bias. It is not unusual for the parents to say that the child was very bright and that were no problems at school, but examining school records prior to the injury may tell a different story. The Neurobehavioral Rating Scale (Levin et al. 1987; McCauley et al. 2001) or similar can be used as an aid for the clinician to remember to enquire about different symptoms. Items should include mood (irritability, mood lability, lack of initiative – motivation, anxiety, depression, PTSD symptoms, guilt, anger), somatic problems (sleep, headaches, fatigue, other physical and sensory symptoms, treatment for these, enquiry

whether the treatment has any effect on mood and cognition), abnormal thoughts and perceptions, insight, self-esteem, executive function (inattention, planning, impulse control – inhibition), social skills (empathy), memory, language (comprehension, fluency, dysphasia, perseveration), and speech.

- Individual interview: Present difficulties and changes noticed by the child himself or herself since the injury. Memories about the accident, traumatic memories, symptoms of PTSD, and feelings of guilt or anger may also be elicited.
- It is recommended, if possible, to use specific scales for post-concussive symptoms or post-traumatic stress disorder and neuropsychiatric problems as well as the usual screening instruments (SDQ, RCADS, https://www.corc.uk.net/outcome-experience-measures/).

  Some PTSD measures are available at https://www.ptsd.va.gov/professional/assessment/list_measures.asp.

  There are many measures of concussion and post-concussion symptoms. A review is available at https://www.ncbi.nlm.nih.gov/books/NBK185341/.

  The Concussion in Sports group has developed the Sport Concussion assessment tool, now in its 5th edition (SCAT-5) which can be downloaded and used by professionals.

  For young people over 13: https://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097506SCAT5.full.pdf.

  For children aged 5–12: http://www.parachutecanada.org/downloads/resources/child-sport-concussion-assessement-tool-5.pdf.

Information About the Injury and Circumstances

- Characteristics of the brain injury, severity, treatment received – it is useful to have the medical records. The degree of PTA is difficult to estimate in retrospect. Some hospitals use the Children Orientation and Amnesia Test (COAT) (Ewing-Cobbs et al. 1990) to assess the progress of the child regularly, and this is a more reliable way to establish the period of PTA. The COAT is composed of 16 items designed to assess general orientation (e.g., name, parent's names, age, school, and grade), temporal orientation (e.g., year, month, and day of week), and memory (e.g., digits forward, Sesame Street character, and examiner's name). It has normative data for ages 3–15.
- Be aware of possible safeguarding issues (including direct injury to the child caused by caregivers and injuries resulting from neglect because of lack of supervision).
- Circumstances around the accident; how the accident occurred and the reactions of the family to accident. It is possible that the accident occurred when one of the parents was driving, and in this case feelings of guilt are not unusual; this may influence the parents' reaction to the behavioral difficulties that the child may experience subsequent to the accident. Feelings of guilt, anger, retribution should be discussed as they may influence the coping strategies.
- Litigation issues.

Past Psychiatric History

It is important to try to understand the pre-morbid difficulties. Many children may have had undiagnosed psychiatric problems as ADHD. Some of the difficulties prior to the accident may have been made more severe following the accident.

Developmental History

This should be obtained as usual. Any regression in developmental milestones since injury should be noted.

Educational History

It is important to get records from the current school and, if possible, records from a school prior to the accident as this may indicate some difficulties or protective factors. Any special help arranged for or needed by the child should be noted.

Family History Including Family History of Psychiatric Disorders

Some parents may experience post-traumatic stress symptoms following the accident, from the accident itself or from seeing their child badly hurt or in an intensive care unit. If these problems are not dealt with, it will be difficult for the parents to implement any different strategies that are suggested in the management plan.

The family burden of injury interview gives a structured way of enquiring about the different challenges that families face after the injury (Burgess et al. 1999) . It can be found at https://www.apa.org/pi/about/publications/caregivers/practice-settings/assessment/tools/family-burden.aspx.

There are many scales to assess family functioning. The family assessment device – general function (FAD-GF) has been shown in some studies to be related to psychiatric outcome of the child. There can be changes in parenting following the injury. It is not unusual for parents to become "overprotective," but this may influence the behavior of the child.

Mental State Examination

Appearance and general behavior including the ability to make eye contact, fidgetiness, general behavior during interview, capacity to pay attention and to respond appropriately to questions, impulse control.

Abnormalities of speech should be noticed: In particular perseveration, this may be shown by repeating an answer inappropriately in subsequent questions. This should be distinguished from reiteration in which a patient continually repeats some words, phrase, or question.

Mood, worries, thoughts, and abnormal perceptions. Presence of symptoms of PTSD.

It is important to assess cognition (or cognitive state), orientation, attention and concentration, memory and general information. The Mini Mental examination has not been well evaluated in children, and it may not be useful for children who are in primary school, although there is a preliminary study of an adapted version for children from the age of 4 (Ouvrier et al. 1993) and for children with cerebral palsy (Moura et al. 2017).

Physical Examination with Particular Care to Neurological Examination

- Neurological soft signs are part of the comprehensive neurological examination and may point out neurological dysfunction.

Other

- Neuropsychological testing could uncover subtle deficits and give an idea of strengths and weaknesses.
- Information from school/education regarding past and present performance.
  - Liaison with the school may reveal a lack of knowledge by the teachers about the consequences of the injury. Education of teachers and school staff about the psychological/cognitive consequences of brain injury is important.
- Liaison with medical team regarding past and present treatments.

The formulation should include the predisposing, protecting, perpetuating, and precipitating factors for the presenting concerns and the interaction between them.

A thorough formulation is essential for a management plan.

Management of Psychiatric Disorder and Psychological Disturbance

A. Preventative Measures

In 2008, the World Health Organization (WHO) issued a report on prevention of injuries to children. They noted the high cost of childhood injuries for individuals, families, and society and consider that is unacceptable not to try to prevent injury. They classified risk factors at four levels: child factors, vehicle and safety factors, physical environment, and socioeconomic environment and considered interventions at every level. The report can be found at https://www.who.int/violence_injury_prevention/child/injury/world_report/en/.

In 2017, WHO published the report "Save lives: a road safety technical package" http://apps.who.int/iris/bitstream/handle/10665/255199/9789241511704-eng.pdf?sequence=1 underlining the priority strategies for prevention.

Regarding road traffic accidents, there are some general measures that have been found to reduce head and brain injuries. Among them are: speed control, promoting helmet usage, restricting alcohol consumption, safer pedestrian environments, safe routes to school, separation of "two wheelers," safe vehicle design standards, use of child restraints in vehicles, visibility of road users, and, once an accident has occurred, appropriate emergency care, and rapid transfer to hospital if needed. Rehabilitation can avoid or ameliorate some of the consequences of injury.

The accessibility and affordability of services following an injury is another determining factor affecting the consequences of brain injury.

Some measures have proven effectiveness; e.g., it is reported that in the UK, lowering speed limits can result in a 70% decrease in child pedestrian crashes and a near halving of crashes involving children on bicycles (Hyder et al. 2007).

Staton et al. (2016) reviewed the effectiveness of road traffic injury prevention initiatives in low- and middle-income countries. They looked at interventions based on legislation, enforcement, speed control, education/public awareness, and road improvement. The findings were that interventions based on legislation had the strongest evidence for reduction of traffic accidents, injuries, and death rates although the evidence was limited. In general, all the interventions (apart from road improvement) had some data supporting an impact, but the impact could be short lived.

Measures in other reports include preventing falls with the use of guards on windows that are above ground level, stair guards, safer playgrounds, and increased supervision. Violence prevention methods, the restriction the availability of weapons can reduce the number of brain injuries.

Some of the injuries to children are caused in the context of abuse. The interventions to reduce abuse have been reviewed by the Center for Disease Control and Prevention at https://www.cdc.gov/violenceprevention/pdf/CAN-Prevention-Technical-Package.pdf and by WHO in 2016 at http://apps.who.int/iris/bitstream/handle/10665/207717/9789241565356-eng.pdf?sequence=1.

Service Provision

Many countries have recommendations for the care of children in the acute phase following a brain injury, but the recommendations regarding management in the subacute and chronic period are scant.

McKinlay et al. (2016) wrote practice recommendations for service provision for children and young people with acquired brain injuries. Families and professionals (medical and education) may have different ideas about the organization and delivery of services. A comprehensive service for children with brain injuries cannot happen without appropriate organization and funding. Professionals, families, and voluntary organizations need to communicate in order to have some basic

agreements about essential and desired services; they need to work with policymakers to achieve this.

Below are some ideas for consideration:

- Medical professionals/clinicians should be able to assess children with brain injuries, know the guidelines regarding acute management, and refer appropriately. They should be aware of the possible long-term consequences. If a child, who has had a brain injury in the past, is presenting with psychological/cognitive problems, they should refer to the appropriate professionals for further investigation. Therefore, it is essential that medical professionals are educated and have access to appropriate resources to update their information.
- When a child is discharged from emergency department or hospital following a brain injury, parents should have information regarding the nature of the injury, severity, possible outcomes, and follow-up appointments.
- For children who attend emergency department following a mild head injury, emergency department should provide information in writing regarding mild head injuries and what to do in case of worsening symptoms, possible cognitive/psychological symptoms, and advice on rest and return to sports and school.
- The hospital or medical practitioner who has assessed the child following a mild brain injury should communicate this information to the school (this may need to be via the parents) and make the school aware of possible temporary cognitive/psychological changes.
- Following the discharge from hospital, most rehabilitation is done by the family and school. Therefore, it is essential that services for children are family centered.
- It is essential that parents and children receive psycho-education about the brain injury and know which resources to access. They should be made aware of possible cognitive and psychological consequences including the possibility of psychological/cognitive problems becoming more apparent later in life. How to do this in a sensitive manner at a time that families feel quite vulnerable is a challenge. In some countries, voluntary organizations are a source of support and information to families. Medical practitioners should let families know about these resources.
- Teachers should have access to information, supervision from the department of education, and/or other professionals to help them to assess the child's educational needs, implement accommodations, and other help for the child at school and monitor the progress. It takes time and skill to differentiate the curriculum, think about strategies, review the results and monitor the child in an appropriate manner; teachers need time and support to do this. Education departments may have a professional(s) with particular expertise in brain injuries who can help teachers when needed.
- Children who have had moderate/severe head injury families may need to attend many different appointments after discharge. There should be a transition document between the hospital and community services. Ideally services should be organized and provided by a community multi-disciplinary team and include psychological and physical assessment and therapy. If this is not possible, the

professionals should communicate among them and may be able to hold reviews together. There should be a professional with appropriate training in brain injuries who leads the care of a child; he/she should asses and monitor the progress of the child in a holistic way taking into account all the other professional input. Families report that having a care coordinator (a person who can coordinate and understands the different clinical needs and to whom they can address their concerns) is useful.

- Professionals, families, and child should agree on the goals of different therapies. Professionals should think how the different therapies/goals may complement each other and how the different exercises/treatments can be included in the life of the family considering all the members of the family's needs and, if this is not possible, how the therapeutic goals are going to be achieved.
- Professionals should assess the child, monitor, record progress, and review strategies depending on the goals/results. They should review the progress periodically with the parents and, if possible, with other professionals. Interventions should be evidence-based when possible.
- Communication between parents, child, school, and medical professionals is essential and time needs to be allowed for this. Technology may help the ability to attend meetings when in a different location.

Interventions for Psychological/Psychiatric Difficulties Following Brain Injury

The management of a child following a brain injury requires a multidisciplinary approach. Liaison between medical, mental health, education professionals, and family is essential to aid the recovery.

It is essential to recognize that physical and environmental factors interact and that interventions ought to follow a comprehensive assessment of physical, cognitive, psychological, family, and environmental factors be delivered in a coordinated way.

Psycho-education and Information to Child, Parents, and School

Families want accurate information regarding the injury, expected difficulties and prognosis given in a sensitive way. Providing information may help to decrease anxiety.

There are many definitions of psycho-education and different models, but it is usually understood as more than just giving information about symptoms and prognosis to patients and families. It is a process of delivering information in a way that helps families/patients to understand, manage the symptoms, and cope with the disorder. It may need to involve various meetings; families are encouraged to take an active role in questioning, finding out information and relating the information to their own situation.

Information to the school is also important, and it may need to be repeated each academic year, as sometimes teaching staff may not realize that an injury that happened years ago is relevant to the present difficulties. There needs to be liaison with the education department to help the school institute appropriate support.

There are many useful websites that give information about brain injuries for example:

www.brainline.org/article/children-traumatic-brain-injury-parents-guide
https://childbraininjurytrust.org.uk/wp-content/uploads/2018/11/Acquired-brain-injury-in-children.pdf
https://www.braininjuryhub.co.uk/information-library/an-introduction-to-the-brain
https://www.headway.org.uk/about-brain-injury/individuals/information-library/

For schools:

https://childbraininjurytrust.org.uk/wp-content/uploads/2018/11/ABI-Mini-Guide.pdf
https://www.biausa.org/downloads/brain-injury/teaching.strategies.for.students.with.brain.injuries.pdf

Concussion information for parents and schools:

https://www.cdc.gov/headsup/index.html

Although not specifically about head injuries, parents may find this leaflet useful:

parenting-ed.org/wp-content/themes/parenting-ed/files/handouts/coping-with-a-chronic-illness.pdf

There is strong evidence for educating and involving the family in the rehabilitation of children. There are studies that support helping the family to structure the environment in a manner to enhance performance on daily functional tasks. In a randomized control trial in Brazil, Braga et al. (2005) compared the outcomes (cognitive and motor) of a rehabilitation program delivered by clinicians to a family intervention group who received intervention delivered by the family members under the supervision of clinicians. There was a 2-week initial assessment and training period for the family. After the assessment training period, the family implemented intervention at home. The therapy group delivered by clinicians and the therapy group delivered by family both received treatment for 1 year. The two groups demonstrated improvements on the outcome measures, but only the family intervention group was statistically significant. The outcomes were not affected by the family's education level (Braga et al. 2005; http://www.sarah.br/en-us/especialidades/rede-pediatria-do-desenvolvimento/).

Cognitive Rehabilitation Following Brain Injury

A detailed neuropsychiatric and neuropsychological assessment to assess the residual cognitive disabilities of the young person with TBI is necessary prior to agreement of a rehabilitation plan with the child and family and school.

It will be necessary to repeat neuropsychological assessments at regular intervals to evaluate the effectiveness of the treatment.

In adults, cognitive rehabilitation has been shown to have more benefits when administered as a part of a multidisciplinary team; it is thought that the same applies to children.

Studies have divided cognitive rehabilitation into two components: restorative and compensatory approaches. The restorative approach aims to restore the impaired skills and reinforce the skills that are left (e.g., working memory training). It often includes repeated exercise and standardized tests of increasing difficulty targeting specific cognitive domains. The compensatory approach teaches ways of bypassing or compensating for impaired function. Assistive technologies such as calendars, electronic memory devices, alarms, are part of compensatory techniques (Barman et al. 2016). In clinical practice, both cognitive restoration and compensation are used, tailored to the individual patient's needs.

A review of the literature by Slomine and Locascio in 2009 concluded that there was some evidence for the effectiveness of attention training. Regarding memory, they found that one study reported that the Amsterdam Memory and Training Programme for children improved delayed word memory, as well as attention, but there was no change in immediate memory. There was also some evidence for improvement of function by training children to use external cues (e.g., use of a paging or alarm system to remind people of certain actions).

Regarding the rehabilitation of children with unilateral neglect, they found some evidence in two studies of constraint-induced movement therapy.

They also examined cognitive rehabilitation strategies for language. They note that following a brain injury, children have difficulty with pragmatic or contextual elements of language as well as deficits in discourse and language organization (adults tend to have different problems to those of children such as aphasia). They found one study that supported the use of a computer-assisted cognitive rehabilitation program designed to enhance cognitive linguistic skills and one study that found peer group training improved pragmatic communication skills in a small group of adolescents.

For executive function, they looked at interventions that included helping children to solve problems in a systematic way during everyday activities. There were some case studies and group studies that supported its use. In education, there was emerging evidence for the use of a teaching technique called "direct instruction" in enhancing the skills of children with a variety of special needs.

Shaw (2016) systematically reviewed cognitive rehabilitation interventions that helped a child to re-integrate at school and the community following moderate/severe TBI. Therapies should be developmentally appropriate (e.g., for primary school children more behaviorally based, while middle and high school children were more capable of introspection and learning reasoning strategies). She concluded that interventions that helped a student to organize (e.g., using a planner with list of the places to go, people to meet, tasks to do) were effective. Training to recognize and regulate emotional states was also important. Emotional recognition can be helped by drawing emotions, selecting pictures that illustrate emotions,

games. Treatment should be embedded in real-life situations, e.g., social skills can be learned by helping children to interact with another child and reflect and learn from their interactions.

In a recent review, Resch et al. (2018) reviewed the effective components of cognitive rehabilitation for children and adolescents with acquired brain injury. They concluded that drill-based training interventions (e.g., computerized training by programs such as Cogmed, Captains Log, Foramen Rehab, TEACHware) improved performance in tasks similar to the training tasks; the transferability to everyday situations is not mentioned; metacognition/strategy training (e.g., computerized programs such as AMAT-C, AIM, etc.) improved psychosocial functioning. Combined interventions improved both cognitive and psychosocial functioning. External aids improved functioning in tasks that required everyday memory.

Family Intervention Directed to Helping Emotional/Behavioral Problems

In 2009, Cole et al. reviewed the family intervention guidelines for families of children with ABI and summarized them as follows *"(1) select developmentally appropriate interventions, (2) match the intervention to the family, (3) provide advocacy, (4) provide injury education, (5) focus on family realignment, (6) appropriately adjust the child's environment, and (7) provide skills training to the family and child.*"

Unfortunately, there are not many studies on the effectiveness of family intervention for psychological/psychiatric problems following ABI in children. Brown et al. (2015) reported that a structured parenting behavioral intervention (Stepping stones PPP) plus Acceptance and Commitment Therapy was better than "treatment as usual" in reducing parental distress, increasing parents' flexibility and confidence in the management of the child's behavior and reducing conflict. Wade et al. (2015) found that a Web-based counselor-assisted family problem-solving therapy delivered to families of adolescents during the first year following the accident was better than internet resources only for externalizing and internalizing symptoms and the results were maintained at 18 months.

Pharmacological Interventions for Psychological Symptoms and Psychiatric Disorder Following Brain Injury

Following a comprehensive assessment and management plan, the possibility of pharmacological intervention for some of the disorders or symptoms may be considered as part of a comprehensive treatment package.

- The strongest evidence is for the pharmacological management of attention problems and ADHD (Hornyak et al. 1997; Mahalick et al. 1998; Williams et al. 1998).

  A review was carried out in 2012 by Harvey et al. They found eight papers that evaluated methylphenidate after TBI. Some papers contained mixed samples of children and adults and some samples of children with brain injury and other disorders. For all the studies, the maximum dose ranged from 0.3 mg/kg twice daily to 36 mg daily. They found positive results from most of the studies.

Methylphenidate was well tolerated but that there was a sub-group of patients (female and lower IQ) being identified as having an increased risk of bad adverse effects.

Ekinci et al. (2017) have published an open label study of MPH treatment of 20 children (mean age 12 years) with moderate to severe brain injury. 70% had good improvement, one had severe irritability as a side effect; otherwise, the treatment appeared to be well tolerated. The dose of methylphenidate started at 5 mg and increased to 10 mg t.d.s. over a period of 3 weeks.

There has been a concern about the possibility of increased risk of seizures in patients with brain injury who are taking methylphenidate, but this has not been sustained. The use of methylphenidate seemed to be safe in children with brain injuries. It is worth noting that the dose of methylphenidate in all the papers was small.

- There have not been controlled trials in children with ADHD following brain injury with amphetamine, atomoxetine, clonidine, or guanfacine.
- As the mode of action of methylphenidate and amphetamine/lisdexamphetamine is slightly different and these drugs affect some neurotransmitters differently, Webb (2015) suggests that dexamphetamine/lisdexamphetamine may be of more benefit for executive function than methylphenidate when the substantia nigra (dopaminergic neurons) has been severely affected by the injury. This is an interesting hypothesis, but there are no clinical trials to test it. In clinical practice, it may be worth considering amphetamine or lisdexamphetamine or another medication if attention and impulse control do not show improvement with methylphenidate and educational measures.
- *Depression, anxiety, post-traumatic stress disorder, obsessive compulsive disorder*, and psychosis can follow acquired brain injury. Psychological and pharmacological interventions may be the same as in children without acquired brain injuries, but there are no randomized controlled trials. In the absence of randomized controlled trials, care must be taken with dosage of medication and titration if pharmacological intervention is considered necessary. In general, it should be started in a lower dose and titrated at a slower pace than in children who have not had brain injuries. In adults, SSRIs have been shown to be effective in the treatment of depression following ABI (Yue et al. 2017).
- *Abulia/apathy/diminished motivation*: Lack of emotional reaction and lack of drive and apparent lack of concern or thought about these issues have to be distinguished from depressive disorder. The pathophysiology of disorders of decreased motivation is thought to be related to many neurotransmitters, especially dopamine, so drugs that enhance dopamine release or reduce its re-uptake might be useful. Findings in adults have suggested that stimulants are helpful. Some research with adults has suggested use of bromocriptine, or levodopa/carbidopa (Spiegel et al. 2018).
- *Sleep problems*. For chronic problems with sleep that have not responded to behavior management, melatonin may be useful for those with delayed sleep phase syndrome. Daytime sleepiness can be a problem and stimulants can then be useful.

- *Problems with impulse control and aggression.* These symptoms may be part of ADHD but sometimes may present by themselves. There are no studies that look at the pharmacological management of these symptoms in children with acquired brain injury. Bates (2006) talks about "intermittent explosive disorder" and suggests that stimulants may be useful. It would seem reasonable to think that if the aggression is related to lack of impulse control, it may improve with stimulants; however, stimulants may increase irritability. When used the dose and response need to be monitored very carefully. Drawing on the literature on adults, the possibility of using carbamazepine, risperidone, and lithium is mentioned.
- Sexual disorders, sexual preoccupation, and hypersexuality are not common and have to be distinguished from social disinhibition, which may be a result of poor impulse control and lack of social awareness.
- Other possible pharmacological treatments:
  - Amantadine use in children following TBI was reviewed by Williams (2007). There were five trials targeting different symptoms. They all reported positive results. Williams concluded that the efficacy of amantadine was greater for patients who had a recent head injury (less than 1 year) and whose symptoms included decrease in alertness. One study found improvements in parents' report of executive function. There has been a small trial of amantadine in the treatment of cognitive concussion symptoms, but a review of medications used to treat concussion by Halstead (2016) concluded that there was not enough evidence to promote its use.
  - Medication has been used in adults to improve cognitive function. Scher et al. (2011) discussed the use of various medications (bromocriptine, amantadine, etc.) in adults, but there are no appropriate studies or randomized controlled trials in children. They also looked at the randomized controlled trials in adults of methylphenidate to improve attention and processing speed after TBI and reported good results.
  - SSRIs have been used for adults who suffer from pseudobulbar affect, and recently the Food and Drug Administration has approved Nuedexta (commercial name of dextromethorphan hydrobromide and quinidine sulfate) for adults with pseudobulbar affect.

Psychological Interventions for Emotional Difficulties

Emotional support from family, education, and health professionals can be invaluable for children to adapt to the new situation.

There have been some concerns about the usefulness of individual psychological therapies for emotional problems when children suffer from memory and other cognitive difficulties.

For people over 16 years old who have had a brain injury, Gallagher et al. (2019) have reviewed modifications needed when using psychological therapies. They include: shortening the sessions and providing breaks when patients have attention problems, incorporating visual resources, and using short questions. A direct, structured approach may be needed if the patient has executive function deficits, focusing

on concrete examples if patients have problems with cognitive flexibility, memory aids, etc.

For adults with anxiety and depression following brain injury, some evidence exists for adapted CBT (Ponsford et al. 2016). However, a Cochrane review of non-pharmacological treatments for depression in adults with brain injury (Gertler et al. 2015) could not find any intervention (CBT, or mindfulness vs. no treatment vs. CBT and supportive therapy), which was significantly better than others. They did not find studies in children.

In the absence of an evidence base, clinicians have to adapt the treatments to each individual patient, agree goals, and regularly assess symptomatology.

Conclusion

A brain injury can have a devastating effect on the life of a child and many of the injuries are preventable. It is essential that governments promote and fund preventive measures and that individuals become aware of their own responsibilities in prevention of injuries. Following the acute treatment of the injury, most rehabilitation takes place at home and at school, so services should be family centered and educators should have information and facilities to promote the child's rehabilitation and wellbeing.

Brain injuries are a prime example of body and mind interaction; there is a need for psychological and physical services to work together and integrate their approach management plans to suit the child.

Neuro-behavioral difficulties are frequent following brain injury. A proportion of children who sustain a head injury may have had symptoms or disorders prior to the injury. Following the injury, these may increase or the child may have a new difficulty. Following moderate-severe brain injury over 50% have a psychiatric disorder, with organic personality change, ADHD, and depression being frequent. A thorough assessment is necessary and should be repeated periodically as new problems may become evident as the child grows older. It is important to pay attention to all aspects of the child as a person and the environment and formulate a comprehensive management plan.

A few treatments have been shown to be effective to treat some symptoms; more research is needed to find treatments which help to ameliorate the consequences of the injury.

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Part VII

Prevention, Treatment, and Services

Family Work in the Community and CAMH Care System

29

Bhoomikumar Jegannathan

Contents

Abstract

Engaging with the families is of paramount importance in CAMH care settings. The families bear the burden of care due to dearth of professionals and meager resource allocation to CAMH services, particularly in the LMICs. The global mental health movement and the health policy advocates propose the Western model of distress and mental illness as a dominant paradigm to the neglect of the family that is deeply rooted to the society, religion, and culture. New ways of helping and evidence-based solutions could be offered by giving voice to the families through research, policy, and practice that reflects the sociocultural milieu in which children and families live. Improved knowledge and understanding of child rearing practices and belief systems of families across diverse ethnic

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communities, faiths, traditions, and cultural beliefs will enrich the field of child and adolescent mental health.

Keywords

Empowering · Prevention · Integration · Resource allocation · Displaced persons · Grandparents

Introduction

Child and adolescent mental health (CAMH) problems are of concern worldwide. The fact that 50% of mental health disorders commence by the age of 14 and 75% by the age of 24 underscores the importance of investing on child and adolescent mental health, a global priority (Lu et al. 2018). Though the strategies for mental health promotion, prevention, and treatment among children and young people are well documented, the gap between the service need versus availability remains wide due to funding constraint, misplaced priorities, and lack of well-designed family engaged services. Developing child and adolescent mental health (CAMH) services with a life-course perspective and an emphasis on family involvement at the primary care level may reduce the risk factors for CAMH problems (Kieling et al. 2011). The family's belief system related to mental illnesses, causes, and therapy has significant impact on help seeking behavior and outcome of the therapy. It is important to understand the role of families in promoting child development and mental health and the challenges faced by them in the presence of sociocultural transitions and shifting family priorities in the era of globalization and digitization (Patole 2018; Timimi 2005). This chapter focuses on understanding family work with a health system perspective, families as agents of change, theory of change framework, and family empowerment to address burden of care and mitigating the impact of migration and climate change on the mental health of children and young people.

Understanding Family Work with Health Systems Perspective

Families living in impoverished conditions in the rural areas of low- and middle-income countries (LMICs), middle-income urban settings as well as in developed economies face challenges leading to compromised childcare, development, and mental health outcomes. Promoting parenting practices and providing social support may enhance resilience among the families that face adverse psychosocial situations. Traditionally, the family therapists focus on the family structure, child's position within the family, and how the dynamics of relationship between family members influence the onset and maintenance of the mental health problems in children and young people (Fig. 1a). The transferability and applicability of the conventional family therapy model to non-Western cultures where the individuals view

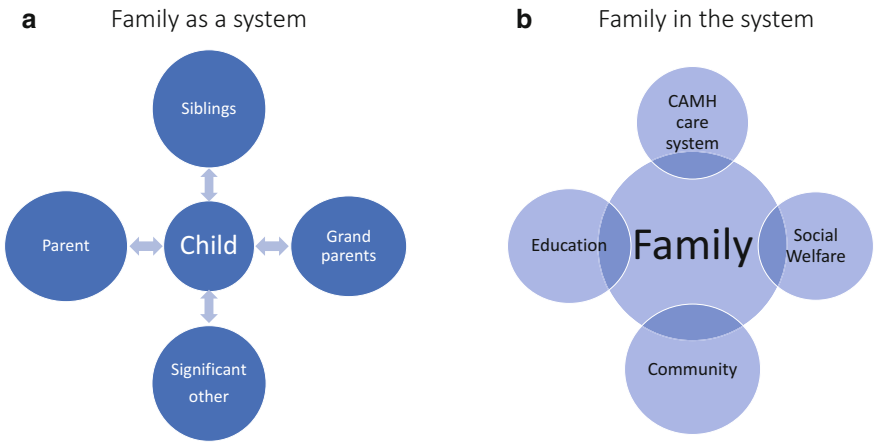

Fig. 1 Family as a system, and in the CAMH care system

themselves as part of the family and larger community rather than as "self-contained individual" need to be carefully considered (Quinet et al. 2015). The families as part of the microsystem within the communities have the potential and responsibility to demand quality CAMH care and services from the service providers in the educational, health, and social service sectors that constitute the mesosystem (Fig. 1b). The family unit being the proximal and fundamental social system influences child development and mental health and is the most valuable resource to bring about attitude and behavior change and promote resilience at individual, family, and community level (Bhana and Bachoo 2011).

Community-based primary and secondary prevention programs, integration of mental health services with the existing primary health care system, task-sharing, and stepped-up care model are seen as the key strategies to improve access to sustainable cost-effective quality care for children and young people with mental health problems (Patel et al. 2007). Families have a crucial role to play in improving the mental health services across the levels of health care system, as agents of change, and family therapists need to acknowledge the growing trend of the global mental health movement and the shift in family work with health systems perspective (Patterson et al. 2018b).

"Stepped-Up Care Model" and Families as "Change Agents"

The corner stone of stepped-care model is the "low-intensity intervention" such as psychoeducation that can be given at the community level by caregivers or mental health volunteers who routinely monitor the child's growth and development. When the families actively work with the volunteers for child development or lay health workers in the community, they gain the knowledge on normal child development and deviation and become the agents of change in the community.

Families as "Attitude, Behavior-Change Makers" at the Community Level

There are many barriers that hinder individuals from seeking appropriate mental health treatment. It is important to take into account the prevailing stigma, cultural notions, and attitudes towards mental illness within the communities while considering family work, particularly in LMICs (Nikapota 2009). In many traditional pre-industrialized societies, families tend to hide the children with mental illness due to the stigma attached to the condition and the apprehension that the families might be seen as "cursed," inadequate, or even responsible for the illness, a "self-stigmatizing attitude" (Mukolo et al. 2010). While the strong family ties in LMICs make for significant social support, the family's misconceptions and beliefs about supernatural spirits and their influence on human behavior and emotions can be an obstacle for a person with mental illness to seek help. In emerging economies such as Cambodia and India, the widespread belief that mental illness is a divine retribution to the negative deeds in past life (Karma) further adds to the stigma and shame leading to discrimination, neglect, and reluctance to seek help (Charles et al. 2007; van de Put and Eisenbruch 2004). Families can play a key role in awareness raising and attitude change in the communities, resulting in de-stigmatization and enablement of access to appropriate services to children with CAMH problems. When parents, caregivers, members of the extended families, and the community come together to overcome the stigma and shame and demand quality of service, the accountability at various levels of care improves (Fig. 2).

Integration of CAMH Services at Various Levels of Care and Role of Families

Families find it difficult to cope with their children's emotional and behavioral problems while seeking help at the primary, secondary, and tertiary levels of care and tend to drop out of the CAMH care system due to professional attitudes towards children with mental illness. To improve the utilization of services by children and

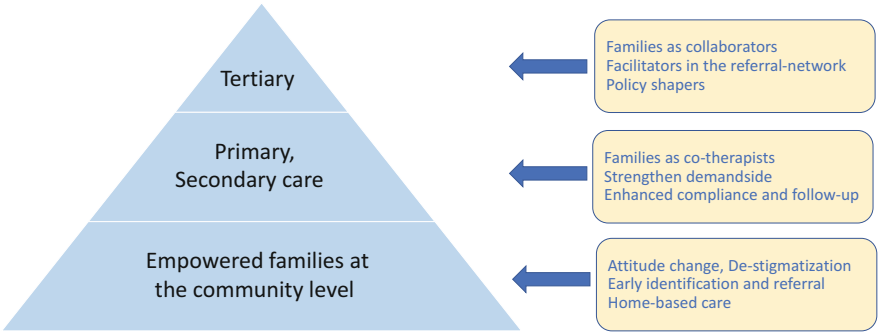

Fig. 2 Family engaged stepped-up care model

young people with mental health problems, it is therefore necessary to understand the kinds of "professional and institutional attitudes and practices that communicate shame" that leads to shunning of services by young people and their families (Heflinger and Hinshaw 2010). The service providers may lack motivation and interest to help children and young people with mental health problems due to stigmatizing attitudes, lack of competency, overwork, and poor institutional support, particularly at the primary care level. When there is structured on the job-coaching by CAMH professionals from tertiary level institutions on a regular basis with the objective of task-sharing and integrating CAMH services into the ongoing maternal child care programs, there is increased acceptance and willingness on the part of the primary healthcare providers (Alfredsson et al. 2017). This enhances the feasibility of integrating mental health services at the primary health care level provided the families have trust and confidence on the competency of services providers not only at primary level but also at other levels of care (Fig. 2).

Empowered Families as Co-therapists and Collaborators at Tertiary Level

The families find it a challenge to provide optimal care for children with neurodevelopmental disorders (NDDs) and mental health problems as their situations can be complex, particularly when there are comorbidities such as challenging behaviors and seizures. This warrants coordination and collaboration between many disciplines and service providers, more so at the tertiary care level. Families often fail to grasp the complexity of the situation, find it overwhelming, and drop out of the CAMH care system. Empowering the families to communicate with several professionals in the care system could ease the stress of coordinating the different services. But equally important is to bring in health system reforms where multidisciplinary services are co-located within the same premises and integrated care services are offered with a child developmental perspective (Paton and Hiscock 2019). There are frictions and challenges in collaboration between professionals and families in the health care system not only in resource-poor settings but also in advanced and well-developed systems of care in high-income countries (HICs). Families might have varied experiences of negotiating with the service providers, given the hierarchy and the top-down nature of relations between the service provider and families in the health system (Fig. 2). Collaboration and partnership between professionals and between professionals and service users may enable the families to make best use of the CAMH care system (Odegård and Bjørkly 2012). Collaborative, integrated care models for young people with depression and substance abuse has been attempted successfully in high-income countries by the primary healthcare providers with built-in algorithm to facilitate referral and consultation process at specialty services. Tertiary-level care givers when co-located at the secondary-level care, even if periodically, might improve the overall outcome of care, provided the funding for additional clinical resources is ensured and families are motivated and engaged to play an active role within the CAMH care system (Rousseau et al. 2017).

Family Work Within the Health System: A Theory of Change (ToC) Framework

Theory of Change (ToC) is a "logic model" and a tool to enable cross-agency service planning, implementation, and evaluation in which the causal pathways that lead to the outcome are made explicit. ToC framework has been used to develop sustainable services for children with emotional behavior disorders which are complex problems, often with comorbidities needing multi-agency collaboration (Breuer et al. 2018). Initially developed by evaluators working in education and development sectors, this approach has been used in public health research, mostly in high-income countries. ToC has also been used for interagency planning for youth at risk in high income as well as LMICs (Hernandez and Hodges 2006).

The Fig. 3 illustrates the ToC map for development of CAMH care settings with the family as the fulcrum for service planning, demand, and referral process from the community through other levels of care. This map outlines the input, process, output, the outcome, and enhanced care for children and young people with neurodevelopmental disorders and mental health problems as the long-term impact. It is important to engage with families at the community level through a series of workshops with the objective of awareness raising and program planning through a consultative process to integrate CAMH services at all levels of care (Hailemariam et al. 2015; Olin et al. 2010). The ToC with families as the backbone of CAMH service setting is conceptualized around the notion that families' understanding of their child's condition leads to family empowerment (input) which enables them to engage with peers and mental health professionals (process) leading to improved service provision for the children and young people with neurodevelopmental and mental health problems (output). This results in reduced stress and strain among families and caregivers (outcome) and ultimately (long-term impact) children and young people receive enhanced quality of service and experience better quality of life (Fig. 3). The ToC map may seem to oversimplify the "complex system of multiple causal pathways" across three levels of the health system. However, at each level there are carefully designed intervention packages that the family, caregivers, and mental health service providers may have access to in order to make the system functional and effective: a manualized mental health awareness and early detection package at community level, a psychosocial treatment package for children as detailed in the WHO mhGAP manual for primary care level in resource-poor settings. This manual needs to be adapted to countries' respective situations depending on the available resources, evidence, feasibility, and acceptability in order to strengthen the health system related to CAMH (Keynejad et al. 2018).

The theory of change model not only lists the specific outcomes, processes, and activities at various levels, but also highlights the assumptions and principles that underlie the coordinated planning process. This serves as a blueprint for family engagement at all levels, in a step-by-step manner taking into account the shared beliefs of the families and other stakeholders in the system. Overall there are built-in logical connections between the families, communities, and the service providers

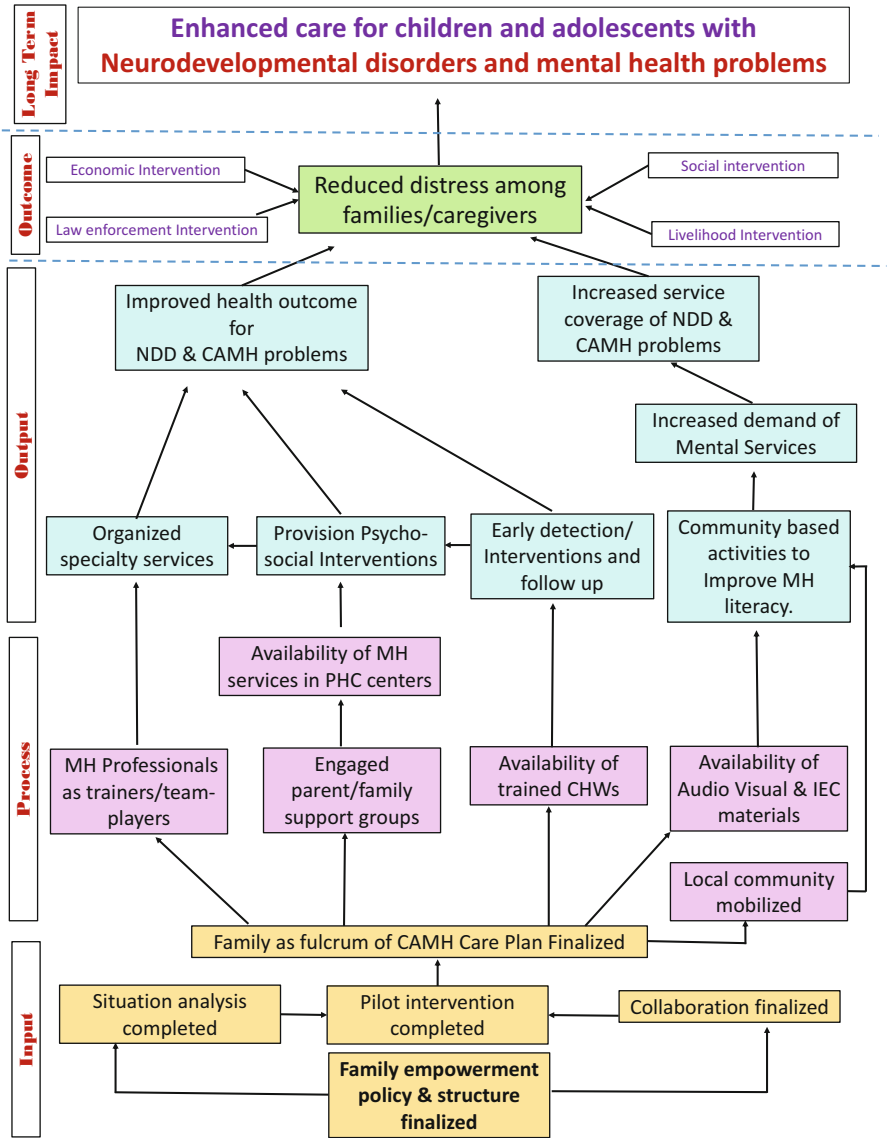

Fig. 3 ToC framework with the family as the fulcrum of CAMH care system

who are actively engaged to bring about desired outcome, as the strategies that need to be undertaken are clearly outlined. When empowered, the families take active part right from the community (primary) level up to the institutional (tertiary) care level, ensuring quality care within the CAMH care setting.

Family Empowerment to Address Burden of Care

Families across the cultures, either from developed or emerging economies, are burdened by the care-giving role, repeated referrals, poor understanding of the child mental health problems, and health system unresponsiveness and indifference. In USA, 28% of the families with children with mental health problems reported significant family burden (Houtrow and Okumura 2011). The burden of care, stress of parenting, and mental health problems among the families of children with autism spectrum disorder and developmental delay are significantly high in Cambodia (Sok et al. 2018). When the parent support groups come together to benefit from group interventions delivered by community-based mental health or child development workers, there is reduced stress level among the families and increased participation in the CAMH care system (Dykens 2015). The focus of community-based family interventions could vary depending on the activities that are aimed at strengthening the different tiers of health care systems. At the primary level, building relationships with families of children with NDDs and mental health problems based on mutual understanding and empathy places them in the role of a collaborator rather than a passive service recipient. It is important to focus on the strengths of caregivers and assist them to identify community resources to establish early intervention programs, as well as to reframe expectations towards children's growth and developmental trajectories rather than a "quick-fix medical cure." Self-help groups, parent support groups, and networks among the families burdened by the challenges of migration, poverty, and related psychosocial stressors may alleviate the feeling that they are alone. This might have a turn-key effect, roping in other families into the network (Murthy 2003).

Mitigating Impact of Migration and Climate Change Disasters

About two million people are displaced in the backdrop of armed conflict, environmental degradation, and climate change-related disasters of which the majority are young people in the age group of 15–24. The refugees experience significant distress leading to anxiety, depression, posttraumatic stress disorder, and psychotic breakdown. Many of them are separated from their families that had been a strong support system in their country of origin, the absence of which makes them vulnerable to mental health problems and substance abuse disorders. There is potential for family work among the refugees to address the mental health concerns of displaced persons either due to external or in-country migration (Patterson et al. 2018a). Family-focused interventions where group of parents with similar concerns come together regardless of the child's diagnostic label to tackle the challenges might provide relief to the parents who are challenged by climate change-related disasters and imminent migration. In emerging economies such as Cambodia, China, and India, millions of children are left behind in rural areas by their parents when they migrate to cities in search of jobs to make a

living. Many of the "left-behind children" have significant level of mental health problems such as emotional and conduct problems, hyperactivity, and communication challenges (Wang et al. 2019). This may have long-lasting impact on the family as a system. Innovative family work that involves grandparents may mitigate the negative effect, as most often grandparents are the caregivers who fill-in the place of parents (Aryal et al. 2019). The role of grandparents as caregivers for children with NDD and mental health problems in the rapidly transforming family systems due to either internal or external migration is an area of potential research.

Children, young people, women, and elderly are the most vulnerable among the population and are often disproportionally affected by drought, floods, forest-fires, storms, and other climate change-related disasters. It is prudent and necessary to involve the parents, siblings, close friends, and the extended family and the community, the microsystem in which the child lives, to plan disaster preparedness, provide emotional support and other emergency relief measures (Pfefferbaum et al. 2012). The families could play an active role in shaping the behavioral responses in the community by delivering packages of psychoeducation and information, education, communication campaigns during complex mental health situations following disasters (McDermott and Cobham 2014).

Innovative family work among HIV-affected families in LMICs such as the Family-Strengthening Intervention (FSI) have enhanced parenting skills, improved communication within the family, problem-solving skills, and pro-social behavior among children and young people (Betancourt et al. 2014). This model can be adapted to other chronic problems and disaster situations. Novel strategies such as mindful parenting may empower families to deal with the stress and burden of caregiving to children affected by migration, disaster, chronic disorders, and other adverse life situations (Bögels et al. 2010).

Conclusion

Engaging with the families is of paramount importance in CAMH care settings. The families bear the burden of care due to dearth of professionals and meager resource allocation to CAMH services, particularly in the LMICs. The global mental health movement and the health policy advocates propose the Western model of distress and mental illness as a dominant paradigm to the neglect of the family that is deeply rooted to the society, religion, and culture. New ways of helping and evidence-based solutions could be offered by giving voice to the families through research, policy, and practice that reflects the sociocultural milieu in which children and families live. Improved knowledge and understanding of child rearing practices and belief systems of families across diverse ethnic communities, faiths, traditions, and cultural beliefs will enrich the field of child and adolescent mental health.

Cross-References

- ▶ Education in Mental Health
- ▶ Services for Neurodevelopmental Disorders such as Autism Spectrum, Attention Deficit Hyperactivity Disorder (ADHD), and Tic Disorders

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Mental Health in Schools

30

Tamsin Ford and Katie Finning

Contents

Abstract

Schools are a key forum for mental health prevention and intervention. Childhood mental disorder can lead to reduced attendance at school, increases the likelihood of exclusion and dropout from school, and can impair academic attainment. Stressors specific to the school environment, such as bullying, poor relationships with peers or teachers, and stress relating to academic performance, can also

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adversely affect mental health. Various models of school-based mental health screening exist, including universal or targeted use of questionnaires, teacher nomination, and use of routine data such as attendance or attainment. Schools provide an ideal setting within which to deliver mental health interventions, which may take the form of universal interventions delivered to whole schools, targeted or selective interventions provided to individuals deemed at risk of developing problems, or indicated interventions for those already experiencing symptoms. Many high-income countries are turning towards a multitiered approach, combining universal interventions for all pupils with targeted or indicated interventions to those in need. Despite the increasing interest in school-based interventions, many questions remain. We do not yet know the conditions under which these interventions work best, who they work for and why, how the effectiveness of different interventions compare, or whether their benefits continue long term. Prevention and intervention may reduce the burden of mental ill health, alleviate distress, and improve children's functioning, a possibility that should keep us all focused on improving our practice and the evidence that it is based on.

Keywords

School · Attainment · Academic · Exclusion

Introduction

Given the impact of poor mental health on academic outcomes (Deighton et al. 2018; Panayiotou and Humphrey 2018), and the regular and longitudinal contact schools have with children and their families, schools are necessarily a key forum for mental health prevention and intervention (Fazel et al. 2014). Indeed, population-based surveys repeatedly demonstrate that teachers are the most commonly reported "service" contacted about mental health in the UK (Ford et al. 2007; Mandalia et al. 2018; Newlove-Delgado et al. 2015). Close collaboration between health- and education-based practitioners is therefore essential to support the mental health of children and young people, particularly those who struggle to cope with school. In this chapter, we summarize mental health issues in the school setting and describe school-based interventions.

How Does Childhood Mental Disorder Impact School?

Poor mental health can lead to reduced motivation, impaired concentration, lack of energy, and impaired relationships with peers and teacher as well as somatic symptoms and poor attendance. All of these can impact on a child or young person's ability to cope with school, and resulting adverse consequences can then further undermine their mental health.

School Attendance

Historically, problems with school attendance have been categorized into two groups: *school refusal*, referring to students who miss school due to emotional distress, and *truancy*, referring to those who are absent due to lack of interest in school or defiance of authority. However, given the frequent comorbidity between internalizing and externalizing difficulties, and emerging evidence that school refusal and truancy can co-occur, many researchers are calling for the use of broader terms such as "absenteeism" or "problematic absence," which make no assumptions about the underlying etiology of the problem (Kearney 2008; Pellegrini 2007). In reality, there remain a variety of terms used to describe school attendance problems, and there is little consensus about measurement, which complicates the literature and makes comparison of studies difficult.

Given that truancy is listed as one behavior that might indicate conduct disorder in both the International Classification of Diseases and the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, the association between problematic attendance and behavior problems is hardly surprising. Teacher reports in a recent large population survey in England indicated that children with conduct disorder (11.2%) were the most likely to have ever truanted, and children with no psychiatric disorder the least likely (0.8%; Mandalia et al. 2018). That children with emotional disorder (9.7%) were more likely to be truant than those with ADHD (5.5%) and less common disorders (4.1%) emphasizes the importance of not assuming that truancy relates to disruptive behavior exclusively.

Depression, anxiety, and internalizing difficulties are consistently associated with poor school attendance across a variety of settings, cultures, and ages (Finning et al. 2019, 2020). These findings generally hold true regardless of the precise terminology and method of measuring attendance, although the strongest associations are observed in relation to truancy. Depression in particular greatly increases the risk of unauthorized absence. A recent systematic review also suggests associations between poor attendance at school with both self-harm and suicidal ideation (Epstein et al. 2019). It is important, therefore, that clinical and educational professionals are aware that poor attendance, particularly if a change in the pattern of attendance, may signify an underlying emotional problem as well as externalizing difficulties, regardless of the "type" of nonattendance.

School Dropout

School attendance can be considered as a continuum between perfect attendance and school dropout. Poor mental health, including depression, anxiety, and internalizing difficulties, is associated with an increased risk of school dropout (Esch et al. 2014; Riglin et al. 2014). Once again, the evidence suggests that depression is a particularly strong risk factor, and this association is independent of any externalizing difficulties; the elevated risk of school dropout among the latter group will surprise a few. A study of Canadian adolescents demonstrated that nearly one in four young

people who had dropped out of school had clinically significant symptoms of depression in the 3 months prior to leaving school (Dupere et al. 2018). Anxiety, particularly social anxiety, is also associated with an increased risk of school dropout (Esch et al. 2014). There is little evidence, however, that emotional disorders increase the risk of school dropout in the longer term, and the risk appears to subside once young people are symptom-free. While it is reassuring that such effects are unlikely to endure long term, these findings further emphasize the need for timely identification and intervention for mental health difficulties, in order to minimize adverse educational consequences.

Exclusion from School

Exclusion from school, whether fixed-term (suspension) or permanent (expulsion), is sadly commoner among those with special educational needs and psychiatric disorder (Parker et al. 2015, 2018). Prospectively collected population data from the UK suggests that children with psychiatric disorder are more likely to be excluded than those without, and children with conduct disorder or ADHD are more likely to be excluded from school than children with other disorders (Parker et al. 2018). Children with recognized disorders were more likely to be excluded than those who met diagnostic criteria without raising the concern of a teacher or parent, as well as those with subclinical difficulties whose problems were recognized by the adults around them. This suggests a failure to successfully support such children to cope with school, rather than a failure to identify poor mental health. Moreover, there was a bidirectional relationship between exclusion from school and mental health, emphasizing the adverse impact that exclusion from school may have (Ford et al. 2017).

Academic Attainment

Depression and internalizing difficulties are associated with reduced academic attainment in the short term, although it is unclear whether these impairments persist longer term (Panayiotou and Humphrey 2018; Riglin et al. 2014). The relationship between anxiety and academic attainment may depend on important individual and contextual factors. Riglin et al. (2014) found that while anxiety is associated with lower grades in European and Asian countries, it is linked to *better* grades in studies conducted in the USA. Likewise, there is evidence that anxiety is associated with lower grades for older adolescents but not for children or younger adolescents, which may reflect the increasing demands and pressure of academic work as pupils' academic careers progress. In some circumstances, anxiety may occur as part of an adaptive response to stress and has the potential to increase motivation. It is important, therefore, that professionals working with young people with emotional disorders consider the impact of individual and contextual factors when assessing potential impairments to academic attainment.

A longitudinal cohort study conducted in the UK demonstrated that each additional inattentive symptom at age 8 predicted a 2–3 point reduction in General Certificate of Secondary Education (GCSE) scores at age 16 (Sayal et al. 2015). Children meeting diagnostic criteria for ADHD were twice as likely to fail to obtain five good passes (27–32 point reduction in GSCE scores), which was independent of the presence of comorbid behavior disorder. The latter was associated with similar reductions in attainment. Similarly, teacher assessment suggests that children in Australia who were on the autism spectrum were much more likely to underperform relative to their ability compared to peers with dyslexia or no special educational needs, which seemed to be due to a higher proportion who struggled to maintain their attention and regulate their emotions (Ashburner et al. 2010).

Intellectual disability predicts the persistence of conduct disorder, perhaps due to impaired learning (Ford et al. 2017), while children who struggle academically have elevated rates of psychopathology (Trzesniewski et al. 2006), educational and occupational failure, criminality, and substance misuse (Ramey and Ramey 1998). Evidence that the association between reading difficulties and disruptive behavior is mediated through environmental influences suggests that intervention may improve both mental health and educational outcomes (Trzesniewski et al. 2006). Even for the academically able, the pressure to attain can represent a significant stressor that may respond to cognitive behavioral strategies, with improved academic attainment as well as mental state (Keogh et al. 2006).

Many mental disorders reduce the ability to focus and sustain attention, or impair social relationships, both of which are likely to impact a young person's ability to engage with schoolwork and compromise learning, sometimes described as adjustment erosion (Moilanen et al. 2010). Alternatively, the struggle to cope with school among those with poor academic abilities may lead to low self-esteem and distress to poor mental health (Moilanen et al. 2010; Deighton et al. 2018). Equally, there are shared risk factors for both mental disorders and educational outcomes, such as socioeconomic deprivation, that might explain why many children experience both (Mandalia et al. 2018; Moilanen et al. 2010; Deighton et al. 2018). There is remarkably little longitudinal research in this area. Two large cross-lagged studies demonstrated strong continuity of academic attainment, internalizing symptoms, and behavioral problems as well as cross-sectional associations between all three at baseline line (Deighton et al. 2018; Panayiotou and Humphrey 2018). Behavioral problems at baseline predicted poorer subsequent academic attainment, only in boys in the study with sufficient numbers to stratify their analysis by gender (Panayiotou and Humphrey 2018). Neither study demonstrated the reverse association once shared risk factors were controlled for. In contrast, poor academic attainment only predicted later internalizing symptoms among primary school children, and internalizing symptoms only predicted poor academic attainment in one study (Deighton et al. 2018).

What then are practitioners to recommend? We do not as yet have evidence that effective mental health interventions improve educational outcomes, intuitive as that seems. More research is clearly needed, and it seems imperative that mental health interventions routinely include educational outcomes to further explore this

important relationship. Too high or too low academic expectations are potentially detrimental, and given the high levels of comorbidity between learning disability and mental disorder, checking academic ability and ensuring that special educational needs are adequately addressed when children present with school-based problems are essential. As poor school attendance also negatively impacts academic attainment, steps to encourage attendance and provide support to catch up time missed due to ill-health are also important practical measures to take.

School-Specific Stressors with the Potential to Undermine Mental Health

More than a third (36.2%) of 11–19-year-olds in England reported having experienced bullying over the previous year (Marcheselli et al. 2018). A regrettably common experience, bullying predicts depression, anxiety, psychosomatic symptoms, eating difficulties, self-harm, and suicide into adulthood as well as lower educational attainment (Arseneault 2018). A recent meta-analysis suggests that the odds of suicidal ideation and suicidal attempts are more than doubled among young people who report peer victimization, and suicidal ideation is commoner among those who report cyberbullying (van Geel et al. 2014). Children with autism spectrum conditions in particular may struggle with the highly social nature of schools, especially at secondary level, and even if they are academically able, frequently become targets for bullying, which may then precipitate comorbid emotional difficulties (Humphrey and Symes 2010).

Poor peer relationships predicted the persistence of ADHD and anxiety disorders and had a marginal association with persistent conduct disorder over 3 years in a population sample from the UK (Ford et al. 2017). Teacher-pupil relationships are similarly important predictors of child mental health (Lang et al. 2013) and may improve with classroom management training for teachers (Hayes et al. 2019).

Poor academic performance itself can lead to emotional distress (Deighton et al. 2018), and young people may find themselves in a negative spiral of emotional ill-health and poor educational outcomes. Reduced attendance and attainment, as well as exclusion and school dropout, are all associated with a variety of long-term adverse effects including low income, unemployment, mortality, and poor health (Mirowsky and Ross 2003), highlighting the importance of early identification and intervention.

Despite increasing interest across the world in school-based mental health prevention and intervention (Fazel et al. 2014, 2016), there is surprisingly little research into school-level influences on mental health. Most studies are cross-sectional and suggest that school-level characteristics explain a small but significant amount of the variance in mental health after adjusting for individual-level characteristics (Modin et al. 2018; Wang et al. 2018; Prati et al. 2018; Dunn et al. 2015). Two studies, one following a longitudinal cohort into midlife, suggest that school-level characteristics have a stronger influence on mental health than neighborhood (Dunn et al. 2015; Dundas et al. 2013). There is some tentative evidence that standing out in your

school or neighborhood in terms of socioeconomic status or ethnicity may predict poorer subsequent mental health (Zammit et al. 2014). Schools may not be able to alter the social context in which they operate, but knowledge of associated risks could assist targeted support. In addition, some school-level operational features, such as school connectedness, pastoral care, or school climate, might be directly influenced at school level.

The Identification of Mental Disorder in Schools

Various models of mental health screening or school-based needs assessment exist, which include the universal or targeted use of questionnaires, teacher nomination, and the use of routine data such as attendance or attainment. Two linked systematic reviews indicate that there is a little evidence for the feasibility, effectiveness, and cost-effectiveness of school-based screening programs and a need for rigorous evaluation (Anderson et al. 2019; Soneson et al. 2018). Mental health screening may have adverse as well as positive effects that warrant systematic research. Care is needed to ensure that young people, parents, and school staff understand that no screening method is completely accurate, to handle consent and confidentiality with sensitivity, and to ensure that those identified are offered appropriate support (Anderson et al. 2019; Fazel et al. 2014; Soneson et al. 2018).

School-Based Interventions for Mental Disorder

Schools arguably provide an ideal setting within which to deliver mental health interventions. Young people spend a great deal of time at school, and school-based services can reduce disparities in access to mental health services, normalize help-seeking, and increase uptake of interventions (Humphrey 2018). However, school-based interventions may increase the risk of stigma due to visibility of help-seeking to teachers and peers and are not acceptable to all (Fazel et al. 2016). Pupils experience complex dynamics in the school environment, in which peers can be both a source of emotional support and a source of stigma, negative labeling, and even bullying (Gronholm et al. 2018). In order to be successful, school-based interventions need to fit in with the schools' ethos and culture and require commitment and engagement from school staff. Furthermore, fitting interventions into a regular school timetable can be challenging (Stallard 2013).

A comprehensive review of all evidence-based school-based interventions is beyond the scope of this chapter, but we provide an overview.

There are three main approaches to school-based mental health interventions:

1. Universal
   Whole-school or class approaches in which interventions are provided to all pupils, with the primary aim of preventing mental ill-health or promoting mental health

2. Targeted/selective
   Interventions that are provided to individuals deemed at risk of developing mental health difficulties, with the aim of preventing the onset of disorder
3. Indicated
   Interventions provided to pupils who are already experiencing symptoms of a mental health disorder, with the aim of reducing symptoms and preventing secondary difficulties from arising

Universal interventions offer good coverage and may be perceived as less intrusive and less stigmatizing than targeted or indicated interventions. However, they can be difficult to implement and require strong school engagement and commitment, and effect sizes are typically small (Greenberg and Abenavoli 2017). On the whole, school-based interventions tend to show greater impacts for children who are experiencing more severe distress or mental disorder compared to those with milder difficulties (Greenberg and Abenavoli 2017). The population influence of universal interventions may be differentiated across subgroups, with the same intervention acting to promote well-being for some, while preventing deterioration or actively treating others. Small population effects, therefore, do not necessarily demonstrate lack of effectiveness (Greenberg and Abenavoli 2017). Targeted and indicated interventions tend to produce greater effect sizes than universal approaches, but they rely on accurate identification of pupils in need and may be stigmatizing for those that receive them (Gwernan-Jones et al. 2016).

Many high-income countries are turning toward a multitiered approach, combining universal preventative interventions delivered to the whole school, with targeted and indicated interventions provided to pupils identified as having additional mental health needs (Fazel et al. 2014; Weare and Nind 2011). The implementation of universal prevention approaches at primary school age has the potential to teach children skills to help them manage their emotions and behaviors and may reduce the likelihood of disorders occurring in later childhood or adolescence. Combined with targeted or indicated interventions at the first sign of difficulties, this approach may have the most potential for promoting positive mental health and minimizing the risk of disorder. However, this requires school staff to be equipped with the knowledge and skills necessary to identify the signs of mental health difficulties and highlights the need for adequate mental health training and support to be provided to educational professionals. Early identification and prompt intervention with children experiencing difficulties are considered key in order to positively impact mental health trajectories (Weare and Nind 2011).

Although there is an increasing interest in school-based interventions, we do not yet know the conditions under which they work best for most mental health conditions; who they work for and why; or how the effectiveness of different interventions compare. We have also yet to establish whether the beneficial effects of many of these interventions on pupils persist in the longer term, and the potential benefits of booster sessions or long-term prevention strategies incorporated into regular classroom activities, have yet to be tested.

Emotional Disorders

The majority of studies that have investigated school-based interventions for the prevention or treatment of emotional disorders have employed a Cognitive-behavioral therapy (CBT) approach, such as "FRIENDS," which is a well-established program that can be delivered either as a universal or indicated intervention. It uses manualized CBT techniques and fun activities to help children identify anxious feelings, identify and replace unhelpful anxiety-provoking thoughts, learn to relax, and face and overcome their difficulties rather than avoid them (Stallard et al. 2014). There is also emerging evidence to support the use of mindfulness-based approaches to reduce internalizing symptoms and promote pupils' self-esteem (Dunning et al. 2018; Maynard et al. 2017), and a large randomized controlled trial to assess the effectiveness of school-based mindfulness training to enhance the mental health and well-being of 12–14-year-olds in the UK is currently underway (Kuyken et al. 2017).

Two systematic reviews of worldwide research on the effectiveness of universal school-based interventions for anxiety and depression have demonstrated that these interventions produce small-to-medium effect sizes when compared to no intervention or school-as-usual (Weare and Nind 2011; Werner-Seidler et al. 2017). These effects occur immediately after young people receive the intervention and for up to 12 months afterward. A systematic review of studies that evaluated the effectiveness of targeted interventions for pupils who are already experiencing symptoms, which included studies conducted in the UK, the USA, Australia, New Zealand, and Germany, concluded that such interventions are effective at reducing symptoms of both depression and anxiety (Kavanagh et al. 2009).

ADHD

The research literature for psychosocial interventions in school for children who have ADHD is plagued by heterogeneous approaches to measurement and outcome selection as well as poor study design, which greatly impairs our ability to understand what is effective for whom (Richardson et al. 2015). Most interventions with an evidence-base are targeted at children diagnosed with ADHD rather than preventative approaches. A recent mixed methods systematic review of 28 randomized controlled trials (25 of which were conducted in the USA) suggested that effective programs combined multiple features, self-regulation, and 1:1 components and, unless they were individualized, did not aim to improve the student's relationships or were delivered in the classroom (Moore et al. 2018). There is also moderate evidence for the use of daily report cards for this group of children (Moore et al. 2018).

Behavioral Problems

Domitrovich et al. (2017) provided an overview of five recent meta-analyses of internationally conducted research on the effectiveness of universal school-based

interventions that aimed to promote socio-emotional competence and build resilience, and concluded that these interventions led to reductions in aggressive and disruptive behavior plus substance misuse, and resulted in improvements in academic attainment and emotional distress that were sustained over two or more years. Importantly, these interventions may be more effective for the most vulnerable children and are cost-effective.

Recent evidence-based guidance for schools about behavior management can be distilled to the following six recommendations: know and understand your pupils and their influences; teach learning behaviors alongside managing misbehavior; use classroom management strategies to support good behavior; and use simple approaches as part of your regular routine (Education Endowment Foundation 2019). The supporting review of behavioral management techniques in schools reveals a surprising lack of evidence for adolescents (Moore et al. 2019). For primary school-age children (4–11 years), training teachers how to positively reinforce desirable behavior and improving teacher-pupil relationships were effective as both universal and targeted approaches (Moore et al. 2019). For children with more severe problems, individually tailored approaches seem most effective. Whole-school approaches provided smaller effects than classroom-based programs, which may relate to difficulties in consistent implementation. Longitudinal studies were limited, but one trial of teacher classroom management techniques in the UK showed an impact on low-level disruptive behavior and concentration that was sustained over 30 months (Ford et al. 2018). Finally, a systematic review of school-based interventions demonstrated a small but significant drop in exclusions from school that attenuated after 6 months; interventions that involved mentoring and teacher training may have had longer lasting effects (Valdebenito et al. 2018).

Who Is Best Placed to Deliver School-Based Mental Health Interventions?

Practitioners from education, health, and sometimes social care may contribute to school-based mental health interventions, but the organization and extent of school-based mental health services vary greatly in the level of integration and coordination across and within countries (Fazel et al. 2014). (Rural vs Urbanized Communities and First World vs Developing World). Mental health specialists may be contracted to provide direct intervention within schools, or they may consult to nonmental health specialists such as teachers and school nurses. Practitioners from an education background will have a comprehensive understanding of the school context but may be constrained to considerations around access to the academic curriculum (Fazel et al. 2014).

Some studies have demonstrated good outcomes with interventions delivered by school personnel as long as sufficient training is provided, and some universal preventative approaches are in fact most effective when delivered by teachers (Sanchez et al. 2018; Weare and Nind 2011). However, other studies that have directly compared interventions relating to anxiety and depression delivered by

school versus health personnel have reported better outcomes when the intervention is provided by health professionals (Werner-Seidler et al. 2017), which may relate to the more health-oriented nature of the condition and perhaps the programs.

Conclusion

While the long-term debate rages about prevalence trends, diagnostic categories, and dimensional approaches (Rose and Day 1990), many children are struggling with poor mental health, and effective school-based interventions could potentially improve functioning across the whole population as well as those currently experiencing difficulties (Huppert and So 2013). Effective prevention or intervention in childhood may reduce the burden of mental ill-health in adulthood as well as alleviate distress and improve children's current level of functioning. This possibility should keep all of us focused on improving our practice and the evidence that it is based on.

Cross-References

- ▶ Burden and Cost Associated with Childhood Bullying Victimization
- ▶ Diagnoses
- ▶ Psychological Treatment of Mental Health Problems in Children and Adolescents
- ▶ Screening Methods and When to Use Them
- ▶ Self-Harm and Suicidality in Children and Adolescents
- ▶ Socioeconomic Inequalities and Mental Health Problems in Children and Adolescents
- ▶ Trends in Child and Adolescent Mental Health Prevalence, Outcomes, and Inequalities

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Education in Mental Health

31

Maite Ferrin

Contents

Abstract

Health is a human right which is closely linked to education and learning. For the past 20 years, the *United Nations Educational, Scientific and Cultural Organization (UNESCO)'s* work has made a stronger emphasis on education and learning in order to promote both physical and mental health worldwide. The *World Health Organization (WHO)* has differentiated between health education and health promotion and defined the second as a more complex process that moves from an individual level toward a wide range of social and environmental interventions that increase knowledge and influence attitudes toward health. Mental health is contributed by a constant interactive relationship between the individual and their environment. In the shaping process of mental and emotional development during childhood and adolescence, education within the family, the school, and the whole community has a paramount influence. This chapter

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focuses on the importance of education in families, schools, and communities and gives examples of successful educational programs and initiatives across the globe. The potential role of education for reducing stigma in mental health and psychoeducation for improving outcomes in different mental health conditions is also discussed. Finally, current barriers for implementation of educational programs are highlighted. A better understanding and effective implementation of the successful approaches for promoting education in mental health seem of greatest importance at this stage.

Keywords

Education · Health promotion · Stigma · Families · School · Psychoeducation · Public mental health programs

Education and Health: Health Education and Health Promotion in the Community

Education is the process of developing our body, mind, and soul through either formal or informal learning. It is considered a basic need and one of the rights of human beings. The purpose of individual education is to enlighten and strengthen the individual, so that they fully develop their skills and capacities. At least up to early adulthood, there is a brain maturational element when both social and academic learning take place. This gives us, at an individual level, a broader knowledge and understanding of the world around us. Education helps us have a more critical point of view about things, which enables us to take decisions in our life (Johan and Harlan 2014). At a group level, education is essential for any kind of society and cultural development. It promotes humanity and facilitates understanding among people with different cultures and backgrounds. Education provides us with the knowledge of health, sanitation, and population control. It also enhances our ability to increase production, protect the environment, and carry out our social responsibilities to improve as a society (Johan and Harlan 2014).

The *United Nations Educational, Scientific and Cultural Organization (UNESCO)* covers all areas of education worldwide. UNESCO's work has evolved over time; in recent years a stronger emphasis on education and learning to promote health has been made, so that education, health, and well-being are now seen as totally interrelated (https://www.who.int/hrh/resources/Ebook1st_meeting_report2015.pdf?ua=1). For instance, evidence shows that educating girls in low-income countries (LICs) can reduce population mortality by 66% (Summers 1992; UNESCO 2010).

Health in turn is also considered a human right. For the past 20 years, the World Health Organization (WHO) has revised its definition of health to stress that health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." The social, economic, and environmental determinants of health are grouped as one of the leadership priorities of WHO in the Twelfth

Global Programme of Work 2014–2019 (http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_6-en.pdf). The social determinants of health are intrinsically linked with *equity*, *social cohesion*, and *poverty reduction*. They have a central role in global health, development, and foreign policy (Detels et al. 2015). Social determinants of health are the conditions in which people are born, grow, live, learn, work, worship, and age. They are determined by the distribution of money, power, and resources at global, national, and local levels, which are themselves influenced by policy choices.

The WHO has defined health education as "any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes" (https://www.who.int/topics/health_education/en/). It slightly differs from health promotion, which is considered as "the process of enabling people to increase control over, and to improve, their health. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions." In this sense, health promotion is a more complex and ambiguous concept and set of practices. It is centered on the values and principles of equity, participation, and empowerment. These concepts were embedded in a health promotion's founding document, the Ottawa Charter for health promotion in 1986 (https://www.who.int/healthpromotion/conferences/previous/ottawa/en/).

A YouTube video showing health promotion and the Ottawa Charter is shown here (https://www.youtube.com/watch?v=G2quVLcJVBk).

Education and Mental Health: Public Mental Health Programs

Mental health is contributed to by complex mechanisms in which genetic contributors are combined with elements arising from both close and more distal environment. The principles of mental health hygiene and the means to promote a mentally healthy society consider a dynamic growth and the constant interactive relationship between the individual and their environment (Wall 1955). There are different opinions over the best means of securing a healthy mental and emotional development during childhood and adolescence. In the shaping process of mental and emotional development, education within the family, the school, and the whole community has a strong influence.

In our society, the broad public health impact and the economic burden of mental health problems are probably not fully acknowledged. According to the WHO, "the economic impacts of mental illness affect personal income, the ability of ill persons – and often their caregivers –to work, productivity in the workplace and contributions to the national economy, as well as the utilization of treatment and support services. The cost of mental health problems in developed countries is estimated to be between 3% and 4% of GNP" (https://www.who.int/mental_health/media/investing_mnh.pdf).

Aware of the potential impact of mental health problems in our society, modern mental health programs in high-income countries (HICs) have tried to improve psychosocial health by addressing determinants of mental health in their public policies. There has also been a heightened interest in the promotion of positive mental health and well-being, and effective primary prevention programs have been developed for promoting mental health in settings such as families, schools, and workplaces. Scientific evidence has shown that many mental disorders are preventable by public mental health interventions. A meta-analysis reviewed 177 primary prevention programs designed to prevent behavioral and social problems in children and adolescents and provided empirical support for these programs in primary prevention, with mean effect sizes ranging from 0.24 to 0.93 (Durlak and Wells 1997). Empirical evidence has also demonstrated that suicide prevention is feasible, effective, and highly cost-effective. Key measures in effective public health suicide prevention programs have also found an increased awareness in the population about mental health and depression (WHO 2010; Haskins et al. 2016).

However, in low- and middle-income countries (LMICs), the gap between the high prevalence rates of mental disorders and the limited access to mental health services has been an ongoing major limitation (Kessler et al. 2007; WHO 2009). In response to this need, the World Health Organization (WHO) launched the Mental Health Gap Action Program (mhGAP, WHO 2008, 2016), with the aim of expanding services for mental and substance use disorders in LMICs. One of the perspectives adopted in the last 10 years is the task-sharing approach, in which mental health care is integrated into the primary health-care setting, and therefore people in need of mental health treatments have easier access to medical services and to specialized care when necessary (Patel 2009). Additionally, the mhGAP program supports training community health workers in taking on limited tasks in the care of people with mental illness, such as case detection, referral to primary care, and providing psychosocial interventions (Keynejad et al. 2018). In addition, WHO has also developed an Intervention Guide (IG) for mental disorders in nonspecialized health settings (WHO 2016) in order to support this task-sharing process. A recent systematic review compiled evidence on the practical implementation of the WHO mhGAP-IG in LMICs and showed promising results (Keynejad et al. 2018).

Education to Reduce Stigma in Mental Health Conditions

Despite these efforts to enhance provision of mental health care in LMICs, and strong evidence indicating their positive results, many people with mental illness still do not receive adequate treatment. Stigma of mental disorders has shown a key barrier for help-seeking behaviors, as well as the development of mental health-care services especially in LMIC (Saxena et al. 2007; Heim et al. 2018).

Stigma can be conceptualized in terms of knowledge (i.e., ignorance or misinformation), attitudes (i.e., prejudice), and behavior (i.e., discrimination, violence, hostility, and human rights abuses) (Thornicroft 2006). Different theories have tried

to understand the different dimensions and effects of stigma. The labeling theory developed by Link et al. (1989) asserts that labeling individuals with, for example, a diagnosis of mental illness may affect their behavior and sense of self. The "why try" effect proposed by Corrigan et al. (2009) is an extension of the labeling theory, which asserts that self-stigma results in life limitation, worsening recovery outcomes, and decreasing self-worth among individuals who experience mental health conditions (Fig. 1).

However, the dominant model of stigma utilized within the literature was proposed by Pryor and Reeder (2011). They suggest that stigma is the result of a complex interaction among individual, interpersonal, and social factors. Their model comprises structural stigma, public stigma, stigma by association, and self-stigma (Fig. 2). Public stigma refers to the negative emotional reactions of individuals toward those who they perceive to hold a stigmatized condition. Stigma by association is the stigma experienced by an individual as a result of their relationship with a person who experiences a stigmatized condition. Structural stigma refers to the ways in which stigma is perpetuated and exacerbated by inequalities due to social ideologies and institutions.

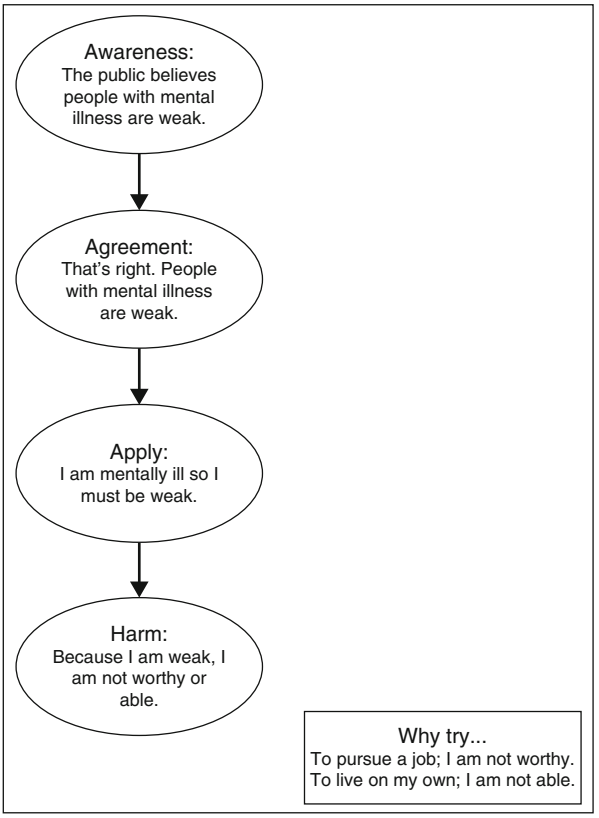

Fig. 1 The why try model of self-stigma (Corrigan et al. 2009)

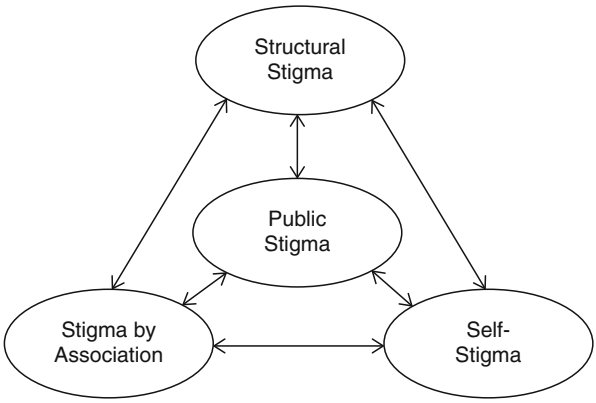

Fig. 2 Model of stigma by Pryor and Reeder (2011)

Finally, self-stigma occurs when people who experience a stigmatized condition internalize the stigma expressed toward that condition in the public sphere and apply it to their own belief set and behavior.

Fortunately, education in mental health has also shown to reduce stigma in these conditions. A large randomized controlled trial, which included 24 high schools and 534 students carried out in Ontario, Canada, demonstrated the effectiveness of an integrated, standardized mental health educational resource for high school students on knowledge and stigma and its potential for broad-based implementation of the educational curriculum in high schools (Milin et al. 2016).

The Role of the Family in Mental Health Education

Family is a crucial element for the child's development throughout their whole life, but especially important during the first years. From early childhood, every growing child has to learn to conform to a series of norms; their ideas of "good" and "bad" are based on what they find to be acceptable or unacceptable to the adult world around them (Wall 1955). However, because of the importance of the family during the first years, there has been a tendency to concentrate attention and support on the educative activity of the parents of the very young children. This tendency has led to neglect the middle and late childhood and adolescence or at least to assume that the child could "grasp concepts" that are important for their mental health from other external groups, such as school and society. Importantly, efforts to improve mental health within the family should not just focus on the first 5 to 10 years of the child's life but begin with the family before the child is born and continue throughout adolescence and up to adult life (Wall 1955).

It is important to highlight that the cooperation between school and homes and between schools and communities has usually been weak and sketchy. In urban areas, it has been difficult for the teacher to get to know the homes of their pupils and their parents' attitudes to mental health. *Les Écoles des parents et des éducateurs* is an initiative that was founded in 1929 by Marguerite Verine-Lebrun and was

launched in 1952–1953 in France, Switzerland, and Luxemburg. In France, *La Fédération nationale des Écoles des parents et des éducateurs* is now an established association with a recognized value that provides services for young people and their families (http://www.ecoledesparents.org).

Authorities in other countries should study ways of coordinating the different services to ensure there is a comprehensive system working for the benefit of all children and adolescents and safeguarding their mental health needs within their families. Effective parent education is a lengthy and continuous process, and some parents may make mistakes in managing their children. In addition, families in the modern society usually live in a restricted living space in an urban environment, and because of time restrictions, they might be less able to provide their children all they need for their physical and emotional development. If all the different systems are well coordinated, mistakes should not inflict any lasting damage in the young person (Wall 1955).

Education in Schools

There is a compelling body of research that shows that poor mental health in students is associated with poor classroom behavior, academic performance, and retention of students. In UMICs and HICs, nurseries and preschools are essential institutions to provide care to young children whose parents cannot provide attention during the whole day. Later on, primary and secondary schools have been conceived not just as institutions of instruction but as formal instruments for molding the young and for inculcating values, ideas, and modes of behavior. Apart from intellectual growth, schools are institutions for the development of essential concepts such as socialization, security and independence, interaction with adults, sexual knowledge and attitudes, work attitude, discipline, and respect (Wall 1955).

However, schools have been traditionally provided with very limited guidance on education and promotion of mental health. In HIC countries, while education policy frameworks identify the importance of well-being development, minimal guidance on how to promote students´ social and emotional development as well as their cognitive and academic development is provided.

An important element of mental health promotion in schools is to create a culture where calm, dignity, and structure encompass every space and activity. This approach is one of the most effective ways of encouraging good mental health, in order to avoid circumstances where poor mental health is exacerbated. As discussed earlier, partnerships with families, the wider community, and a proactive engagement with external agencies are also effective to promote consistent support for children's health and well-being (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/755135/Mental_health_and_behaviour_in_schools__.pdf).

There are a relatively large number of evidence-based programs for schools to promote mental health well-being in their students. In the United States, the Collaborative for Academic, Social, and Emotional Learning (CASEL) has identified

around 20 evidence-based programs for children in primary school. In Australia, *KidsMatter* (Dix et al. 2012), a national primary school initiative in mental health promotion in primary schools, has identified almost 100 early intervention programs where social and emotional competences have been included in the curriculum (https://www.kidsmatter.edu.au). However, with the exception of Australia, few other HICs have included similar mental health programs in their schools. In the UK, a non-statutory advice from the Department for Education was published in November 2018. The advice emphasizes on the importance of schools fully aware of the local services available, in order to ensure they are able to approach them when required. The measures are specified in what is called the *Green Paper*. The goal is to improve collaboration between schools and specialist services and to provide a wider range of support and interventions in or near schools. The UK Government's Green Paper outlines a "three-pillar" strategy: (1) a designated senior lead for mental health in every school and college; (2) new Mental Health Support Teams linked to groups of schools and colleges; and (3) trials of a 4-week waiting time for access to Child and Adolescent Mental Health Services (CAMHS). It also provides information about the ongoing work to improve mental health provision. The new Mental Health Support Teams will work with the designated senior leads for mental health which schools are encouraged to put in place. These staff will have access to free of charge training in providing strategic oversight of the whole school approach to mental health and well-being. Two of the three pillars will be tested and evaluated in different trailblazer areas, which will start testing this model in 2019–2020. The final ambitious goal is to reach between 20% and 25% of the schools across the UK by 2023. (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/755135/Mental_health_and_behaviour_in_schools__.pdf; https://www.thersa.org/discover/publications-and-articles/rsa-blogs/2018/10/a-whole-school-approach-to-mental-health).

Nonetheless, despite the availability and efficacy of school programs for mental health promotion, the large-scale implementation and sustainment of programs in schools have been less studied (Adelman and Linda Taylor 2000; Han and Weiss 2005). Funding has been one key barrier for the implementation of these programs, and the capacity of schools and educators is sometimes not supported due to growing curriculum demands and increasing class sizes. In many countries, schools have faced cuts to their budgets and been forced to review anything they offer that is not considered essential or core to the academic curriculum (http://www.rsaacademies.org.uk/role-education-mental-health/; https://www.gov.uk/government/publications/mental-health-and-behaviour-in-schools%2D%2D2).

Further, there is an ongoing debate about the types of programs that would produce the greatest benefits and whether schools should focus more on universal mental health promotion, on problem prevention, or on early identification targeting students who are at higher risk or exhibiting difficulties (Craig 2009). The current paradigm is shifting from focusing on the factors that determine vulnerability to mental illness to mechanisms that promote *resilience* to enable individuals to overcome adversity (Rutten et al. 2013). In a review, Betancourt and colleagues identified three preventive school-based interventions that focus on developing

resilience as a mechanism for improving mental health. One of them, the ERASE-Stress, uses psychoeducation and skill training with meditative and narrative experiences to reduce the impact of traumatic events. The second strengthens social support and self-efficacy. The third one focuses on family and community relationships and problem-solving to improve well-being (Betancourt et al. 2013).

Accessing health information has also become a fundamental part of health service delivery and a matter of debate. Historically, student mental health programs have been predominantly delivered face-to-face by either mental health professionals or school staff. However, there has been a huge expansion in the use of information, communication technologies, and social media in health (Christensen and Hickie 2010; Detels et al. 2015). The WHO Department of Knowledge, Ethics and Research (KER) has been collaborating with the department of health workforce for a number of years on standards of registration of social health and in eHealth and eLearning (https://www.who.int/ethics/review-committee/en/). In the last decade, many youth mental health programs have been developed or converted for online delivery, and some studies have found similar results than traditional programs delivered face-to-face (Cuijpers et al. 2008). Online technologies allow programs to be delivered in a standardized manner and might be more accessible and self-pace designed. In addition, they are extremely appealing to young people who like technology and are concerned about their privacy (Gulliver et al. 2010; Kolko et al. 2010).

Education in More Specialized Mental Health Settings

Primary care, families, and schools have a central role in provision of mental health services to the population; however, more specialized settings should also contribute to education and promotion of mental health in young people. For instance, Child and Adolescent Mental Health Services (CAMHS) may contribute by promoting psychoeducation in young people attending their services and their families. Psychoeducation programs have four core elements, including briefing the patients about their illness (information), problem-solving training, improving communication, and self-assertiveness training. Through psychoeducation, both patients and their relatives should be empowered to understand, accept, and cope with the disorder in a more successful and healthier manner. Psychoeducation has been considered as a precursor and catalyst for subsequent complementary psychotherapeutic and psychosocial treatment strategies such as CBT, family therapy, or parenting techniques (Bäuml et al. 2016).

The effects of psychoeducation in mental health conditions are certainly promising. In psychosis, RCT multicenter studies on the short-term and long-term effects of psychoeducation programs for young people and their families have demonstrated a significant reduction in rehospitalization rates from 58% to 41% and also a shortening of intermittent days spent in the hospital from 78 to 39 days (Pitschel-Walz et al. 2006; Bäuml et al. 2016). In two Cochrane meta-analyses, psychoeducation in psychosis was also accompanied by a higher level of compliance, lower rate of

relapse, and improved psychopathological status (Pekkala and Merinder 2000; Xia et al. 2011). Similar results have been found in other psychiatric disorders such as bipolar disorder (Colom and Lam 2005). In child and adolescent psychiatric disorders such as ADHD, psychoeducation with parents has shown to improve ADHD symptoms while promoting social skills in their children (Ferrin et al. 2014; Ferrin et al. 2016).

In LMICs there is a lack of CAMHS services and consequently a lack of experienced child and adolescent mental health clinicians. In recent years, the International Association for Child and Adolescent Psychiatrists and Allied Professions (IACAPAP) has developed the iCAMH (International Child and Adolescent Mental Health) program, which expands on the child mental health competencies covered in WHOs mhGAP previously mentioned. The iCAMH Training is a free 24–30-hour competency-based training aimed at second-line practitioners around the world, who have no specific training in child psychiatry, but nevertheless see children with mental health problems (e.g., pediatricians, GPs, general psychiatrists, mental health officers). The iCAMH Training helps them to identify, diagnose, and manage common uncomplicated psychiatric disorders of childhood and adolescence as well as to supervise and support primary care staff managing CAMH problems. Initial pilot programs in Ethiopia and Sri Lanka have shown excellent clinical relevance and significant improvement in clinical skills, attitudes, and ability to identify child mental health problems in practice (http://iacapap.org/icamh_home_page).

Other Barriers to Implementation and New Challenges for Mental Health Education

There are many advantages to the implementation of mental health promotion programs in schools, including highly trained professionals and that in upper middle and HIC schools are governed under mandatory educational policies (Shute and Slee 2016). However, there are also a number of obstacles that enable or hinder the implementation of evidence-based programs in schools, including the following: (i) schools as complex organizations, with multiple stakeholders; (ii) lack of funding for large-scale dissemination; (iii) difficulties for adaptation in rural and remote regions; and (iv) national, provincial, and local politics in education which can have contradictory approaches. As discussed earlier, the complexity of educational programs in schools is influenced by a number of characteristics including levels of staff experience, differences in characteristics of the students, variability in the communication with parents and community leaders, the social and political contexts and their influence in implementation of the programs, and the demographic setting (e.g., rural vs. urban) (Sandler et al. 2005; Shute and Slee 2016).

The social and political contexts also have a direct impact on the implementation of educational programs in schools. The social, economic, and political context influence each phase of the educational approach, its implementation, and evaluation. Local legislations and policies are decisive for the funding too. For instance,

many US states and Canadian provinces have responded to suicide incidents by developing plans to target bullying in schools. As an example, the WITs (Walk away, Ignore, Talk it out, Seek help (www. wits.programs.ca)) has been designed to promote social responsibility, prosocial leadership, and positive school climate to reduce bullying. Older children are taught prosocial leadership using the LEADerS lesson plans to Look and listen, Explore points of view, act, ask Did it work, and Seek help in order to empower younger children in the playground and their communities (Leadbeater et al. 2016).

Finally, it is estimated that worldwide approximately one billion children currently live in conflict-affected areas. These children are constantly exposed to violent events, poverty, and poor living conditions and overcrowded in camps. They suffer not only the direct physical impact of the conflict but also the emotional impact, which lead to broad-ranging and long-lasting consequences in their mental health, including anxiety, depression, and PTSD. In addition, education of these children is usually severely compromised. Nevertheless, a number of educational programs have been developed in response to a growing evidence of cases of violence, abuse, and neglect. As an example, in Palestine, international and local non-governmental organizations played a role introducing mental health services for young people, which are offered in schools through the United Nations Relief and Work Agency (UNRWA). One of these programs is the Family and Child Protection program, which focuses on child participation and peer groups to combat adversity and promote resilience (UNRWA 2013).

The success of educational techniques depends on many factors, including the readiness of participants to accept them, which is in part a function of individual resistances and self-protective attitudes and in part of the cultural patterns of the particular social or cultural group. Continued research is needed in order to understand the successful approaches that need to be adopted and implemented as part of education in mental health. These findings will be equally important for schools, educators, parents, commissioners, and politicians in both HICs and LMICs.

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Misuse of Alcohol, Drugs, and Other Substances

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Abstract

Substance misuse is common in young people across the world and is associated with substantial levels of morbidity and mortality. Substance misuse is associated with high levels of co-existing mental health problems and social adversity and causes significant economic burden to the whole society. In view of the impact of substance misuse across multiple domains of the young people's lives and the long-term risks, misuse of substances is seen as a major public health problem across the globe. Substance misuse in adolescents is different from adults, and a developmental perspective is essential in the assessment and treatment of substance misuse in young people. A systemic perspective is crucial to make a comprehensive assessment of the risk and protective factors and identify those are at risk of persistence of substance misuse. Early identification and comprehensive treatment of young people who show persistent difficulties using integrative, multi-agency treatments could help reduce the morbidity and mortality and prevent the derailment of their developmental trajectory.

Keywords

Substance use · Substance misuse · Drugs · Alcohol · Young people · Adolescence · Substance abuse · Dependence · Addiction · Developmental perspective

Introduction

Misuse of drugs and alcohol is common in young people across the world and is associated with substantial levels of morbidity and mortality. It can also lead to significant alteration in the developmental trajectory of affected young people. Most children in their middle childhood are exposed to various substances including alcohol and tobacco, and a substantial minority, as high as ten percent, continues to use drugs into adolescence and adulthood (Newcomb 1997; Gilvarry 2000). A substantial proportion of young people who misuse drugs have multiple antecedent and coexisting mental health problems, unrecognized learning difficulties, interpersonal and family difficulties, involvement with the justice system, and deeply entrenched social adversities. Substance use, including one-off experimental use, can have tragic consequences. Persistent use of substances can lead to deleterious effects such as academic underachievement, difficulties in peer relationships, family conflicts and dysfunction, high health care costs, violent crimes, accidents, and suicides (Gilvarry 2000). Substance misuse increases the risk of developing mental health problems such as depression and psychosis as well (Mirza et al. 2017a). In view of the impact of substance misuse across multiple domains of the young people's lives and the long-term risks, misuse of substances is seen as a major public health problem across the globe.

Prevalence and Correlates

Studies in general populations across the world suggest that the extent of substance misuse among young people remains higher than that among older people, with some exceptions such as opiates or khat. Early (12–14 years) to late adolescence (15–18 years) is a critical risk period for initiation of substance misuse and misuse may peak among people aged 18–25 years (World drug report 2018). Not all young people who use substances continue to use them regularly. For example, research from the UK, Europe, and USA shows that – even though about 20% of young people have smoked cigarettes, about 45–50% have ever used alcohol, and about 25% have ever used illicit drugs – only about 3% of young people smoked regularly, 10% had used alcohol in the last week, and 10% had used drugs in the last month (Home office UK 2018; NHS digital 2016; ESPAD 2016; SAMSHA 2017).

Misuse of substances in young people varies from country to country and depends on the social and economic context of the affected young people. For example, drugs such as "ecstasy," methamphetamine, cocaine, ketamine, LSD, and GHB are used more commonly in high-income countries, whereas the street children in many countries use inhalants (Embleton.et al. (2013), World Drug report 2018). However, tobacco, alcohol, and cannabis are the most commonly abused substances across the world with cocaine and heroin accounting for less than 10% (World Drug report 2018; ESPAD 2016). Initiation to drug and alcohol use is more common among young boys than girls, but the risk of persistence of substance misuse is higher in women (World Drug report 2018). The range of substances used change over time, with an increase in the prevalence of prescription opiates in young people across the USA, Asia, and Africa. Over the last decade, a new class of drugs appeared called New Psychoactive Substances (NPS) (−historically referred to as "legal highs"), which are largely produced in clandestine laboratories, often have unclear pharmacological profiles, and pose significant risks to those who take them (see Table 1 for details of NPS). Two percent of young people in England aged 11–15 years reported that they have used NPS in the last month (Home office UK 2018) and about 3% of 15–16 years olds in 35 European countries have reported using them in the last year. (ESPAD 2016).

Most of the campaigns against substance misuse are directed at illegal drugs such as cannabis, heroin, cocaine, and ecstasy. However, many more people die or develop problems, either directly or indirectly, as a result of using tobacco and alcohol than all illegal drugs combined. In view of the above, there are on-going debates about the classification of drugs into legal and illegal categories (Nutt et al. 2007).

Substance Misuse in the Young: A Developmental Perspective

Not everyone who use drugs develop problems. The effects of a drug are not just dependent on the drug itself. The mindset of the individual who takes it and the setting in which it is used are crucial variables. Anecdotal reports from young people

Table 1 New Psychoactive Substances (Historically Called ∗"Legal Highs"): Mimic psychoactive effects of drugs of abuse. There is little information on the pharmacology, toxicology, and safety of NPS for humans; the potential health implications of these compounds are largely unknown

Class of drug	Chemical structure/type of drugs	Popular brand names	Mechanism of action	Effects and dangers
Stimulants: Drugs with actions similar to Ecstasy or Methamphetamine	Mephedrone – most common Piperazines NRG drugs – Naphyrone	Bubble, Miaow, MCAT, BZP pills, NRG-1, NRG-2 Rave, Energy, fury, jet	Action of many drugs not known, but seems to increase DA/NA/5-HT	Acute effects due to symaptho-mimetic activity, including confusion, aggression, blurred vision, hallucinations, tachycardia, hyponatremia even death, acute myocarditis
Synthetic Cannabinoids; "Spice" And Related Products (Synthetic Cannabinoids are dissolved in solvent and sprayed on to an organic herbal material)	Naphthoyindoles Phenyl acetyl indoles, Cyclo hexyl phenols, Benzoylindoles, Classical cannabinoids	Black Mamba, Spice, Annihilation, Psyclone, Exodus, K2	Acts similar to THC-and possess equal or higher affinity for Cannabinoid receptors	Agitation, seizures, hypertension, vomiting, and hypokalemia. Spice like products are known to precipitate psychosis in vulnerable people and cause relapse in people with psychosis
Hallucinogens: Plant-based products	Salvia Divinorum Lysergic acid amide Psilocybin Amanita Muscarita	Diviners sage Hawaiian baby Lions Ear	Hallucinogenic effects produced by plant based substances-effects on 5 HT/DA	The overall toxicity of *S. Divinorum* products appears to be low. Bad trip experience with dysphoria, anxiety, fear attacks, and even suicidal thoughts. Three case reports of psychosis related to salvia

About 60 countries across the world have taken legal measures against the nps. In 2016 the UK government banned all of the new psychoactive substances as illegal, so there is no loophole to sell them legally on line/shops'

suggest that they take drugs for a variety of reasons: to gain pleasure, conform to attitudes and values of the peer group, block out traumatic and painful memories, and to relieve sadness and worries associated with their everyday lives. For some young people, use of drugs and alcohol may become a problem in itself, and a very small minority develop substance dependence (Shedler and Block (1990), Gilvarry et al. 2012). Early onset of substance use and a rapid progression through the stages of substance use are major risk factors for the development of substance misuse (Hawkins et al. 1992). Longitudinal studies have shown that the peak age for first use for both legal and illegal substances is between 15 and 18 years. Use generally decreases by the age of 24 (Kandel 2002). The natural history of substance use in young people is marked by the existence of a developmental continuum ranging from experimental stage to substance dependence and heterogenous outcomes. In view of the above, defining what constitutes substance misuse in young people and when to intervene is often a challenging task for clinicians and researchers.

Definitions Based on International Classificatory Systems

International classificatory systems such as ICD–10 and DSM-V have suggested that we could reliably use adult categories such as harmful use and dependence (ICD-10) and substance use disorder (DSM-V) to diagnose substance misuse in young people. Unfortunately, both of the above systems lack a developmental perspective in psychopathology, and categories such as harmful use and dependence do not seem to capture all stages of substance use in young people (Halikas et al. 1990). For example, tolerance and withdrawal, which typically develop in response to long periods of chronic substance use, are rarely seen in young people. The classificatory systems of ICD-10 and DSM-V are inadequate in identifying young people at risk of evolving to the more serious stages such as harmful use and dependence. A new category of "hazardous use" has recently been introduced in the draft of ICD-11 (2018) to denote substance use that has not yet reached the level of substance dependence or having caused harm to the physical or mental health of the user.

Alternative Classifications for Substance Use in Young People

In view of the shortcomings of the categorical models of classification, a number of clinicians and researchers have proposed dimensional models to classify substance misuse in young people (Halikas et al. 1990). Based on the seminal work by Joseph Novinsky and colleagues, Mirza and Mirza proposed a developmentally sensitive model to classify the stage of substance use in young people (Mirza and Mirza 2008) – starting with nonuse at one end, moving through the stages of experimental use, social use, at risk (prodromal) stage, and through stages of harmful use to substance dependence on the other end. The above model has the potential to describe stages of substance use across the dynamic continuum and choose the most appropriate intervention to suit the stage of substance use (Table 2).

Table 2 Stages of substance (alcohol and drugs) use and suggested interventions: a pragmatic classification (Mirza and Mirza 2008, Mirza et al. 2011, Gilvarry et al. 2012). (Table modified and reproduced with permission from Mirza et al. (2017a), John Wiley and Sons, London)

Stage	Motive	Setting	Frequency	Emotional impact	Behavior	Impact on functioning	Suggested interventions (Gilvarry 2000)
Experimental stage	*Curiosity and risk taking*	*Alone or with peer group*	*Rarely or very occasionally*	*Effect of drugs is usually very short term*	*No active drug seeking behavior*	*Relatively little; may rarely result in dangerous consequences*	Universal prevention (drug education – formal or informal) provided by school or other agencies
Social stage	*Social acceptance/ the need to fit in*	*Usually with peer group*	*Occasional*	Mind altering effects of drugs are clearly recognize	*No active drug seeking behavior*	*Usually no significant problems, but some can go on to show features of the Early at risk stage*	Universal prevention (drug education – formal or informal) – provided by schools or other agencies
Early at risk stage	Social acceptance/ peer pressure	Facilitated by peer group	Frequent, but variable, depending on peer group	Mind altering effects of drugs are clearly recognized and sought	No active drug seeking behavior – but develops a regular pattern of drug/alcohol use	Associated with significant dangers including recurrent binge drinking or problems associated with intoxication	[a]Targeted intervention/ treatment by nonspecialist services (e.g., GP, school health worker, young people's counseling services, health care staff working in medical settings, and CAMHS (if available)
Later at-risk stage (substance use is not dominating mental state) (*Similar to*	Cope with negative emotions or enhance pleasure	Alone or with a like-minded peer group	Frequent/ regular use	Uses drugs to alter mood or behavior	Active drug seeking behavior is a key indicator of this stage	May be impairment in functioning in some areas (e.g., school and family)	Treatment by referral to specialist services such as CAMHS or other mental health professionals to address mental health issues and provision of

hazardous use in ICD-11)							interventions to prevent progression of substance use to further serious stages
Stage of harmful use (similar to ICD-11)	Drug use is the primary means of recreation, coping with stress or both.	Alone or with an altered (drug using) peer group	Regular use, despite negative consequences	Negative effects on their emotions and ability to function	Active drug seeking behavior, despite negative consequences across many areas of life	Impairment in almost all areas of life and or distress within families or close relationships	[a]Treatment by specialist services (e.g., specialist substance misuse treatment services for young people and specialist substance misuse professionals within CAMHS and other medical settings)
Stage of dependence (Similar to ICD-11 only a rare minority of young people progress to this stage)	To deal with withdrawal symptoms, and stop craving.	Alone or with like-minded peer group	Compulsive, regular or often daily use to manage withdrawal symptoms	Emotional impacts of drugs are very significant. Withdrawal symptoms prominent	Active drug seeking behavior, often loss of control over use, preoccupation with drug use, craving, and behavior may involve criminality	Physical and psychological complications, impairment in all areas of life	[a]Treatment by specialist substance use services including detoxification and for some residential rehabilitation

[a]For some the involvement of agencies and services, other than substance misuse services, may be required

Etiology: Risk and Protective Factors

Substance use is an individual phenomenon, but the psychosocial context will determine the onset, progress, and course of the disorder. A systemic framework is essential to understand the complex interaction of the drug with genetic, environmental, behavioral, psychosocial, and cultural factors in producing substance misuse in vulnerable individuals (Tables 3, 4, and 5).

The intricate mechanisms by which risk and protective factors mediate and modulate development of substance misuse are beyond the scope of this chapter and interested readers may refer to excellent reviews or text books (Hawkins et al. 1992; Swadi 1999).

Mental Health Problems that Predate and Possibly Contribute to Substance Misuse

Longitudinal studies from general populations report that depression may predict alcohol dependence and cannabis use (Pardini et al. 2007). Children exposed to neglect and maltreatment are at high risk of developing substance misuse (Kendler

Table 3 Risk factors for the development of adolescent substance misuse

Domain	Risk factor
a. ***Neuro-biological***	Genetic susceptibility to substance misuse
	Psycho-physiological vulnerability (EEG, ERPs)
	Neuro-chemical abnormalities (DA, 5HT, Opioids, etc.)
b. ***Psychological***	Depressive disorder Anxiety disorder
	Early/persistent conduct symptoms, ADHD
	Physical and sexual abuse
	Traumatic/stressful life events Early onset of drug use
	Sensation seeking traits in personality
c. ***Family***	Drug use by parents/other family members Family conflict and disruption
	Inconsistent or harsh discipline
	Lack of parental expectations about their child's future
d. ***Peer group/ school***	Peer rejection/alienation from peer group
	Association with drug using peer group
	Poor commitment to school
	Academic failure/underachievement
e. ***Social/cultural***	Easy availability of drugs
	Social norms or laws favorable to drug use
	Extreme economic deprivation
	Disorganized, anomic neighborhood

Table 4 Protective factors

Close, affectionate parent–child relationship
Parental monitoring of young person
Authoritative parenting style
High educational aspiration/commitment
Having a nondrug using peer group
Good social and interpersonal skills
Sense of bonding to school or other social institutions (sports club, church, mosque)
Acceptance of socially approved values and norms of behavior

Table 5 High-risk groups (based on longitudinal studies)

Young people engaged in offending behavior
Children of drug misusing parents
Children exposed to maltreatment
Children excluded from school/truants
Young people looked after by local authority
Young people leaving care
Young homeless people
Teenage mothers
Young people attending mental health services
Regular attendees of accident and emergency services

et al. 2000; De Bellis 2005). In addition, conduct problems in childhood predict substance abuse and dependence in early adulthood, after controlling for a range of social and other covariates (Fergusson et al. 2007). Similarly, untreated ADHD has been shown to be a significant risk factor for development of substance misuse in adolescence and adulthood (Wilens et al. 2003). The combination of conduct disorder and hyperactivity carries a particularly high risk, especially if it is associated with social adversity (Mirza et al. 2017b).

Cooccurring Mental Health Problems

Research done in clinical samples and in the general population reported significant rates of coexisting psychiatric disorders in young people with substance misuse (Boys et al. 2003; Roberts et al. 2007). The most common disorders are conduct disorder, major depression, attention deficit hyperactivity disorder (with or without comorbid conduct disorder), anxiety disorders (post-traumatic stress disorder and phobias), and bulimia nervosa. Coexisting substance misuse has significant implications for the onset, clinical course, treatment compliance, and prognosis for young people with psychiatric disorders (Roberts et al. 2007). For example, in young people with psychosis or major depression, coexisting substance misuse is seen as the single most important factor that increases the risk of suicide (Mirza 2002).

Consequences of Substance Misuse

Substance misuse is frequently associated with impairment in psychosocial and academic functioning in affected young people. Substance misuse often leads to family conflict, distress in the near and dear, school dropout, or academic failure. Affected young people may engage in offending behavior, or other high-risk behaviors such as teenage pregnancy and unprotected sex. Coexisting psychiatric disorders contribute further to risks and impairments. Injecting drug use is rare in young people, but when it occurs, it can lead to serious complications. Mortality is high due to accidents, suicides, and physical complications of substance misuse.

Assessment

Young people are often brought to treatment and may struggle to accept that they might have developed problems related to substance use. The clinician's ability to engage the young person is a key variable in determining the quality of information they collect and outcome of treatment. Clinicians should try to obtain information from a variety of sources including the young person, parents/other caregivers, general practitioner, school, social services, youth justice system or any other agencies involved. Clinical and research experience suggests that young people are generally more reliable informants than is often assumed. The attitude of the clinician should be flexible, empathic, and nonjudgmental to engage the young person in the assessment process and to obtain a valid estimate of substance use. It may be helpful to start by exploring the young person's leisure activities and then gently guide them to talk about the nature and extent of substance use, context, and its impact on various domains of their lives. This would enable the clinician to determine whether the current pattern of substance use constitutes a normative stage of substance use such as experimental or social use or has progressed to the prodromal (at risk) stage or stages of harmful use/dependence. One should explore the relationship between comorbid psychiatric disorders and substance misuse, which could help formulate a differential diagnosis and treatment plan. Substance misuse is often one of the many problems that young people present with and the clinician should undertake a comprehensive developmental, social, and medical history to determine the multiple complex needs and vulnerabilities across different domains. One should make particular efforts to discover the skills and resources of the young person and the family as well, including their resilience, hopes, and aspirations. Interviewing the young person using the principles of motivational interviewing could help ascertain the young person's readiness for treatment or stage of change and determine the initial treatment goals and the range of treatments that should be offered (McCambridge and Strang 2004; O'Leary and Monti 2004).

Mental State Examination and Physical Examination

Young people occasionally present with features of intoxication or dependence including withdrawal states. Telltale clinical signs include recent injecting sites, bloodshot eyes, nicotine stains on fingers, tachycardia, unsteady gait, high blood pressure, and tremulousness. Perceptual abnormalities may suggest a primary psychotic illness or the use of drugs such as cannabis, alcohol, amphetamine, or cocaine. Inhaling solvents from the bag may lead to a rash around the mouth and nose. Risk of harm to self and others should be systematically assessed, especially in young people with a history of offending behavior and those with comorbid psychiatric disorders. A detailed physical examination including basic neurological examination should always be undertaken to determine the medical complications of substances, if any.

Investigations

Testing bodily fluids (urine, saliva, blood) for specific substances should be part of the initial evaluation, especially in inpatient settings and judicial settings. Most substances – except benzodiazepine, methadone, and cannabis – are detectable in urine for a few days only. Considering the above and the potential for adulteration of samples, a negative urine result does not necessarily mean that the young person is not using drugs. This is particularly relevant for the new psychoactive substances (NPS) with uncertain pharmacological profiles. A hair test can be more reliable as it gives a longer historical profile of drug use (up to 1 month). However, some professionals argue that drug tests add little to the verbal reports of substance use in young people and could potentially undermine the trusting therapeutic relationship the clinicians have managed to nurture with the youngsters. There is little evidence at present to recommend repeated testing of bodily fluids to monitor routine clinical treatment.

Treatment

The primary goal of treatment is help young people achieve and maintain abstinence from drugs and alcohol. While abstinence should remain the explicit, long-term goal of treatment, harm reduction may be an interim, implicit goal, in view of both the chronicity of substance misuse in some young people and the self-limited nature of substance misuse in others. Psychosocial treatments are the mainstay of treatment. Medication is used as an adjunct only, though it may offer a window of opportunity for young people to engage in psychosocial treatments. (Mirza 2002, Marshall and Mirza 2007). Specialist child and adolescent mental health services (CAMHS) have a primary role in providing specific treatment of "core" mental health problems such as depression, eating disorders, ADHD, and PTSD, which often coexist with substance misuse. Young people with comorbid psychiatric disorders and substance misuse should be offered integrated treatment programs (Libby and Riggs 2005;

Mirza and Buckstein 2010), though this may be problematic in many developing countries that do not have well developed child and adolescent mental health services (CAMHS). Inpatient treatment is required for a very small minority, in those with severe and chaotic substance misuse, repeated failed community detoxification, intravenous drug use with complications, and for those with severe mental illness and risk of self-harm.

Evidence Base for Treatment

Longitudinal research on the outcome of treatment for young people with substance misuse has concluded that treatment is better than no treatment and treatment is cost effective (Williams and Chang 2000). Naturalistic follow-up of young people in a number of treatment settings in the USA showed decreased substance misuse and criminal involvement, as well as improved psychological adjustment and school performance, one year after treatment (Hser et al. 2000; Williams and Chang 2000). Family therapy approaches such as multisystemic therapy (Henggeler et al. 2002) and multidimensional family therapy (Liddle et al. 2002) have the best evidence base for efficacy across a number of domains (Stanton and Shadish 1997). Individual approaches such as cognitive-behavioral therapy (CBT), both alone and in combination with motivational enhancement, have been shown to be efficacious (Waldron and Kaminer 2004). There is an emerging evidence base for brief motivational interviewing as well (McCambridge and Strang 2004; O'Leary and Monti 2004). Research on psychosocial treatment for substance misuse in young people is still at an early stage and it is difficult to be certain regarding the processes of change. Predictors of good treatment outcome include treatment completion, low pretreatment substance use, and peer and parent social support (Williams and Chang 2000). Other factors predictive of outcome are involvement of family, use of practical problem solving, and provision of comprehensive services such as housing, academic assistance, and recreation.

Prevention of Substance Misuse

Compared to the large majority of young people who experiment with substances, only a small minority continue to show drug and alcohol problems in to late adolescence and adult life. It is important not only to reduce the number of young people first using drugs, but also to prevent the transition from experimental use to harmful use or dependence. Reducing or attenuating the risk factors and strengthening the protective factors are the key strategies for prevention of substance misuse. Schools offer the most systematic and efficient way of reaching the children and young people. Preventive interventions need to start at an early age, ideally in preschool, and should address the developmental stage and needs of children and young people. For young people who have initiated substance use, early identification and brief interventions are effective in preventing progression to substance misuse.

Evidence Base for Preventive Interventions

Many interventions for preventing drug use among young people are carried out in primary or secondary schools, and a Cochrane review of school-based interventions showed that programs based on a combination of social competence and social influence approaches showed, on average, small but consistent protective effects in preventing drug use, even if some outcomes did not show statistical significance. Some programs based on the social competence approach also showed protective effects for some outcomes (Faggiano et al. 2014). However, the evidence base for nonschool-based interventions in the community to prevent substance misuse is quite limited. Motivational interviewing and some family interventions may have some benefit. Cost-effectiveness has not yet been addressed in any of the above studies, and further research is needed to determine whether any of these interventions can be recommended (Gates et al. 2006; Emmers et al. 2017).

Developing Treatment Programs in Developing Countries

There is a huge gap between treatment needs and access to treatment, even in developed countries. In many developing countries, the gap is even wider and in fact the treatment needs may have not yet been properly ascertained yet. The World Drug report, a global survey of the extent of substance misuse and related harm, is an excellent starting point for clinicians and researchers to understand the treatment needs across the world. However, a comprehensive assessment of the local needs and resources would often prove to the ideal first step in the development of treatment programs.

Developing treatment interventions for young people with substance may prove to be a challenge in many developing countries. A pragmatic approach towards providing psychological treatments to young people may involve drawing from many of the evidence-based treatments such as MST, MDFT, CBT, and MI, while taking in to account the local context and available resources to provide treatment. Creating a network of professionals working across statutory and voluntary agencies and building on the existing skills of the practitioners could prove to be a cost-effective way of delivering evidence-based interventions such as motivational interviewing and systemic interventions (Mirza et al. 2007). Professionals working in General Practice settings, emergency departments, and other medical settings have an unrivalled opportunity to play a significant role in the early identification and treatment of substance misuse including children of substance misusing parents and other high-risk groups. Routine screening for substance misuse could be undertaken using brief tools such as CRAFFT (Knight et al. 2002) and brief interventions using principles of motivational interviewing have shown to be effective in preventing the progression of young people towards harmful use or dependence (Cunningham et al. 2009, 2012).

Eco-systemic approaches, such as MDFT and MST, that address the problems across all domains including school, family, and judicial systems have the best evidence base. However, there are significant overlaps between different forms of psychotherapies in both theoretical conceptualizations and therapeutic techniques.

The above therapies may prove to be too cost intensive for many developing countries as well. However, the evidence-based interventions developed in the USA and Europe share in common a commitment to a set of core principles, which could be incorporated in to the treatment programs in the developing world. The key elements of a successful treatment program may include the following:

- A systemic framework that aims to work therapeutically with whole families, and "systems of care" – such as school, judicial system, social services, to address the multiple complex needs of young people.
- An empathic and nonjudgmental therapist, who takes painstaking efforts to engage even the "hard to reach" youngster in the treatment process, adapts a nonblaming collaborative stance and rekindles the ability to hope and dream
- A therapeutic process that involves structured and personalized feedback on risk and harm to young people; emphasis on personal responsibility for change; and strategies to increase self-esteem, self-efficacy, practical problem-solving skills, and social skills
- A lengthy period of retention in service to ensure good aftercare
- Easy access to professionals such as psychologists and psychiatrists to address the coexisting mental health problems and for professional supervision
- Regular use of outcome measures to monitor progress and to review treatments

Innovative Strategies to Create Large System Change

Despite providing the best outcomes for young people with substance misuse, even the most intensive forms of systemic therapies may fall short of producing enduring changes, especially for marginalized young people and communities. Appreciative inquiry is an interesting innovation in action research in the past decade, which has a unique methodology to produce long-lasting changes to the larger social systems. Appreciative inquiry focuses on what works well, to discover skills and resources of people, rekindle their ability to hope and dream for a different future, and help materialize their hopes and aspirations through large system change (Cooperrider and Whitney 1999). There is anecdotal evidence for its efficacy in marginalized young people with drug and alcohol misuse in Africa (Mcadam and Mirza 2009), but large-scale studies are needed to substantiate the above findings.

Developing Prevention Programs in Developing Countries

Most of the research on preventive interventions comes from the USA and other developed countries and may be too cost intensive to be applied in developing countries. However, the key principles and strategies – to reduce/attenuate the risk factors and to enhance the protective factors (see Table 6) – could be assimilated by the prevention programs in developing countries, taking in to account the needs and resources available locally. School-based interventions including education about

Table 6 Strategies for the prevention of drug/alcohol use

a. Reduce the impact of risk factors
Delay initiation in to drug use
Reduce availability of drugs by law enforcement
Early identification and treatment of those who are at risk of developing drug/alcohol problems
Treatment of ADHD, mood disorder, and other mental health problems
Controlling access to drug using peer group
Attempts to eradicate poverty and deprivation
b. Enhancing effect of protective factors
Parental monitoring of young person
Changes in parenting styles/practices
Improving family relationships, communication
School based programs for young children aimed at improving social skills and problem solving skills
Establish warm and supportive relationship between children and teachers/mentors
Community based programs aimed at large system change (appreciative enquiry and other models)

substances and development of skills aimed at prevention of initiation to substance use could be made part of the school curriculum.

Conclusions

The notion of a drug-free society is almost certainly a chimera. History reminds us that young people have always used substances to change the way they see the world and how they feel, and there is every reason to think they always will. However, there is an urgent need to debunk the myth that substance misuse is an acceptable and invariable part of normal adolescence. This myth could potentially delay initiation of treatment. A developmental perspective on substance use and misuse and a comprehensive assessment of the risk and protective factors would help identify those at risk of persistence of substance misuse. Research shows that early identification and comprehensive treatment of young people who show persistent difficulties could help reduce the morbidity and mortality and prevent the derailment of their developmental trajectory. Integrative, multiagency treatments addressing a range of ecologically valid etiological factors have the potential to provide good treatment outcomes and engender a culture of therapeutic optimism.

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Self-Harm and Suicidality in Children and Adolescents

33

Sophie Epstein and Dennis Ougrin

Contents

Abstract

Self-harm is defined as any act of self-injury or self-poisoning regardless of intent. Suicidality includes suicidal self-harm as well as suicidal thoughts and plans. Self-harm is common, with 10–20% of young people reporting having harmed themselves before the age of 18. Self-harm is by no means always an act with suicidal intent, and the relationship between these two phenomena is complex. However, self-harm is the strongest single risk factor for completed suicide which is the second most common cause of death in young people aged 10–24. This chapter provides a short summary of self-harm and suicidality in young people and its prevalence and risk factors, prevention, assessment, and management. Links to additional material are also provided.

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Keywords

Self-harm · Suicide · Child and adolescent mental health

Introduction

Self-harm and suicidality can be defined in many different ways. In this chapter, self-harm is considered as any form of self-injury or self-poisoning, regardless of intent (National Collaborating Centre for Mental Health 2004). It includes both suicide attempts and non-suicidal self-injury. Suicidality includes suicidal self-harm as well as suicidal thoughts and plans. Self-harm is by no means always an act with suicidal intent, and the relationship between these two phenomena is complex (Grandclerc et al. 2016). For example, a young person may experience suicidal thoughts and may also self-harm without suicidal intent. Suicidal intent can also be difficult to determine, particularly in young people (Posner et al. 2007).

This chapter provides a short summary of self-harm and suicidality in young people and its prevalence, risk factors, prevention, assessment, and management. Links to additional material are also provided. The majority of evidence used to inform the sections below is derived from high-income countries, as there is unfortunately a lack of research regarding self-harm conducted in low- and middle-income countries.

Epidemiology and Risk Factors

Ten to twenty percent of young people worldwide report having self-harmed at least once before the age of 18 (Hawton et al. 2012; Muehlenkamp et al. 2012). Self-harm is more common in females, whereas completed suicide is more common in males (Hawton et al. 2012). Self-harm is among the strongest risk factors for completed suicide, which is the second most common cause of death in young people aged 10–24 (Patton et al. 2009). Although common, the majority of self-harm in young people is not known to professionals. A study in Europe reported that only 12% of self-harm episodes in young people present to hospital (Madge et al. 2008).

Self-harm is associated with a range of mental disorders including anxiety, depression, and attention deficit hyperactivity disorder (ADHD); however, it does not occur exclusively in the context of mental disorder (Hawton et al. 2012; Moran et al. 2012). Repetitive self-harm is also sometimes seen in those with a diagnosis or characteristics of borderline personality disorder (American Psychiatric Association). Other risk factors for self-harm include low socioeconomic status, parental death, parental mental health problems, adverse childhood experiences, history of physical or sexual abuse, bullying, family discord, interpersonal difficulties, mental disorder, drug and alcohol misuse, low self-esteem, impulsivity, and hopelessness (Aggarwal et al. 2017; Evans et al. 2004; Hawton et al. 2012; Steele and Doey 2007). Limited evidence on the effect of the Internet and social media on self-harm suggests that it has both positive and negative effects (Marchant et al. 2017). Certain groups such as lesbian, gay, bisexual,

or transgender youth or those living apart from their family or in foster care are also at higher risk (Harkess-Murphy et al. 2013; Russell and Fish 2016).

Self-harm is less common in children under 12 and becomes increasingly common during adolescence (Hawton et al. 2003, 2012); however, the majority of adolescents who self-harm do not continue into adulthood (Moran et al. 2012). Young people who self-harm do have an increased risk of repetition, with a study in Europe finding that just over half the sample reported multiple episodes in their lifetime (Madge et al. 2008). Some young people, however, may self-harm in response to a particular life event and not repeat this behavior subsequently.

Young people use a number of methods to self-harm. Methods used to self-harm are not necessarily the same as those which result in completed suicide. Violent methods are much stronger predictors of suicide than non-violent methods (Beckman et al. 2018). In high-income countries, self-cutting and self-poisoning with medication are among the most common methods of self-harm (Hawton et al. 2012); however completed suicides most often result from hanging (Lim et al. 2014) or firearms in the USA (Bridge et al. 2006; CDC 2007). In some low- and middle-income countries, methods such as charcoal burning (Yoshioka et al. 2018) and ingestion of pesticides (Gunnell and Eddleston 2003) are widespread.

Reasons for Self-Harm

Young people self-harm for a number of reasons or sometimes find it hard to understand or articulate why they harm themselves (Nock 2010). Self-harm may be a way for some young people to manage difficult emotions, to communicate distress, and to feel in control or a way of coping in the absence of alternative coping mechanisms or support. For some, the intention could be to end their life (Rodham et al. 2004). Nock describes a functional model where self-harm is driven by four possible reinforcement processes: (1) Intrapersonal negative reinforcement (where self-harm results in a decrease in unpleasant thoughts or emotions), (2) intrapersonal positive reinforcement (where self-harm results in welcome thoughts or feelings such as having punished oneself), (3) interpersonal positive reinforcement (where self-harm results in receiving care or support from others), or (4) interpersonal negative reinforcement (where self-harm results in others stopping doing something negative, e.g., peers stop bullying or parents stop fighting) (Nock 2010). Rather than being seen as "attention seeking" or "manipulative" (common unhelpful and stigmatizing myths about self-harm), the behavior may well serve a function of generating much needed support or action from others, where a young person has not been able to communicate their distress in other ways.

Prevention

Prevention of self-harm is a public health priority and can take place at either an individual or population level. Population-level prevention is particularly important in view of the fact that the majority of young people who self-harm do not present to

hospital (Geulayov et al. 2018) and many are not known to health services at all. This lack of reporting is partly driven by stigma which unfortunately still surrounds self-harming behavior. Addressing this stigma is an important challenge in self-harm prevention and management.

Population-level prevention can take the form of restriction of the means to self-harm. Successful interventions internationally have included barriers at common jumping sites, detoxification of domestic gas and banning certain types of pesticides, or restrictions on their purchase (Sarchiapone et al. 2011). Media guidance on reporting of suicide is another important intervention (see link in section "Other Resources").

School-based interventions can also be considered population-level prevention. Two particular school-based suicide prevention interventions have been shown to be effective in reducing the risk of suicide attempts. One is the Youth Aware of Mental Health (YAM) program, developed as part of the Saving and Empowering Young Lives in Europe (SEYLE) study. This is a manualized, universal intervention which involves awareness raising about risk and protective factors for suicide. It also involves providing information about depression and anxiety and techniques to improve young people's skills to deal with stress, adverse life events, and suicidal behaviors (Wasserman et al. 2015). The second is the Signs of Suicide intervention, which combines universal awareness raising with screening for depression and other risk factors associated with suicidal behavior (Aseltine and DeMartino 2004).

At an individual level, assessment for risk of or actual self-harm or suicidal behavior often forms part of a routine mental health assessment. This is particularly important in cases where young people present with low mood, anxiety, or psychosis or who express thoughts of hopelessness, low self-esteem, or other negative cognitions. There has historically been some concern that asking an individual about self-harm and suicide as part of an assessment increases the risk of such behaviors; however, there is substantial evidence which disproves this theory (Mathias et al. 2012). On the contrary, asking about and therefore identifying self-harm, suicidal thoughts, or behaviors as early as possible creates opportunity for intervention, thus decreasing the risk of future events. Preventative measures can then include ongoing support from clinical services, from school or from family and working on modifiable risk factors such as drug and alcohol use, sleep or treating underlying mental health conditions. More detail on secondary prevention (the prevention of recurrence or escalation of self-harm in those already known to self-harm) is covered in the following sections "Assessment" and "Management."

Assessment

Following an act of self-harm, the nature of an assessment will depend to some extent on the setting. Young people who self-harm will often seek support from friends and family, health professionals, or other professionals such as teachers and

social workers (Ford et al. 2006). Professionals working with young people may also become aware that a young person has self-harmed, even if not directly disclosed by the individual. It is important for all professional groups who work with young people to have the knowledge and skills to respond appropriately if they become aware that a young person has self-harmed. Some resources for non-health professionals can be found in Other Resources. This includes advice on warning signs to look out for, how to respond in an emergency, how to talk to a young person about self-harm, and referral to other services.

When assessing a young person who has self-harmed, an open and honest relationship is essential, and the young person should be involved as much as possible in decisions about their care (National Institute for Health and Care Excellence 2011). People who it may be important to involve in the assessment in addition to the young person include a parent or caregiver, teacher, other trusted adult, a professional working with the young person, or even a friend. It is also important to talk to the young person alone as part of the assessment, as there may be issues that they are reluctant to disclose in the presence of friends or family. The importance of confidentiality should be carefully balanced with the need to inform other responsible adults of any risk of serious harm to the young person.

An assessment of a patient who has self-harmed should include the following:

- A thorough history of the presenting problems and the circumstances of the act
- A mental health and psychosocial assessment
- An assessment of risk and an assessment of needs
- Formulation of a safety plan (as well as a general management plan)

Structured risk assessment tools should not be used in isolation to predict suicide, estimate risk of repeat self-harm, or determine the treatment a young person should be offered (National Institute for Health and Care Excellence 2011). An assessment of risk needs also to take into account all aspects of the history including the presenting problem itself as well as chronic and acute risks, protective factors, and any safeguarding or child protection issues. Whether the self-harm act was impulsive or planned and the presence or indications of suicidal ideation or intent are important considerations.

Formulating a safety plan is a crucial part of any self-harm assessment (and immediate management). This should involve a responsible adult as well as the young person if possible. A safety plan includes consideration of supervision of the young person, how they can access services, who would be alerted in the case of potential or actual self-harm, restriction of access to means, distraction techniques, and enjoyable activities the young person can do. Further information can be found in Other Resources.

As part of safety planning, parents and carers should be advised to remove all medications and, where possible, other means of self-harm available to the child or young person (National Institute for Health and Care Excellence 2011). It should be noted that young people sometimes describe non-suicidal self-injury as a strategy for managing suicidal thoughts and avoiding suicide attempts. For this reason, if, for

example, a young person uses razor blades as means of regular cutting, a discussion about removal of these blades should be carefully considered, with an emphasis on replacement with alternative positive coping mechanisms.

More detailed guidance on assessment and management of self-harm is available from the National Institute for Health and Care Excellence (NICE) in the United Kingdom. See links in section "Other Resources."

Management

Management of self-harm includes necessary medical management of the physical consequences of the act as well as all aspects of assessment and risk management described above. Throughout the course of working with young people who self-harm, ongoing risk assessment is essential, and risk management plans need to be flexible to change accordingly (National Institute for Health and Care Excellence 2011). Ongoing support for the young person is likely to come from a combination of professionals and those close to the young person such as friends and family.

Due to the association between self-harm and mental disorder, a crucial part of self-harm management is to identify and treat any underlying conditions. This includes depression, anxiety, psychosis, substance use disorders, ADHD, conduct disorder, eating disorders, and autism spectrum disorder (Hawton et al. 2012; Minshawi et al. 2014; NHS Digital 2018; Nock et al. 2008; Sansone and Levitt 2002). Other underlying issues which may need to be addressed could include past or ongoing trauma, difficult family circumstances, or difficulties at school or with peers (Hawton et al. 2012).

Psychological Therapies

There is growing evidence for psychological therapies being effective for the secondary prevention of self-harm. These include dialectical behavior therapy (DBT), which has now been shown to reduce self-harm in two independent randomized controlled trials (RCT) (Asarnow and Mehlum 2019) as well as cognitive behavioral therapy and mentalization-based therapy with one positive RCT each, in certain groups of young people (Hawton et al. 2015b; Ougrin et al. 2015). Manuals for the management of self-harm have been developed, and one such manual is listed in the resources section below. Training and ongoing supervision for the delivery of psychological therapies for self-harm, including manualized therapies, are essential.

Hospital Admission and Discharge

In some situations, a young person who self-harms or who is at risk of serious self-harm or suicide may require hospital admission in order to keep them safe in the short term and to offer immediate treatment. Risks and benefits of hospital admission

should always be considered. There is some evidence that hospital admission, compared to intensive community intervention, is associated with higher rates of self-harm (Ougrin et al. 2018). The period immediately after discharge from hospital is associated with a particularly high risk of suicide (Chung et al. 2017), and so close monitoring of young people at this time is paramount.

Medication

No medication has been proven to be effective in the prevention or management of self-harm although very few trials have been conducted and none in children (Hawton et al. 2015a, b). However, medication is used where appropriate to treat any associated mental disorders. When prescribing for a young person with a history of self-harm or suicidal thoughts, risks need to be managed in terms of the potential for misuse or overdose of medication.

Conclusions

Self-harm is common in young people. In most cases it does not lead to suicide; however, it is one of the most important risk factors for completed suicide which remains the second most common cause of death worldwide in this age group. Self-harm is also associated with significant distress for the young person, as well as being associated with comorbid mental disorder. Raising awareness, tackling stigma, identifying those at risk, prevention, and management of self-harm are key responsibilities of any professionals working with young people. This includes those working in schools, social services, primary care clinics, general hospitals, and mental health services. It is crucial that young people are able to find other ways of coping and to offer them the support to do so.

Other Resources

The following websites, books, manuals, and documents provide useful information about self-harm. The resources are generally country-specific and therefore may contain references to services or legal frameworks which are not applicable to other settings.

Resources for non-health professionals:

- E-learning module: https://www.minded.org.uk/

Information for young people:

- Young Minds https://youngminds.org.uk/find-help/feelings-and-symptoms/self-harm/

Guidance on assessment management of self-harm:
National Institute for Health and Care Excellence (NICE) (United Kingdom)

- Short-term management: https://www.nice.org.uk/guidance/cg16/resources/selfharm-in-over-8s-shortterm-management-and-prevention-of-recurrence-pdf-975268985029
- Long-term management: https://www.nice.org.uk/guidance/cg133/resources/selfharm-in-over-8s-longterm-management-pdf-35109508689349

Safety planning:

- Suicide safety planning (not specifically for young people) http://www.suicidesafetyplan.com/
- Distraction techniques: http://www.nshn.co.uk/downloads/Distractions.pdf

Media recommendations for reporting on suicide:

- Reportingonsuicide.org (United States) http://afsp.org/wp-content/uploads/2016/01/recommendations.pdf
- Samaritans (United Kingdom) https://www.samaritans.org/sites/default/files/kcfinder/files/press/Samaritans%20Media%20Guidelines%202013%20UK.pdf

Workbook and worksheets:

- CBT Workbook: *Cutting Down: A CBT Workbook for Treating Young People Who Self-Harm* by Lucy Taylor

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Services for Neurodevelopmental Disorders such as Autism Spectrum, Attention Deficit Hyperactivity Disorder (ADHD), and Tic Disorders

34

Eric Taylor

Contents

Abstract

Neurodevelopmental disorders are based in brain function, but are modified by the social and physical environment. They include autism spectrum conditions (ASD), attention deficit hyperactivity disorder (ADHD), chronic motor tics/Tourette (TS), and learning difficulties. This chapter describes the range of

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services likely to improve the quality of life in affected people. Services will be described according to their goals: promote understanding and reduce stigma, reduce the core symptoms, treat complications and comorbidities, reduce functional restrictions, and support caregivers.

Keywords

Autism spectrum · Attention deficit · Hyperactivity · Tics · Tourette · Stigma · Functional restriction · Stimulants · Mood dysregulation · Communication · Antipsychotics · Behavior modification · Social skills · Epilepsy · Adaptive skills

Introduction

Neurodevelopmental disorders – such as autism spectrum conditions (ASD), attention deficit hyperactivity disorder (ADHD), and chronic motor tics/Tourette (TS) – are all common enough to require the attention of mainstream pediatric and/or child psychiatric services. They are all more common in males than females, arise early in development, have strong genetic influences, and tend to persist over time, albeit in varying ways.

ADHD affects about 5% of the child and adolescent population and perhaps half that rate of adults; ASD affects about 1% of people; tics in severe form about 1%. ADHD and ASD often coexist with intellectual disability and both are considered to arise from brain alterations that lead to neurocognitive changes (Taylor 2009a; Frith and Happé 2005). The conditions are continuously distributed in the population. Nevertheless, diagnostic schemes such as the fifth revision of the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM 5) and the eleventh revision of the World Health Organisation's International Classification of Disorders (draft ICD 11) provide clear operational definitions of how to make classification into discrete categories (e.g., Lord and Jones 2012). Such categorization is useful for statistical purposes, linking research to practice, and guiding regulation of treatments and considerations of remuneration to practitioners (see Diagnoses: Values and Limitations. ICD, DSM, and others). For clinical purposes, however, it is necessary to go beyond the recognition of a diagnosis to a formulation of the range of problems that are present. The separable neurodevelopmental disorders very often coexist with each other and with a range of mental health and learning problems (King 2016).

The level of severity varies from being merely a quirk in an otherwise well-adjusted person to being a part of profound handicap. This continuous distribution means that any figure for prevalence depends upon where one places the cut-off for symptom severity and functional impairment. Correspondingly, diagnostic rates vary from time to time and from place to place. ADHD in particular is underdiagnosed and undertreated in most countries outside the USA (Taylor 2016). The overlap with other conditions means that the needs of severely affected people are various and services need to deploy a range of approaches.

Goals

The goals of interventions include:

- Promote understanding and reduce stigma
- Reduce the core symptoms and behaviors of ASD, ADHD, TS, and other syndromes
- Treat significant complications and associated conditions
- Reduce functional restriction and enable individuals to achieve their potential
- Support the family, schools, and other caregivers
- Ease transitions into later stages of development and adult services

Understanding About the Conditions

Affected people and their families greatly appreciate clear information about the condition. When conveyed with tact and accuracy good information can often relieve a burden of guilt that has been carried by the family because of false suppositions that they have created the disorder themselves. It can liberate good problem-solving. On the other hand, where in-born and potentially inherited conditions carry great stigma then public education is needed and the focus will need to be on the practicalities of coping with the conditions.

Reduction of Core Symptoms

ADHD

It is sometimes possible and desirable for medical or psychosocial interventions to reduce the core features of disorder. In the case of ADHD, the core features are the varying combinations of impulsive overactivity and inattentiveness.

Medication, especially with stimulants such as methylphenidate and dexamphetamine, can be expected to have large effect sizes (approaching one standard deviation) in reducing the symptoms (NICE 2018). If they do so, they can also be expected to improve some of the complications and coexistent problems considered below. They mostly act through altering the balance of the neurotransmitters involved in pathogenesis, especially dopamine and noradrenaline. In some countries, there is little availability of the medicines because regulators fear their potential for creating and maintaining addiction. In fact, however, their potential for dependence is pretty much restricted to situations of gross misuse, e.g., where very high doses are injected, snorted, or inhaled. Therapeutic doses of oral preparations should not maintain or create dependence.

Some psychological interventions, such as behavior therapy following the principles of social learning, can be given and have often been preferred when they are available (NICE 2009). Unfortunately, their action on the core features is rather

disappointing and effect sizes are very small in controlled trials using blinded raters (Sonuga-Barke et al. 2013). They are still valuable for associated problems such as oppositionality and conduct disorder (see ► Chap. 36, "Psychological Treatment of Mental Health Problems in Children and Adolescents" chapter).

Autism Spectrum Disorders

The core features of ASD are impaired social relationships, fixed and stereotyped patterns of activity, and communication problems. Direct modification of these is sometimes possible, at least in part, through applying principles of social learning (NICE 2013). A system of teaching the parents of preschool children at risk for ASD, to recognize and enhance the very early stages has received support from randomized controlled trials in the UK (Green et al. 2017). This intervention, though not yet generally available, has promise in other cultures as well. Medication, especially with antipsychotic drugs, can reduce the level of stereotyped behaviors, but the adverse effects are often prohibitive. It should be remembered that the modern definitions of autism spectrum affect more than 1% of the total child population and that most of those affected are intellectually competent. For them, the key forms of help may not be the reduction of symptoms but the reduction of stigma and intolerance by society.

Intellectual Developmental Disorders (Intellectual Disability)

Intellectual disability is a combination of cognitive impairment with poor adaptive function. It is not usually possible to increase IQ with medical treatment unless it is secondary to a remediable medical illness such as phenylketonuria (which can be treated with special diets from infancy) or environmental toxins (see ► Chap. 21, "Toxins and Pollution"). Adaptive function can be helped by education and family support (see "Learning Difficulties", below).

Tourette and Chronic Tics

Chronic tics can be modified with drugs such as alpha 2 adrenergic stimulants and with dopamine blockers such as the antipsychotics. In practice the adverse effects can be worse than the problem. Most chronic tics are cosmetically unpleasant but not damaging to health and life. Most affected people learn to be resilient to the teasing and stigmatization which constitute the main problems in practice. Some severely affected individuals, however, may find that tics are interfering with everyday activities such as eating, walking, and working in groups. Medication can then be very helpful (Shaw and Coffey 2014).

It is occasionally possible to modify an underlying physical cause. Infective and immune causes of neurodevelopmental disorders do exist. PANDAS, for

example – Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections – describes an unusual acquired cause of tics and obsessions; and according to some authorities of other conditions as well (Swedo et al. 2012). The hallmarks are an explosively acute onset in a child and an episodic course. Those exacerbations were originally thought to come from an infection with group A beta-hemolytic streptococci as evidenced by a positive throat culture for streptococci or a history of scarlet fever. So far, however, routine antibiotics and immune therapies such as steroids have not been shown to modify the course.

Several substances are promoted for their ability to modify the fundamental basis of neurodevelopmental disorders. Such claims should be taken skeptically. Polyunsaturated fatty acids, especially omega 3, have received considerable research attention. Current evaluations of the extensive research suggest that they have a small but significant effect in reducing the symptoms of ADHD. The statistical significance is interesting and can be expected to drive further research. Unfortunately, the small size of the action (about 0.2 SD) implies that they will not have a major effect on most people trying them, and the expense is considerable. They are nevertheless relatively safe by comparison with most psychotropic drugs. (Occasional problems of increased bleeding time and seizures have been reported.) Scientific practitioners will probably neither recommend nor forbid them, but offer monitoring so that families can make up their minds with good information. "Orthomolecular" therapies, involving supplements tailor-made to the supposed chemistry of the individual, have too little trial evidence to recommend them. Some widely advertised treatments, including swaddling in wet sheets, secretin, and dialysis, have good evidence against their use.

Recognition and Treatment of Complications

For many people with neurodevelopmental disorders, the main disabilities are imposed by the complications rather than by the core problems. In both ADHD and ASD, challenging behaviors such as aggression and self-harm can lead to social restrictions. Mood dysregulation can lead to emotional storms, irritability, and severe tantrums. In ADHD these are sometimes helped by the use of stimulant drugs (see ► Chap. 35, "Pharmacological Approaches in Child and Adolescent Mental Health"). In the case of ASD passionate outbursts may well be prevented by an autism-friendly environment. In such an environment, unexpected events are reduced by predictability and clear information about what will happen, sensory stimulation (e.g., loud noise) is reduced, and communication is enhanced by aids.

When behavior problems do arise then they can often be managed by applying the methods of behavior modification. Controlled trials of teaching parents' behavioral skills, which have shown only limited effects on core symptoms of ADHD, have confirmed that coexistent oppositional defiant behaviors are

substantially reduced (Sonuga-Barke et al. 2013). Applied behavioral analysis can also be effective in reducing irritability and emotional dysregulation in people with autistic conditions and indeed those with intellectual disability (see ▶ Chap. 36, "Psychological Treatment of Mental Health Problems in Children and Adolescents").

Communication can be assisted in various ways. For people who have not yet acquired language, picture boards can allow them to point to their needs. Sign language may be easier than spoken for some impaired people to acquire. For those able to communicate then the best advice is usually simply to encourage them to do so. Anxiety about speaking can be reduced by an approach of graded exposure.

Social skills can be increased by individualized approaches. For some this will take the form of groups with adult facilitators. For others, anxiety about socializing may be reduced by an approach of cognitive behavioral therapy. For others again, a stepwise approach to learning the skills involved in socializing may enhance their confidence and ability to go through the processes of recognizing what others are doing, joining in a tactful fashion and introducing their own needs only gradually.

Depression and anxiety are very often concomitants of the disorders. About a quarter of children with ADHD will show anxiety symptoms as well. Anxiety is so common in autism as to be almost the rule. In people with autism, anxiety tends to increase in later childhood and adolescence and a good deal of this is due to isolation from and victimization by other children (Simonoff et al. 2008). Medication for depression and anxiety is no more effective than in typically developing children (see ▶ Chap. 35, "Pharmacological Approaches in Child and Adolescent Mental Health").

Obsessive compulsive disorders can raise particular difficulties of diagnosis. In children with stereotyped patterns of behavior, it can be hard to appreciate that some repetitive acts are maintained by anxiety and can be managed through the same methods as in typically developing children (see ▶ Chap. 36, "Psychological Treatment of Mental Health Problems in Children and Adolescents"). Graded exposure with response prevention (ERP)can be applied even in autistic people. Antidepressants such as SSRIs can also be helpful. Naturally, however, neither ERP nor SSRIs can be expected to cure the majority of autistic stereotypies.

Emotional dysregulation refers to transient moods that are excessive in intensity, frequency, ease of elicitation, or impossibility of soothing. Anger is the most troublesome and is often accompanied by prolonged states of anger, misery, and resentment. Such a combination is diagnosed in DSM-5 as "disruptive mood dysregulation disorder." There is no accepted standard treatment; recommendations are available in Taylor (2009b). When irritability is prominent in ADHD, stimulants are not contraindicated and may be very helpful for the mood storms. As a second line, a mood stabilizer such as lamotrigine may be advocated before proceeding to the more toxic antipsychotic drugs. In ASD, antipsychotics such as aripiprazole or risperidone are reasonably effective and safe if given in small doses for periods up to a few months.

Physical Illnesses

People with neurodevelopment disorders can find themselves excluded from some of the normal health checks and interventions. If they have communication problems, then pain may go unrecognized and be responsible for a major worsening in social adjustment. Ear infections, throat infections, and constipation may all need to be detected in people who are not specifically complaining of them.

Premature death is more common than would be expected for people without ADHD or ASD. In ASD, death rates are increased approximately sevenfold during childhood and early adult life. For those with coexisting intellectual disability, the commonest cause is epilepsy. Self-harm can also contribute. Indeed, for those without intellectual disability, the commonest cause of death in ASD is suicide. In ADHD, the commonest cause of death in the USA is violence; in most other countries accidents are the commonest.

Disorders such as ASD and ADHD can be barriers to receiving good quality care for physical health. Travel to services can be a struggle, and crowded clinics can be very aversive to autistic people. All services for chronic disorders in young people should be aware of limitations of access for those with special needs.

Recognition and Treatment of Associated Problems

Genetic causes may need to be recognized. The genetic inheritance is usually a matter of large numbers of genes of small effect, so detection of individual genetic changes is unlikely to become fruitful for most individuals in the near future. Polygenic profiling of individuals' DNA, however, is expanding rapidly and decreasing in price, and could well soon become a part of routine investigation.

There are also a few genes of large effect that can be recognized from their associated bodily changes (Richards et al. 2015). A chromosomal deletion at 22q11, for instance, has widespread effects on mental life. The fragile X chromosomal anomaly is a useful screen in autism and intellectual disability; and an increasing range of genetic problems can be detected by specialized services including chromosomal microarray. All these investigations can allow family counselling about the possibilities of recurrence.

Epilepsy is quite common. This can give rise to problems in diagnosis. For instance, episodic changes in behavior are sometimes attributed directly to seizures or to automatisms following seizures. "Epileptic rage" is in fact very uncommon. Temper outbursts in people with seizures are much more likely to be a result of a mood problem, or occasionally of a temporal lobe aura of fear and dread.

The treatments for epilepsy can also produce adverse mental changes as an uncommon side-effect. Some antiepileptics such as phenobarbitone are especially likely to produce irritability and behavior problems. Where countries have prescribing policies that allow only the cheapest antiepileptics to be used, then this deserves to be challenged on psychiatric grounds.

Impaired reality testing, producing hallucinations and delusions, is much more common than the psychotic illnesses of schizophrenia or bipolar disorder. Focal seizures with retention of consciousness can be responsible. Reduced stimulus environments can also bring about altered perceptions, as can the failure to distinguish internally generated sensations (such as loud thoughts) from external events in the real world.

Learning difficulties (LD) can be either general, as in low IQ, or specific, as in dyslexia or dyscalculia. They are not in general curable. Mental health professionals can be involved in their recognition. Behavioral and emotional problems are frequent complications, especially when academic progress is slow and parents are demanding, and the diagnosis of an LD may clarify the true predicament. Standardized testing of IQ is crucial, and best done by a qualified psychologist. There are also some brief tests available, such as the Kaufman Brief Intelligence Test (K-BIT 2), which can be administered by a wider range of professionals and form a useful screen for problems of intellectual level (Kaufman 1990). Low IQ is also important in making a prognosis: it worsens the outlook for people with other developmental problems. Causes should be sought, and chromosomal and genetic testing is now practical for the diagnosis of conditions such as Down syndrome and fragile-X. The management of LDs is a key concern for education, and mental health should seek consent from parents to share their evaluations with teachers.

Environmental Adjustments

Schools can do a great deal to promote healthy development. The high prevalence of neurodevelopmental disorders implies that in most countries most affected children will be in regular classrooms. There is then much to be done to help children. In the case of ADHD, it can help to break down material to be learned into simple chunks that can be absorbed briefly. Such an approach is rather similar to the teaching methods used for young children who are developing normally; and most teachers will find it possible to take an individual approach to inattentive and impulsive children.

Where class size makes an individual approach impossible, then a teaching aide in the classroom may be encouraged on medical grounds. Furthermore, several trials have shown that teachers can be taught fairly simply to use behavior therapy methods, such as target setting and reward, rather than the more instinctive methods of reproof and punishment, and that this creates better behaved children and happier classrooms (see chapter ► Chap. 36, “Psychological Treatment of Mental Health Problems in Children and Adolescents”).

For children with ASD, many schools find it practical to provide sanctuary areas with predictable routine and an avoidance of undue and unexpected sensory stimulation. Special schools have been able to develop appropriate educational practices. An educational atmosphere is often to be preferred to a nursing one when considering residential places (NICE 2013).

Parents, too, and families generally, can contribute a great deal. They are often crucial in assembling the mix of services needed for an individual child and in campaigning for the provision of the variety of ways of meeting needs. At home, a major difficulty for people with ADHD can be the development of hostile emotion in other family members. This is often generated by the apparently silly quality of impulsive behavior and by the apparent defiance of children who are simply forgetting instructions and rules. Inattentive behavior can also be very off-putting to caregivers who find they do not get the usual rewards of the child's attention. Psychoeducation is a good way of reducing hostile and critical emotion – which can often be monitored by clinicians noting the expressed emotion in the way that carers speak of the children and their problems.

Chronic tics do not respond to punishment at home. They may however be helped by maneuvers such as habit reversal at the onset of tic premonition. A relaxed approach and an optimistic outlook are usually the ways to avoid the complication of emotional problems.

Particular problems for families can arise when there is diagnostic uncertainty. Awkwardly, diagnoses do change with time. Autism, ADHD, and tics very often coexist with each other and with learning disabilities; and over time one or the other may come to dominate the picture at different points. Changing diagnosis and multiple diagnoses can lead parents to confusion and to distrust of the professions who should be helping them. One reaction to uncertainty is to seek out an ever-widening range of authorities for one approach or another. It is then all too easy for families to be exploited. Clinicians should keep up to date with the evidence from research trials about what works and what does not.

Stigma can be the most limiting problem, especially for young people with epilepsy, and exclusion from education and occupation is all too common. The key remedy is through psychoeducation and is described in ▶ Chap. 14, "Stigmatization and Society's Inclusiveness Across Cultures" in this volume.

Organization of Services

The descriptions above, of the varying needs of people with neurodevelopmental disorders and the ways of meeting them, have emphasized their multiplicity. There are therefore challenges in developing useful services for those with many needs. One method has been to develop multidisciplinary centers with a range of skills and professions, to which children can travel for specialist assessment and advice. These may be accompanied by residential facilities to allow for detailed observation and quick trials of closely monitored interventions. Such a system is capital- intensive but may be particularly suitable in widely dispersed populations.

Another system has been to educate professionals in a wide variety of skills including medication, behavioral therapy, consultation at schools, and family advice. Such a broadly trained professional can cope with a wide variety of needs and delegate specific aspects of intervention to community workers. An efficient use of this kind of versatile and well-trained professional is to deal with a full range of

neurodevelopmental disorders rather than specializing in one, for example, in autism. In any case, the various disorders so frequently coexist, and have so much in common by way of complications and associated disorders, that much can be done in an integrated way.

Another method of organization has been for a range of specialist clinics. Services for autism, ADHD, or Tourette can reach a high level of specialist skill. Cooperating teams of professionals with different skills can enhance the sophistication. Such a system, however, risks an expensive and inefficient duplication of resources. Furthermore, families can be troubled and severely inconvenienced by the need to go to separate services for the different problems that their children present. The balance between localized and centralized services needs to be planned according to the situations in the individual region. Regions with very restricted professional resource often find it best either to concentrate on a center of excellence from which expertise can eventually be distributed; or on a peripatetic service bringing instruction and advice to local workers.

Support services for chronic disabilities aim to improve personal adaptive skills. Occupational therapists will aim to ensure the provision of meaningful and purposeful activities, self-care skills – such as washing, dressing, feeding, cooking, employment activities and skills, and leisure and domestic activities. Speech therapists will seek to improve communication skills, articulation, and vocabulary. Physical therapists will aim to improve the quality of life by enhancing mobility and independence. Ideally, there will be enough communication between the support coordination agencies to maintain an individual support plan and help communication between the givers and recipients of service.

Transitions into adult services need to be planned in advance. All the disorders described here tend to persist into adult life. If services for children and adolescents are organized differently and with different personnel from adult services, then there should be explicit and agreed standards of how information is transferred. Young people and their families should have careful and realistic explanations of what will be available in advance of the transitions. Preparation for employment needs individual attention from educators. Information should be made available to employers: many affected adults can contribute a great deal if their working conditions can be made suitable.

Conclusions

Neurodevelopmental disorders, such as ADHD, autism spectrum, and chronic tics, often coexist with each other and with a range of other mental health problems, learning difficulties, and neurological conditions such as epilepsy and motor coordination disorders. They often persist into adult life. Clinicians can offer valuable help in making diagnoses and identifying the full range of problems in the individual case. Psychoeducation gives families the knowledge to cope and use the range of available services constructively. Some focused treatments, such as medication for ADHD and behaviorally focused therapy for aggression, have good support from

trials. A range of educational and therapeutic support measures can be identified and often call for a multidisciplinary approach.

Cross-References

- ▶ Epilepsy
- ▶ Pharmacological Approaches in Child and Adolescent Mental Health
- ▶ Psychological Treatment of Mental Health Problems in Children and Adolescents
- ▶ Stigmatization and Society's Inclusiveness Across Cultures

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Pharmacological Approaches in Child and Adolescent Mental Health

35

David Coghill

Contents

Abstract

While psychological therapies remain the first-line treatment for most child and adolescent mental health disorders, there is increasing evidence to support the use of medications especially where a psychological treatment has been ineffective. When using psychotropic medications in children and adolescents, it is particularly

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important to maintain good prescribing practice. This chapter highlights several key principles of prescribing including the importance of properly defining the patient's problem and specifying the therapeutic objectives, working with a selection of preferred drugs that you are very confident with, giving good and clear information about potential benefits and risks, and closely monitoring outcomes. In addition to these general principles, there is also a discussion on polypharmacy and drug x drug interactions, the importance of changing things one step at a time, adherence to treatment, and initiation of treatments. Therapeutic options and strategies are discussed for the most common mental health disorders of childhood and adolescence covering attention deficit hyperactivity disorder, depression, anxiety, obsessive–compulsive disorder, autism spectrum disorder, tics and Tourette's, bipolar disorder, and schizophrenia. Advice is given about approaches to measurement-based care and structured approaches to adverse effects.

Keywords

Psychopharmacology · Pediatric · Good prescribing practice · Mental health · Psychiatry · ADHD · Depression · Anxiety

Introduction

For most child and adolescent mental health problems, psychological therapies are, rightly, considered to be the first-line treatment option. This approach, to try a non-pharmacological approach first, is supported by a considerable and growing evidence base and is recommended by many evidence-based guidelines for a broad range of disorders ranging from depression, anxiety, obsessive–compulsive disorder (OCD) and post-traumatic stress disorder (PTSD), eating disorders, substance use disorders and attachment disorder to oppositional defiant disorder (ODD), conduct disorder (CD), Tourette's and the irritability and aggression associated with autism spectrum disorders (ASD), or intellectual disability (ID). There are however several disorders such as attention deficit hyperactivity disorder (ADHD), bipolar disorder, and schizophrenia where it is now agreed that a pharmacological approach can legitimately be considered as a first-line treatment approach. While it is not surprising that the use of medication to treat psychiatric problems is far less common in children and adolescents than in adults, it is also clear that the rates of prescription of psychotropic medication are increasing in these younger age groups. Despite a significant increase in the number and quality of the clinical trials of psychotropic medications in children and adolescents, there are legitimate concerns that the increase in rates of prescribing still outstrips the evidence base. One example from the UK concerns the prescribing of antipsychotics for children 7–12 years of age in primary care which almost tripled between 1992 and 2005, with the prescribing of atypical antipsychotics increasing 60-fold from 1994 to 2005 (Rani et al. 2008). The vast majority of this increased prescribing was for the management of aggression and challenging behaviors rather than for psychosis. It is not clear whether this increase

in prescribing of antipsychotics to children should be viewed as an indication of appropriate clinical practice in the management of often very complex and debilitating conditions or raising concerns about safety of prescribing potent medications that may be a consequence of poor understanding about the non-pharmacological options available to treat these behaviors or a genuine lack of access to non-pharmacological treatments. The truth is likely to be a combination of the two but does highlight the need for better evidence to allow this kind of clinical decision-making more evidence-based.

Against this backdrop of increased prescribing, it is clearly important for all professionals working with child and adolescent mental health problems to have a good understanding of the appropriate use of psychotropic medications including both their potential benefits and adverse effects in these populations. For those readers with a strong grounding in adult mental health, it is reassuring to know that many of the issues around prescribing psychotropic medications in children and adolescents are similar to those in adults. However, there are also several important differences that need to be taken into account.

General Issues

Although medications are not considered to be the first-line treatment for most child and adolescent mental health disorders, they can make an important contribution to the overall management, particularly where a psychological therapy has either failed or only partially improved the clinical presentation. It is important that medical and nonmedical clinicians working in child and adolescent mental health services or within a pediatric setting don't fall into the familiar trap of adopting a polarized view about medication and psychological approaches to treatment. They can complement each other well if used thoughtfully and knowledgeably.

In children and adolescents with psychiatric disorders, medication is nearly always deployed alongside psychosocial interventions and integrated into a total treatment package which should also include a strong psychoeducational component; it is, or at least should be, uncommon for medication to be the only form of intervention. One particular benefit of medication, often undervalued by clinicians, is the ability to put a child or adolescent in a position whereby they are more able to take full advantage of a psychotherapeutic intervention. On the other hand, there are clear indications that psychotropic medications are being increasingly used in children and adolescents, and while evidence is sparse, there is a growing concern that in some instances medications are being used either to compensate a lack of availability of, and access to, adequate high-quality psychosocial treatment or as a "quick fix" for problems that would more appropriately be managed through a psychological intervention.

Most of the conditions for which medication is useful affect older children and adolescents (see Table 1), and it is unusual to prescribe psychotropic medications for preschool children. The reactions of very young children to psychotropic medication are much less predictable and are associated with increased rates of adverse effects compared to older children and adolescents who are themselves more susceptible to

Table 1 Summary of the main medications used in child and adolescent mental health disorders

Class	Main drugs within class used in children and adolescents	Main indications
Stimulants	Methylphenidate Amphetamines Lisdexamfetamine	ADHD Binge eating disorder
Non-stimulant ADHD medications	Atomoxetine	ADHD
Alpha 2 agonists	Guanfacine Clonidine	ADHD Tics and Tourette's Sleep disorders
Serotonin reuptake inhibitors Selective	Citalopram Escitalopram Fluoxetine Fluvoxamine Paroxetine Sertraline	Depression Anxiety OCD
Less selective	Clomipramine	
Other antidepressants	Bupropion Venlafaxine	ADHD Treatment-resistant depression
Atypical antipsychotics	Risperidone Aripiprazole Quetiapine Olanzapine Lurasidone Brexpiprazole	Schizophrenia Mania Tourette's Irritability, aggression (in ASD and ID)
Mood stabilizers	Carbamazepine Valproate Lithium Lamotrigine Gabapentin Topiramate	Mania, bipolar disorder Irritability, mood instability, aggression
Other drugs	Melatonin	Sleep disorders

adverse effects than adults. It is also important to note that some psychotropic medications (e.g., fluoxetine) have been demonstrated, in animal studies, to lead to lasting developmental changes to the immature brain although the implications of this for humans remain unclear. For these reasons, it is strongly suggested that clinicians approach the use of any of the medications mentioned in this chapter in the very young child ($\leq$5 years) with great caution and continue to exert a degree of caution for those medications not adequately trialed in children and young people while their brains are still developing (which we now understand extends well into young adulthood – late 20s).

It is also important to always consider for whose benefit a medication is being prescribed. It is, for example, becoming more common for the parents or teachers of children with disruptive behaviors to ask for, and sometimes "insist" on, medications to make their child easier to manage. If this results in improved family relationships,

a more settled household and a happier child then perhaps can be justified, but enabling an easier life for adult caregivers or educators is an insufficient reason to prescribe, particularly when balanced against the very real risk of long-term metabolic and motoric adverse effects.

Good Prescribing Practice for Child and Adolescent Mental Health Problems

Whenever we consider prescribing a medication for a mental health problem, it is highly recommended to run through a checklist of questions and practice points to make sure that the decision to prescribe is justified, that the best medication is chosen at the correct dose, that the target symptoms are clear and appropriate, that outcomes can be measured and monitored, and that the patient, and where appropriate their family, are fully informed of potential risks as well as benefits of the treatment choices and are in agreement with the treatment plan. While it is easy to skimp on these preparatory steps, failing to follow them is likely to have a negative effect on outcomes.

There are several very-well-thought-through approaches to ensuring good prescribing practice which, with a few tweaks, can be easily applied to child and adolescent psychopharmacology. Coombes and colleagues (2011) highlight the four important stages of prescribing:

1. *Information gathering*: This requires the prescriber having the requisite skills to gather the relevant patient information including current symptoms and diagnosis, medical and psychiatric history, current and past medication history, and allergies and adverse drug reactions.
2. *Clinical decision-making and treatment planning*: Using pharmacological knowledge along with details of the diagnosis and clinical presentation as well as demographic and developmental information to select the most appropriate medication and the most appropriate dosing protocol for that individual patient. At this stage, it is essential to consider non-drug treatments, and give the patient and their family enough information to engage them in collaborative decision-making as this has the potential greatly to improve adherence and patient outcomes. The prescriber should be able to tailor their decision-making styles, to be more or less directive or collaborative, and decide which is most appropriate for the patient at that point in time, while always considering and valuing the patient's/carers' views.
3. *Communication:* The prescriber needs to then be able to communicate their prescribing decisions in a clear, safe, and effective manner to the patient and any other health professionals that are involved in the case. Prescriptions should always be legible, unambiguous, and without error-prone abbreviations safe dispensing. The management plan should also be clear and contain triggers for review should any serious and/or unexpected adverse events emerge. Monitoring

requirements, potential adverse effects, and contingency planning should also be discussed.

4. *Monitoring and review:* The prescriber should be available to review the therapeutic and/or adverse effects of the treatment to inform dose adjustments or a change in treatment. As discussed below, measurement-based care, the process by which changes in treatment are based on regular operationalized and structured outcome measures, is not yet common in psychiatric practice. There is however strong evidence that this approach delivers improved outcomes. Hopefully, these approaches will soon be recognized as standard practice.

The World Health Organization has also proposed several key steps that can be followed to improve good prescribing practice, and their manual, "Guide to Good Prescribing: A practical manual," would make a welcome addition to every prescribers bookshelf, computer, or device (De Vries et al. 1994). They propose six key steps that overlap neatly with the four-stage process described above: (1) define the patient's problem; (2) specify the therapeutic objective; (3) verify the suitability of your P-drug; (4) write a prescription; (5) give information, instructions, and warnings and; (6) monitor (and stop?) the treatment. They also highlight the importance of staying up to date about new drug developments and information. One interesting and important contribution of this manual is the introduction of the need for clinicians to select their P(ersonal) drugs. P-drugs are the drugs that a clinician has access to and has chosen to prescribe regularly and with which they have become familiar. They are a prescriber's priority choice for any given indication and situation. The P-drug concept includes much more than just the name of the drug; it also includes the formulation, dosage, and titration schedule and duration of treatment. P-drugs will differ from country to country, and between individual doctors, depending on availability and cost as well as medical culture and individual interpretation of information (although with the acceptance of evidence-based practice, there should be less variation in the last two). The principle is however a universal one: choose your preferred drugs based on availability, cost, and evidence and use them where appropriate. This avoids repeated searches for a good drug in daily practice and allows the prescriber to become thoroughly familiar with their effect profile of positive and negative (adverse effects). This familiarity has clear benefits to the patient. The WHO manual has some very good tips for how and how not to select our list of P-drugs (De Vries et al. 1994).

Other factors to take into account when prescribing psychotropic medications for children and adolescents include:

1. The well-known mantra of "start low go slow," although it is also important not to start too low or go too slow as this increases the risk of undertreatment and of the patient dropping out due to a too slow response time. Titration is therefore an important balancing act between achieving optimal response with the least adverse effects. This is another strong argument for having a portfolio of P-drugs that you know well and can be confident about prescribing.

2. Address issues that may impact on adherence at the very beginning. Young people are not alone in their ambivalence about taking medication on a regular basis, but for many adolescents, it is an even more unwelcome imposition. This is particularly true if a decision to start a medication is made simply on the basis of a discussion with parents. Adherence can be improved if the clinician takes time to have an individual discussion with the child/young person about why the medication is being prescribed, what the benefits may be, what adverse effects can be expected, how long before any positive effects will be seen, and how long it is anticipated the course will be. These discussions form the necessary basis for informed consent and are good practice even with children too young to be competent to grant or withhold consent. Most people only remember a small proportion of what has been said in the clinic, so the use of developmentally appropriate handouts describing the drug in question is often helpful and much more likely to be of use than the data sheets supplied by the manufacturers.
3. Only change one thing at a time. When making changes in dose or switching between drugs in order to either improve effectiveness or reduce adverse effects, it is important to make only one change at a time. It is very tempting not to follow this rule when things are not going well and you have several ideas for how to improve them. However, if you make more than one change at a time and things either improve or get worse, it is often extremely difficult to know which of the changes made the difference. This may or may not be a problem at the time (depending on whether the changes went well or not) but will always make it difficult in the future if and when further adjustments are required.
4. Avoid polypharmacy wherever possible. While it is sometimes necessary to prescribe more than one medication at a time (e.g., when treating ADHD and bipolar disorder at the same time), polypharmacy should not be the norm for most child and adolescents. From clinical observation, one of the major issues seems to be that a failure to up-titrate patients to the optimal dose results in an additional medication being added to manage a partial response to the first medication. This can result on patients being treated with multiple drugs for essentially the same problems. It is always preferable to titrate the first drug up to maximum dose or maximum tolerated dose (as long as this is within safe limits) rather than to add a second medication. Also where there is a suboptimal response to a first medication, consider switching to another medication rather than adding a second to the first. Some helpful questions to ask before switching or adding are provided in Box 1.
5. Always pay attention to possible drug x drug interactions. Many psychotropic medications are metabolized by the CYP family of hepatic enzymes and most importantly the CYP450 isoenzymes. As a consequence, there are many drug x drug interactions whereby the metabolism of one drug is altered by another. This can lead to both inhibition and induction of the CYP enzymes which results in either decreased or increased drug metabolism. When prescribing two drugs at one time, it is therefore important to check for these, and other, potential drug x drug interactions. There are now several helpful online references that can be checked for current information on medications and drug interactions. The British

National Formulary (BNF) which can be accessed through MedicinesComplete (https://www.medicinescomplete.com/#/) is particularly helpful in child and adolescent health as it includes access to the BNF for Children.

6. Think like a chess player and try to work out whether the change you make now has the potential to hinder you in the future. An example of this from ADHD practice is when titrating onto a psychostimulant. You have increased the dose and symptoms have improved considerably and there are no adverse effects. Should you leave the dose as it is or increase further? My personal practice would be to increase the dose to ensure I have optimized treatment to maximum benefit. There are several advantages to this approach. If there is a further improvement, the benefits are clear. If there are not or there are adverse effects at the highest dose, it is easy to say "Ok we now know the best dose for you" and drop the dose back down. But another potential longer-term benefit is that if the patient comes back in 6 months and reports that their medication is now not working as well, we would be clear that this is likely to be due to tolerance rather than suboptimal dosing. In this case, the treatment approach would be to stop the medication for a brief (perhaps 1 week) period and then restart it, and it is likely to work better again. If we did not know this from our early experience with titrating to optimal effect, we may be tempted to just increase the dose. This would of course provide a temporary solution to the tolerance, but after a short period, it would reoccur and we could get into a spiral of increased dose to counteract tolerance.
7. Make sure the patient will be able to take the medication being offered. Not all children find swallowing tablets and capsules easy, and liquid preparations of medicines are often not available. It may be necessary to teach a child how to swallow a tablet using a graded series of small cake decorations and sweets, ensuring that swallowing a solid item is always followed by a drink.
8. Keep medications safe. Parents need to be reminded to keep medications safe and secure and should supervise the taking of them. This is particularly important with controlled drugs such as the stimulants.
9. Always prescribe within the limitations of your knowledge, skills, and experience. This may seem obvious but we often end up in situations we are not familiar with. In times like this, it is always appropriate to stop, take a step back, and ask for advice from a colleague or consult the literature. Common examples of such situations are when switching from one drug to another with questions like: Should I stop one drug before starting the other or should I cross taper between drugs? How slowly should I reduce the dose, or how quickly should I increase the dose? Are there any drug x drug interactions I should be aware of and if so how do I manage them?

Off-Label Prescribing

Although the number of psychotropic medications "licensed" for use in children and adolescents with mental health problems is increasing, it is still the case that for most disorders most medications in most countries are not "licensed" and need to be used

"off-label." A drug license is a "marketing authorization" meaning that a pharmaceutical company has been granted permission to promote a drug for a specified indication by a national or international regulatory body. Off-label prescribing occurs when medication use falls outside the scope of the marketing authorization with respect to one or more of four key domains (the "4 Ds"): (1) the disorder being treated, (2) the demographics (primarily age) of the patient, (3) the dosage being prescribed and route of administration, and (4) the duration of treatment (Baldwin and Kosky 2007). While prescribing a medicine in a circumstance that is specified as contraindicated would also constitute off-label use, this is not the same as using one outside the "4 Ds," which is often very appropriate. Until recently, it was relatively uncommon, apart from ADHD medications, for companies to test new drugs on children, and there was neither a requirement nor incentive for them to do this. More recently, the Food and Drug Administration (FDA) in the USA and the European Medicines Agency (EMA) in Europe established a system of obligations, rewards, and incentives to ensure that new medicines are properly researched, developed, and authorized to meet the therapeutic needs of children. This has ensured that companies will consider the potential pediatric use of medications they develop and conduct specific programs of research where there is potential for their use in children and adolescents. This has increased the number of clinical trials for psychotropic medications and over time will result in a stronger evidence base not only for efficacy of medications in this population but also specific data on safety and tolerability.

Unfortunately, these regulations do not apply to existing drugs, and it will therefore still be necessary to prescribe most of the medications we are familiar with, and that are more widely available across the globe, off-label.

When prescribing off-label, it is helpful to consider several factors in addition to those discussed above. The British Association of Psychopharmacology recently published a checklist of helpful recommendations to guide clinical practice in this area (Sharma et al. 2016).

1. Be familiar with the evidence base for the psychotropic agent, including its pharmacokinetic profile in children, the potential for adverse effects, any drug–drug interactions, and differences in bioavailability/stability of the intended formulation.
2. Prescribing an off-label medicine may have advantages over a licensed one. Hence, licensed drugs and formulations should not always be prescribed and supplied in preference to an off-label drug or formulation. A prescribing decision (including a decision not to prescribe) should incorporate knowledge of the overall evidence base and the needs of the individual child.
3. When the evidence base for an off-label medication is lacking or the benefit/risk profile appears potentially unfavorable, obtain a second opinion from another doctor (and perhaps another member of the multidisciplinary team) before prescribing.
4. Explain the potential benefits and side effects to the patient and their parents/carers and document this discussion in the medical record.

5. Provide information leaflets for off-label medications specifying use in children and adolescents, including indications, dosage, and route of administration.
6. "Start low and go slow" and actively monitor response using standardized instruments and whether there are any adverse effects.

Dosing and Variation in Pharmacokinetics in Children and Adolescents

Another important consideration when prescribing for children and adolescents is dosing. Although there are certainly circumstances when children and adolescents will require lower doses than adults with the same condition, this is not always the case and sometimes prescribers are overcautious and give too low a dose. In general pediatric practice, doses are most often calculated according to body weight or surface area. Although this can be useful in determining the starting dose of a psychotropic medication in a prepubertal child, for most psychotropic medications, the weight/dose relationship is not closely correlated. It is therefore more effective to titrate according to response and adverse effects rather than by weight or surface area. Drug response does however generally vary with age, weight, sex, and disease state as these factors can impact on pharmacokinetics (absorption, distribution, metabolism, and excretion). While it would appear that young people often need adult doses of psychotropic medications in their early teens, dose finding studies have never been adequately conducted for many of the older more established medications. Interestingly, children and young people may in fact metabolize medications more efficiently than adults. For example, for the stimulants used in ADHD, where there is a strong association between pharmacokinetics and pharmacodynamics (Sonuga-Barke et al. 2004), the level and frequency of dosing may need to be greater for children and adolescents than that for adults. Individual variation in dose response is most strongly related to the variation in metabolism of medications which often reflects differences in the efficiency of hepatic enzymes. Hepatic metabolism develops gradually in the first year of life but then peaks in early childhood and by middle childhood (6–12 years) is twice that of adults. It then plateaus down to adult values in the early teens. Thus, for drugs with a primary hepatic metabolism (e.g., most antidepressants, amphetamines, atomoxetine), many children **may require higher mg/kg doses** than adults. There are also inter-individual differences in rate of development of renal function: it develops much earlier and closely resembles that of adults by the end of the first year.

Therapeutic drug monitoring refers to the measurement of drug levels in body fluids (predominantly blood) and the use of these levels to adjust dose. In child and adolescent psychopharmacology, therapeutic ranges have been suggested for lithium, imipramine, and nortriptyline and the anticonvulsants valproate and carbamazepine which are used as mood stabilizers (Rosen 2017; Ryan 1990; Rylance and Moreland 1980). It is however hardly ever used and is not generally recommended for other psychotropic medications.

Medication Treatments for Specific Disorders

Although the rest of this book is not organized by diagnostic categories for this chapter, we will adopt a disorder-/problem-based approach. This was chosen over a drug-based approach for two main reasons. For many disorders, drugs from different classes will be considered. As it is the patient with a particular problem that we are treating, it makes more sense to look at the different therapeutic options for each disorder/problem rather than listing the different disorders under each drug class. Also clinical trials tend to be focused on a particular disorder/presentation meaning that the evidence base is organized by disorder rather than by drug. One important reason for this is that, when considering whether to license a medication, all of the major regulators ask that this is done with respect to a particular disorder.

Medication Treatments for ADHD

There has been more research into the use of medication for the treatment of ADHD than any other area of child and adolescent psychopharmacology, and most clinicians are now comfortable with the idea of using medications as a part of their treatment of ADHD. While for some considerable time it has been agreed that stimulant medications (methylphenidate and amphetamine derivatives) should be the first-line treatment for severe ADHD, opinions have been divided about whether medication or parent training approaches should be considered as the first treatment option for those with mild-to-moderate ADHD. While those in the USA have always leant toward medication as a first treatment for all cases of ADHD, those in Europe have, until recently, been more cautious. However, following publication of a series of systematic reviews and meta-analyses that found that while parent training improved parenting and conduct disorder outcomes, it had very little, if any, impact on core ADHD symptoms (Daley et al. 2018; Sonuga-Barke et al. 2013), attitudes have shifted, and the most recent NICE guidelines support the use of medication as a first-line treatment for children and adolescents in the UK aged 6 years and over (Nice 2018). Other guidelines (e.g., those recently published in Germany) still recommend parent training as a first-line treatment for those with mild ADHD.

Several medications are licensed for the treatment of ADHD in countries around the globe. However, there is considerable variation between different countries with respect to which medications are licensed and reimbursed; and even where a medication is available, there is considerable variability with respect to which particular preparations are available. ADHD medications can be broadly separated into stimulant and non-stimulant medications.

Stimulant Medications

There are two main classes of stimulant used to treat ADHD: methylphenidate- and amphetamine-based medications which include dexamphetamine, mixed amphetamine salts, and the dexamphetamine prodrug lisdexamfetamine. Immediate release and extended prelease preparations of methylphenidate and the amphetamines are

available in some countries. The extended-release preparations differ in terms of the proportion of immediate-release to extended-release methylphenidate and with respect to the intended duration of action. Typically, immediate-release preparations have expected durations of action of between 4 and 6 h and require multiple dosing across the day (usually two or three times a day). The extended-release preparations have proposed durations of action of either 8 or 12/13 h and vary considerably in the balance between immediate- and extended-release proportions. Importantly, these differences do not mean that one preparation is better than the other. They do, however, help to understand the important differences between the various preparations and the different ways they will be dosed. It is essential that clinicians become familiar with the preparations available in their counties and understand not only the duration of action but also the immediate-release component of the various doses. A failure to do so is one of the most common reasons for treatment failure following a switch from one preparation to another within the same class. A chart describing the different preparations of methylphenidate available in the UK is provided in Coghill and Sinita (2014), and a detailed discussion of the extended-release preparations can be found in Banaschewski et al. (2006). Lisdexamfetamine which was developed after the publication of these articles is a dexamphetamine prodrug that has an extended duration of action, up to 13 h. The extended duration of action for lisdexamfetamine is a function of the metabolic processes that cleave the dexamphetamine molecule from the lysine and the impact of this on the metabolism of the released dexamphetamine rather than being due to a mechanical delivery mechanism.

Non-stimulant Medications

The non-stimulant medications licensed for use in ADHD are atomoxetine and extended-release preparations of guanfacine and clonidine (clonidine US only).

Atomoxetine is a specific noradrenaline reuptake inhibitor that is effective and safe in treating ADHD and has a low abuse potential. Atomoxetine is generally not as immediately effective as the stimulant medications but can be effective in cases that either do not respond or are unable to take or tolerate stimulants. Although some patients get very clear benefits at around 4 weeks, there are some for whom it may take up to 12 weeks for clinically relevant effects to be seen, and this is worth discussing with patients when they commence treatment.

An extended-release preparation of the alpha 2 agonist guanfacine has been licensed for the treatment of ADHD in several countries around the world, and extended-release clonidine is available in the USA. While both drugs have been demonstrated to be efficacious as stand-alone treatments for ADHD, which like atomoxetine makes them useful for stimulant non-responders, it is perhaps their potential as adjunctive treatments, co-prescribed alongside the stimulant preparations (Dittmann et al. 2018), that is most clinically relevant. Clinical trial data supports the co-administration of guanfacine and methylphenidate both from a safety and efficacy perspective. This is important as the potential for increased adverse effects, particularly blood pressure, pulse, and other cardiac signs and symptoms, needs to be considered before co-prescribing atomoxetine with a stimulant (something the author is very reluctant to do on the grounds of safety).

When choosing which medication to start with when treating ADHD, the first consideration is of course availability. Assuming availability of both methylphenidate and one of the amphetamine medications, the advice until recently was that they are both equally good and that there was no clear benefit of one over the other. Indeed, both methylphenidate and the amphetamines work well for about 70% of those with ADHD, and between 90% and 95% of patients will respond well to one, the other, or both. The most sensible approach is therefore to start with one, and if the patient does not respond and there are no contraindications, switch to the other. Importantly, just as some people do not show a clinical response to one class of medication (i.e., methylphenidate or amphetamine) but do to the other, not everyone who has adverse effects to one will also get them to the other. More recently, the results of a network meta-analysis have suggested that for children and adolescents, methylphenidate may have some slight benefits over the amphetamines (including lisdexamfetamine), while amphetamines (and lisdexamfetamine) are slightly superior in adults. For those who have a partial response to one of the stimulant medications, it is worthwhile considering co-administration of extended-release guanfacine (or ER clonidine where available). Immediate-release clonidine and guanfacine may be beneficial to some patients where the ER versions are not available; but they have much shorter half-lives and need to be given several times across the day. They may be more likely to result in hypotension when taken and a rebound hypertension if stopped abruptly. For those who do not respond to a stimulant, then atomoxetine and the alpha 2 agonists may be effective as monotherapies and should be considered.

There are still some countries where access to stimulant medications is prohibited by law. In these countries, atomoxetine (or extended-release guanfacine if available) would be considered as the first-line treatment option. When prescribing atomoxetine in these circumstances, it is essential to make sure that the patient has a long enough trial of medication to allow for response. We would suggest at least 12 weeks at a dose of 1.2 mg/kg/day (up to a maximum of 100 mg). The alpha 2 agonists clonidine and guanfacine may be considered if atomoxetine is unavailable or ineffective. The extended-release preparations are preferred as they will have a more stable effect across the day and a lower risk of hypotension and rebound hypertension. If the immediate-release versions are prescribed, they need to be given in multiple doses to ensure coverage across the day. Other non-stimulant medications that have some, rather limited, evidence of efficacy in ADHD include bupropion, buspirone, tricyclic antidepressants (although these, desipramine in particular, have been demonstrated to be associated with increased cardiovascular adverse effects), metadoxine, and mazindol. Those considering prescribing one of these agents for ADHD should consult the specialist literature which has been well-reviewed by Dittmann and colleagues (2018).

Practical Issues in the Pharmacological Management of ADHD

The publication in 1999 of the primary findings from the NIMH Collaborative Multisite Multimodal Treatment Study of Children with Attention Deficit/Hyperactivity Disorder (MTA study) marked a milestone in child and adolescent

psychiatry research. A full discussion of the findings of the MTA study is beyond the scope of this chapter, and readers are referred to the excellent overviews and summaries of the trial itself and the longer-term outcomes of the participants (Swanson et al. 2008a, b, 2018).

One of several very interesting initial findings from the MTA study was the superiority of the MTA medication protocol over the community treatment arm (within which the majority of patients received medication). It seems likely that the treatment algorithm developed for the study, which included highly structured titration and continuing care protocols and which aimed for maximal effect with "no room for improvement," only allowing a dose decrease for moderate to severe side effects, was responsible for these differences. As a consequence, those in the medication arm received higher doses of medication and were usually on medication designed to cover 12 h of the day in contrast to the community group who were usually on 8-h dosing regimes. The MTA medication protocol also had an initial intensive "forced dose titration" to optimal dose, and treatment changes were informed by detailed feedback from both parents and teachers. It has been proposed that it was the withdrawal of this structured support, rather than decreased efficacy of medication over time, that resulted in the less positive outcomes reported for the medication management group at the later follow-up visits (Banaschewski et al. 2009) although this is still being debated (Coghill 2019; Swanson 2019; Banaschewski et al. 2009; Jensen et al. 2007; Molina et al. 2009). While it would be unrealistic to integrate the full protocol into day-to-day clinical practice, they can quite easily be adapted and scaled down while retaining key components such as measurement-based care and a clear structured approach to dose optimization through titration. Adopting this approach, Coghill and Seth (2015) were able to significantly improve care in a publicly funded clinical service in the UK. This emphasizes the important benefits that can be realized through the implementation of measurement-based care approaches not only in ADHD but more generally in child and adolescent mental health (Liu et al. 2019).

It is equally important to take a structured approach to assessing adverse events associated with ADHD medications. These have been comprehensively reviewed by the European ADHD Guidelines Group (EAGG, Cortese et al. 2013). While the long-term effects of stimulant medications on growth are important, arguably the most important issue is the identification of cardiac risk prior to starting treatment and ongoing management of cardiovascular adverse effects. While it is not necessary to perform an ECG for every patient before starting ADHD medications, it is essential to screen for other, potentially important, cardiac risk factors. The EAGG has suggested that routine questions about personal history of cardiac disease, history of sudden death in a close relative before the age of 40 years, and symptoms of cardiac disease (effort intolerance, frequent palpitations, and frequent syncope – particularly exercise induced) should be asked as well as enquiring about other medications that could cause cardiac problems. Positive findings should prompt the clinician to consider ECG (preferably a 24-h tape or 12 lead if this is not available) and/or a discussion with a cardiologist (Cortese et al. 2013). Although the average increases in pulse and blood pressure with ADHD medications are

modest, there is a proportion of individuals who experience clinically significant increases. The EAGG further suggest that a heart rate consistently above 120 beats per minute should not be accepted without review and that a blood pressure above the 95th centile should be considered abnormal and be followed up.

Medication Treatments for Depression

The use of medication to treat adolescent depression remains contentious. In the UK, the NICE guidelines for depression in children and adolescents are clear that antidepressant medications should not generally be used as an independent initial treatment for depression in children and adolescents (Nice 2017). They suggest that specific psychological therapy (cognitive behavioral therapy or interpersonal psychotherapy) is offered to all patients with moderate to severe depression. In young people (12–18 years), the combination of medication treatment with psychological therapy can be considered for initial treatment of moderate to severe depression instead of psychotherapy on its own. Fluoxetine is currently the only antidepressant recommended as a first-line medication for depression in children and adolescents.

In 2013, Hazell and Mirzaie published an influential Cochrane review (Hazell and Mirzaie 2013) which demonstrated that tricyclic antidepressants are not effective in treating depression in children and adolescents and are associated with several significant adverse events. In the early 2000s, there was a rapid increase in the use of selective serotonin reuptake inhibitors (SSRIs) in children and adolescents. Their initial use significantly out stripped any evidence for efficacy. There are now several RCTs comparing SSRIs with placebo in children and adolescents although these are not all of high quality. There are consistently positive RCTs for fluoxetine and mixed results for sertraline, citalopram, and escitalopram (reviewed comprehensively by Usala et al. (2008)). There are also negative results for trials comparing paroxetine, venlafaxine, nefazodone, and mirtazapine with placebo (all unpublished "data on file"). A comprehensive network meta-analysis of trials within this age group concluded that only fluoxetine was statistically significantly more effective than placebo and that, in terms of tolerability, fluoxetine is also better than duloxetine and imipramine and that imipramine, venlafaxine, and duloxetine are less well tolerated than placebo (Cipriani et al. 2016). From an evidence-based perspective, fluoxetine should clearly be the first-choice antidepressant for adolescent depression. Most SSRIs are metabolized by the cytochrome P450 family of enzymes, and fluoxetine (2D6, 3A4, 2C19), paroxetine (1A2, 2C19), and to a lesser degree fluvoxamine (2D6, 2C9) and sertraline (2D6) are all associated with inhibition of various P450 isoenzymes. Citalopram and escitalopram do not inhibit 2D6 and are therefore less likely to result in drug x drug interactions and may on occasion be preferred for this reason. They were not however either as effective as fluoxetine or better tolerated than other SSRIs in the network meta-analysis of Cipriani and colleagues (2016).

Several high-quality studies have compared treatment with antidepressants. The publicly funded Treatment for Adolescents with Depression Study (TADS) in the USA (March et al. 2004) and the Adolescent Depression Antidepressants and

Psychotherapy Trial (ADAPT) in the UK (Goodyer et al. 2007) have both investigated combination treatment with CBT and an SSRI (in TADS this was fluoxetine; in ADAPT it was most often fluoxetine) compared with the SSRI alone. The TADS study also included groups receiving CBT alone and placebo. In TADS, both combination treatment and fluoxetine alone were more effective than placebo after 12 weeks of treatment, with the combination being the most effective treatment. In TADS, CBT alone was less effective than fluoxetine and no more effective than placebo. In the 28-week ADAPT study, both the SSRI and SSRI + CBT groups improved, but there was no significant difference between the two groups.

Taken together, these data support the conclusions of NICE that the combination of an antidepressant plus a psychological therapy can be considered for initial treatment of moderate to severe depression instead of psychotherapy on its own. Around 60%, however, of young people with depression will respond adequately to initial treatment with an SSRI; so it is important to consider the most appropriate approach to treating non-responders. This was the focus of the National Institute of Mental Health-funded Treatment of Resistant Depression in Adolescents (TORDIA) trial. TORDIA enrolled adolescents whose depression had not responded to an "adequate trial" of an SSRI. Participants were randomized to one of four treatments (switch to another SSRI; switch to venlafaxine; switch to another SSRI + CBT; switch to venlafaxine + CBT) (Brent et al. 2008; Emslie et al. 2010). After the first 12 weeks, just under 50% of participants had now responded to the switch in treatment. The combination of CBT with a switch to another antidepressant resulted in a higher rate of clinical response than a medication switch alone. For those who had a simple switch of medication, a switch to another SSRI was just as effective as a switch to venlafaxine and resulted in fewer adverse effects. At week 12 after randomization, non-responders were offered open treatment (a switch to another antidepressant, augmentation, or the addition of CBT or other psychotherapy) for a further 12 weeks. At 24 weeks, 38.9% of those enrolled in the study had achieved remission with the likelihood of remission much higher (61.6% vs. 18.3%) among those who had already demonstrated clinical response by week 12 (Emslie et al. 2010). All participants were treated naturalistically from week 24 onward; the remission rate rose to 50% by week 48 and to 61% by week 72. However, 72% of participants still had at least one residual symptom of depression, such as irritability or low self-esteem, at week 72, and 11% met diagnostic criteria for major depression. The study authors make a good point in suggesting that clinicians should pay significant attention to those patients who do not respond in the first 6 weeks of treatment and consider either a combination treatment or switching to another SSRI for such cases.

Suicidality

Although several nonpsychiatric factors are associated with increased risk of suicidal ideations and suicidal behavior, suicidality and depression are of course closely linked, and regular assessment of risk for suicide is a key part of management of depression. In children and adolescents, this has been complicated by the suggestion

that there may be an association between treatment with SSRI antidepressants and suicidality. A recent Cochrane meta-analysis showed that for 16–18-year-old patients with a depressive disorder, there was an increased risk of suicidal behaviors and ideations (there were no completed suicides in the included trials) for those on antidepressants compared with those receiving placebo (17 trials; N = 3229; RR 1.58; 95% CI 1.02 to 2.45) (Hetrick et al. 2012). In the TADS study, suicidality decreased substantially in all treatment groups with improvement in suicidality greatest for the combined treatment and least for fluoxetine alone. Importantly however fluoxetine did not increase suicidal ideation. The authors concluded that suicide-related adverse events are uncommon but may occur more often in patients treated with fluoxetine than in those treated with combined treatment or CBT alone and that CBT may protect against suicide-related adverse events in fluoxetine-treated patients (Brent et al. 2008).

Although pharmacoepidemiological data do not indicate an association between antidepressant use and completed suicide (Henry et al. 2012), the regulators in the USA (FDA) and Europe (EMA) both reacted to reports of a possible link by trying to restrict the use of antidepressants in children and adolescents. This involved issuing "black box" warnings that aimed at restricting the use of these drugs to severe cases that have not responded to psychotherapy. The impact of the "black box" warnings continues to be debated. While Gibbons et al. (2007) reported that subsequent decreases in SSRI use were associated with an increase in suicide in adolescents following the issue of the warnings, Sparks and Duncan (2013) suggest that, overall, pediatric antidepressant prescriptions did not decline significantly and that while rates of youth suicide did rise, this increase has only been seen in more recent years. In view of ecological data from adult studies conducted across 29 European countries which suggests that increased SSRI use is generally linked to lower suicide rates (Gusmao et al. 2013) and direct trial evidence that SSRIs do not increase suicidality (Brent et al. 2008), we conclude that the potential benefits of SSRIs for treating depression in adolescence outweigh the risks.

Medication Treatments for Anxiety

Treatment of anxiety disorders in children and adolescent with medications is also contentious. Although it is acknowledged that the success rates for cognitive and behavioral interventions are relatively high (70–80%), this still leaves a significant proportion of anxious children and adolescents requiring further intervention. Notwithstanding this, there is no provision for the use of medication within the UK NICE guidelines for managing anxiety in children and adolescents (Nice 2013). In the USA, the AACAP practice parameters also recommend CBT as the first-line therapy for most cases but suggest that SSRIs should be considered for moderate to severe cases and those who fail to respond to psychological therapies (Connolly and Bernstein 2007). Unfortunately, there is no guidance within the AACAP practice parameters as to which medications should be considered or how they should be used.

Reviewing the evidence, it again appears that the tricyclic antidepressants should not be considered as first-line treatments for pediatric anxiety disorders (Velosa and Riddle 2000). Benzodiazepines should be considered only when other pharmacological approaches have failed, and they should be prescribed for weeks rather than months, with dose adjustments being made gradually, both when starting and when tapering off treatment (Velosa and Riddle 2000). There is some open-label evidence to suggest that buspirone, a non-benzodiazepine anxiolytic, has a similar efficacy to benzodiazepines with fewer adverse events for childhood anxiety disorders. However, no controlled data are available for either safety or efficacy.

As for depression, the SSRIs are considered the first-choice pharmacological treatment for child and adolescent anxiety disorders. There are now randomized controlled trial data supporting the efficacy and safety of fluoxetine, sertraline, fluvoxamine, paroxetine, and venlafaxine in this population. The Cochrane review by Ipser and colleagues (2009) identified 9 eligible studies with pooled treatment response rates of 64% for the active treatment vs. 34% for placebo giving an overall risk ratio of 2.01 (95% CI 1.59, 2.55) favoring treatment, a number needed to treat of 3 and a pooled effect size of 0.82. They did not identify any clear differences between the different medications. Overall, these suggest a stronger response to the SSRIs for pediatric anxiety compared to adolescent depression.

All of the studies included in the Cochrane review were short-term trials, lasting a maximum of 16 weeks and often shorter. Despite there being no clear evidence either way, concerns have been expressed about the long-term safety of SSRIs for children. Animal studies do raise the possibility of long-term negative effects on brain development. The administration of SSRIs to juvenile rodents has, in some studies, been shown to induce long-term changes in serotonergic transmission in the cortex and hippocampus. However, these concerns must be balanced against the finding that chronic stress, such as that associated with ongoing anxiety, also results in long-term unwanted changes to neurochemistry and neuronal development.

Only one clinical study has investigated long-term treatment. The Child/Adolescent Anxiety Multimodal Study (Compton et al. 2010; Walkup et al. 2008) investigated both short-term efficacy (12 weeks) and long-term persistence of effect (36 weeks) across four groups: cognitive behavioral therapy (CBT), sertraline, and combined therapy (CBT + sertraline), all of which were compared to placebo. This was a large study that included 488 children and adolescents, and as the inclusion criteria allowed for comorbidities, such as ADHD, major depression, and dysthymia, the results should generalize out to clinic populations better than for most clinical trials. The results were encouraging. 80.7% of patients receiving combined therapy had a significant improvement on CGI Improvement scale, compared to 59.7% children receiving CBT alone and 54.9% receiving sertraline. Effect sizes were 0.86 for combined therapy, 0.45 for sertraline, and 0.31 for CBT, and NNT were 2 for combined therapy, 3 for sertraline, and 3 for CBT. There were no differences in adverse event rates between sertraline- and placebo-treated groups.

In summary, it does appear that a significant proportion of anxious children and adolescents benefit from pharmacological treatments. Unfortunately, it is not yet possible to predict who will respond to either psychological or pharmacological

treatments in these children and adolescents. When using medication, the SSRIs should be seen as the first-line treatment for anxiety disorders in children and adolescents. Clinicians should allow at least 3 weeks, at an adequate dose, before deciding if there has been a response. In cases of non-response, it would be appropriate to switch to an alternative SSRI before changing to a drug from a different class. Even where a pharmacological approach is chosen, this should usually be combined with a psychotherapeutic approach as this has been demonstrated to increase response rates and clinical improvement. Serotonin-enhancing agents such as the SSRIs and clomipramine are efficacious treatments for this disorder. The overall effect size for pharmacotherapy is medium at 0.48, and NNT is 6, with some variation between different medications (Watson and Rees 2008). These figures are similar to those reported in adults.

Medication Treatments for Obsessive–Compulsive Disorder

CBT in the form of exposure with response prevention has been demonstrated to be an effective treatment for pediatric OCD, and there is international consensus that CBT should be offered to all young people with OCD and should be the first-line treatment in mild-to-moderate cases of OCD (Geller and March 2012; Nice 2005). There is also relatively strong evidence to support the use of drug treatments for early-onset obsessive–compulsive disorder (OCD) (Watson and Rees 2008). Fluoxetine, sertraline, paroxetine, fluvoxamine, and citalopram have all been shown to be effective in the treatment of pediatric OCD; they are associated with a 29–44% reduction in symptoms and appear to be well tolerated and safe. There are few comparative treatment trials of different SSRIs and little or no evidence to suggest that any one SSRI is more effective than another. Clomipramine has also been demonstrated to be effective in pediatric OCD in several RCTs but its use is limited by concerns over safety.

Only one study to date has directly compared the efficacy of CBT versus SSRI medication in pediatric OCD (Pediatric OCD Treatment Study (POTS) Team 2004). This study found that CBT and sertraline were associated with comparable levels of symptom reduction, but that combined CBT and SSRI treatment was associated with superior outcomes. Further study by the same team has confirmed that the combination of CBT and medication is superior to medication as a monotherapy in pediatric OCD, but only if a full course of CBT is completed. The time taken to respond to SSRI treatment for OCD varies between the studies, and even though Riddle et al. (2001) reported significant responses after only 1 week of treatment, most authors suggest titration over 6–8 weeks and to continue to maximum tolerated doses in partial or non-responders.

OCD is recognized as a chronic condition that persists into early adulthood in about 50% of early-onset cases. SSRIs have been demonstrated not only to be well tolerated and effective at maintaining improvement over time but also to result in continued improvements in symptoms for up to 1 year (Cook et al. 2001; Thomsen 2000). Although treatment continued after this time appears to remain effective, it

does not seem to result in further improvements. It is not known how long treatment should be continued for. Although obsessional symptoms may relapse when treatment is discontinued, it is generally suggested to stop medication after 1–1.5 years and then restart if significant symptoms return.

In cases of non-response to medication, it is important to assess treatment compliance and to ensure that other factors, such as family discord, other psychosocial stressors, and comorbid disorders, have been adequately addressed. Earlier age of onset, longer duration of OCD, and specific symptom subtypes seem to predict a lower rate of response. Different people respond differently to particular SSRIs. It is therefore recommended that a second SSRI should be trialed if there is no response to the initial one and that this is augmented by CBT. In adults with OCD, augmentation strategies using antipsychotics have been demonstrated to be efficacious in cases of partial response. These strategies have not been studied in children and adolescents.

Medication Treatments for Tics and Tourette's

When thinking about treating tics, it is important to take into account the natural history and course of Tourette syndrome, which usually has its onset in early childhood, increases in severity at puberty, attenuates somewhat after puberty, and stabilizes in adulthood. Throughout this time, tics fluctuate in severity throughout with a periodicity of around 3 months. This waxing and waning of tics can make it very difficult to assess the effects of any treatment interventions and highlights the need for careful recording of the baseline and monitoring of symptoms, both before a new medication is started and during treatment.

Until the introduction of the second-generation antipsychotics, haloperidol, pimozide, and, in the UK, sulpiride, were the mainstay of treatment for tic disorders. All three have been shown in RCTs to be efficacious in reducing tics. Haloperidol has the strongest effect, leading to improvement in approximately two-thirds of cases, with pimozide and sulpiride improving tics in just over one-half. However, all three are associated with frequent adverse reactions. For haloperidol, the main concerns are the often disabling extrapyramidal effects. Pimozide is associated with fewer adverse events than haloperidol, but can result in ECG abnormalities, particularly prolongation of the QT interval, and requires an ECG before starting treatment, repeated annually to review QT interval. Sulpiride is also associated with a lower, but not absent, rate of extrapyramidal side effects.

More recently, interest has focused on the atypical antipsychotics. As is often the case in pediatric psychopharmacology, their increased use outstripped the available evidence. There are however now several RCTs supporting short-term efficacy, although longer-term safety data are still not available. Trial data support ziprasidone (at a dose of 30 mg/day) (Sallee et al. 2000), risperidone (2.5–3.5 mg/day) (Dion et al. 2002; Zhao and Zhu 2003), and olanzapine (Ji et al. 2005; Onofrj et al. 2000). Although several authorities now suggest that aripiprazole should be considered the first-line medication in case of moderate tics, in doses of 1–5 mg/day, with the

possibility of higher doses in more severe cases, there are as yet no RCT data to back up this position.

It has been suggested that atypical antipsychotics may benefit those with tic disorders because they are having a positive effect on general functioning by improving emotional and behavioral symptoms as well as tics. There is however no real evidence to support this suggestion (nor to refute it). While clinical experience suggests that many patients do benefit from atypicals, a significant number are unhappy about adverse effects, particularly weight gain and metabolic disturbances. They have, however, for many clinicians become the first-line treatment for tics. This reflects not only their efficacy in reducing tics but also their impact on other target symptoms, such as ADHD, OCD, and aggression. It is essential when discussing medication for tics with a patient and their family to have a frank and honest discussion about the risk/benefit balance and to allow them time to weigh this up before committing to a firm decision.

Clearly, not everyone with tics requires or wishes for a medication treatments. The European Society for the Study of Tourette Syndrome (ESSTS) guidelines (Roessner et al. 2011) suggest that medication should be considered when tics cause:

- Subjective discomfort (e.g., pain or injury)
- Sustained social problems for the patient (e.g., social isolation or bullying)
- Social and emotional problems for the patient (e.g., reactive depressive symptoms)
- Functional interference (e.g., impairment of academic achievements)

Although, compared with the antipsychotics, the evidence to support the efficacy of clonidine for the management of TS is less robust, clonidine (and possibly guanfacine) may also improve ADHD symptoms alongside suppression of mild-to-moderate tics. In addition, clonidine tends to alleviate initial insomnia and reduce anxiety (Sandor 1995). While other medications have been studied and are sometimes used in clinical practice, the evidence for their efficacy is limited and often contradictory. Studies on a wide range of other medications are helpfully summarized by Hartmann and Worbe (2013).

Medication Treatments for Autism Spectrum Disorder (ASD)

There are currently no recognized treatments for the core symptoms of ASD, and proposed treatments mostly focus on associated troublesome behaviors and comorbid disorders (Simonoff et al. 2008). The most common targets for treatment are self-injurious behavior, aggression to others or objects and property, tantrums, yelling/screaming, stereotypies, hyperactivity, impulsivity, and agitation. The use of medications to treat these behaviors is now common notwithstanding the fact that the evidence for efficacy and safety remains sparse. It is however important for clinicians to maintain a working knowledge of what has been studied which can help greatly when planning clinical work. It is however also essential that clinicians think

about possible non-pharmacological interventions before reaching for the prescription pad.

For many individuals with ASD, irritability and aggression are among the most impairing symptoms. They are also the best studied with respect to pharmacological interventions. Various antipsychotics, mood stabilizers, antidepressants (clomipramine), and other agents (clonidine, amantadine, naltrexone, pentoxifylline) have been investigated for reduction of irritability in the context of ASD. Irritability is in fact the only symptom for which there are medications approved for use in ASD, although only in the USA (risperidone from 2006 and aripiprazole from 2009). Risperidone received an indication for children over 5 years of age and a body weight of $\geq$9.1 kg and aripiprazole to children older than 6 years. The effect size is around 1.2 for risperidone (0.5–3.5 mg/day) and 0.6–0.9 for aripiprazole (5, 10, 15 mg/day). Extrapyramidal side effects, weight gain, dizziness, and somnolence are the most important adverse effects associated with these medications. The positive effects on irritability and aggression do not appear to be secondary to somnolence.

Of the drugs prescribed offlabel, valproic acid (sodium valproate) in doses resulting in blood valproate levels of 87–110 mcg/ml has been shown to reduce irritability scores on the Clinical Global Impression (CGI) irritability subscale in a majority (62.5%) of children and adolescents with autism spectrum disorders and result in statistically significant improvements in scores on the irritability subscale of the Aberrant Behavior Checklist (Hollander et al. 2010). Valproate is associated with significant risks to the unborn baby when administered during pregnancy. For this reason, it is strongly advised that it is not prescribed to women and girls of childbearing age. While there is some emerging data to suggest that lurasidone may also have some efficacy in reducing irritability, the findings are not yet conclusive. It may however be a reasonable alternative, before haloperidol and ziprasidone, for those who experience tolerability issues with risperidone and aripiprazole or whose symptoms are refractory to these drugs (Mcclellan et al. 2017).

The management of ADHD symptoms in ASD has not been studied extensively (Bratt et al. 2017), but the limited available evidence suggests that (1) treatment should be similar to that for routine cases of ADHD; (2) the effect sizes are somewhat lower than those seen in children and adolescents with ADHD without ASD (i.e., they are only moderate for stimulant medications); and (3) adverse effects are more likely in the group with ADHD and ASD. The maxim of "start low and go slow" should be applied when prescribing any medications for ADHD in children and young people with ASD and medication doses increased with caution.

Antipsychotics, antidepressants, and mood stabilizers have all been investigated as potential treatments for the reduction of stereotypies and repetitive behaviors in children and adolescents with ASD. Randomized controlled trials of aripiprazole (Marcus et al. 2009; Owen et al. 2009) and risperidone (Mcdougle et al. 2005) both reported significant improvement in more than 50% of study participants. Statistically but not clinically significant response has also been reported for fluoxetine and valproic acid (Hollander et al. 2005, 2010), haloperidol, and clomipramine (Remington et al. 2001). Modest improvements of stereotyped behaviors following treatment with guanfacine have been reported (Politte et al. 2018).

Medication Treatments for Bipolar Disorder

Recent controversies around the diagnosis of bipolar II (BP II) and "bipolar disorder not otherwise specified (BP-NOS)" have subsided somewhat with the recognition that many young people who were receiving one of these diagnoses were in fact presenting with ADHD combined with mood lability or what is now termed disruptive mood dysregulation disorder (DMDD). We agree with the UK NICE that the diagnoses of BP II and BP-NOS should be reserved for adults but acknowledge that bipolar 1 (BP I) is a valid, if uncommon, diagnosis in adolescents and rare but possible in childhood.

Medication treatments are most often considered as an essential component of a treatment package for BP 1 in children and adolescents. Liu et al. (2011) systematically reviewed pharmacological approaches to the treatment of bipolar in children and adolescents. They identified 29 open label and 17 RCTs. The overall odds ratio of 2.23 was significantly greater than 1. Much of the effects were accounted for by the highly significant effects for the second-generation antipsychotics. There were positive RCTs for aripiprazole, olanzapine, quetiapine, risperidone, and ziprasidone. The meta-analysis effects were not significant for divalproex (sodium valproate) and only mildly positive for topiramate and oxcarbazepine (a derivative of carbamazepine). As noted above, sodium valproate should be avoided in girls and women of childbearing age. Although there is some evidence that lithium is also effective in treating BP I in children and adolescents, this evidence is low in quality and findings are mixed. The FDA has indicated that risperidone, quetiapine, and aripiprazole can be used in bipolar disorder for children aged 10 and over, lithium for children over 12, and olanzapine for children over 13 years.

Lurasidone, an atypical antipsychotic, has recently been awarded a license in the USA for the treatment of bipolar depression in adolescents aged 10–17 years in doses between 20 and 40 mg (Channing et al. 2018; Delbello et al. 2017). Clinical trial data and recently reported longer-term follow-up studies have suggested that, in this population, lurasidone is associated with minimal impact on weight gain and metabolic markers.

Medication Treatments for Schizophrenia

Early-onset schizophrenia, the development of psychotic symptoms before the age of 18 years, is associated with severe functional impairments and poor outcomes. Medications have a key role in treating early-onset schizophrenia but caution is required, both because of the potential for serious adverse effects and because, if used too early, they can blur the clinical picture making an already complex diagnostic process even more difficult. In this respect, antipsychotic medication should not be started until a clear diagnosis has been made – and then for those meeting definite criteria for schizophrenia and not those with less clear and more nebulous states of false thinking. It is also important to remember that pharmacological treatments should always be given within the context of a multidisciplinary team able to offer a broad range of supportive therapies.

Despite considerable evidence of efficacy and effectiveness of multiple antipsychotics both typical and atypical in adult schizophrenia, very few studies have included children or young people. The introduction of new legislation for both the FDA and EMA has meant that the makers of recently developed antipsychotics have had to include adolescent clinical data in their submissions to the regulators. As a consequence, we will start to see more studies being conducted. Lurasidone has been through this process and is now licensed in several countries as a treatment for adolescent schizophrenia. The data available includes short-term RCH, a randomized withdrawal study demonstrating longer-term efficacy, and a 2-year open-label study focusing on safety and tolerability (Channing et al. 2018).

Despite the lack of evidence for many of the antipsychotics, the evidence that is available suggests considerable continuity in drug response between early- and adult-onset schizophrenia. Research in both adults and children suggests that almost all antipsychotic medications are of similar efficacy and result in similar rates and patterns of symptom reduction. The main effects center on reduction in positive symptoms, while effects on negative symptoms are relatively minor. As a consequence, it is the adverse effects profile that has the biggest influence on clinical decision-making (Table 2).

With respect to monitoring adverse effects when using antipsychotic medications in children and adolescents (for any clinical indication), it is wise to follow the recommendation from the NICE schizophrenia guidelines. At baseline, before starting any antipsychotic, NICE recommend measuring: weight and height (and plotting these on a growth chart); waist and hip circumference; pulse and blood pressure; blood glucose; glycosylated hemoglobin (HbA1c), blood lipid profile and prolactin levels; assessing any movement disorders; assessing nutritional status, diet, and level of physical activity; and performing an ECG. Efficacy, together with a safety assessment, similar to baseline investigations, should be repeated systematically during the treatment according to the following scheme: weight, weekly for the first 6 weeks, at 12 weeks, and then every 6 months (plotted on a growth chart), height every 6 months (plotted on a growth chart), waist and hip circumference every 6 months (plotted on a percentile chart), pulse and blood pressure (plotted on a percentile chart) at 12 weeks and then every 6 months, and fasting blood glucose, HbA1c, blood lipid, and prolactin levels at 12 weeks and then every 6 months. These should be repeated periodically and abnormal results of negative changes should be acted on.

It is usual to ensure that the patient has had an adequate trial (6 weeks) at an adequate dose. If there is no response after this time, a different antipsychotic should be tried. For treatment-resistant schizophrenia, clozapine is acknowledged as the most effective medication in adults. Although there is relatively little evidence for clozapine in children and adolescents, there is some suggesting that clozapine may be more efficacious than haloperidol (Kumra 2000) and olanzapine (Kumra et al. 2008) at treating both positive and negative symptoms. However, serious adverse effects including neutropenia and seizures are relatively common and require close monitoring and regular blood testing. Clozapine should be reserved for patients who have failed to respond to at least two adequate trials of other antipsychotic agents, at

Table 2 Adverse effect profiles of haloperidol and second-generation antipsychotics in children and adolescents

Adverse effect	Time of onset	Haloperidol	Aripiprazole	Clozapine	Olanzapine	Quetiapine	Risperidone	Ziprasidone	Lurasidone
Anticholinergic	Early	–	–	+++	++	–/+	–	–	–
Acute parkinsonism	Early	+++	+	–	+	–	++	+	++
Akathisia	Early/ intermediate	+++	++	+	+	+	+	+	++
Tardive dyskinesia	Late	++	–/+	–	–/+	–/+	–/+	–/+	–/+
Withdrawal dyskinesia	During switch	++	++	–	–/+	–/+	+	+	–/+
Diabetes	Late	–/+	–/+	+++	+++	++	+	–/+	–
Increased lipids	Early/ intermediate	–/+	–/+	++	++	+	+	–/+	–/+
Weight gain	Intermediate	+	+	+++	+++	++	++	+	–
Increased prolactin/ sexual dysfunction	Early	++	–	–	++	–	+++	+	–
Decreased prolactin	Early	–	++	–	–	–	–	–	–
Sedation	Early	–/+	–/+	+++	++	++	+	–/+	++
Increased QTc	Throughout	–/+	–/+	+	–/+	+	+	++	–/+
Postural hypotension	Early	–	+/–	+++	++	++	+	–	–/+
Neutropenia	Early/ intermediate	–/+	–/+	++	–/+	–/+	–/+	–/+	–/+

– = not present, –/+ = minimal, + = mild, ++ = moderate, +++ = severe

least one of which was an atypical, or who have experienced significant drug-induced side effects (e.g., tardive dyskinesia).

Managing Adverse Effects

Although child and adolescent mental clinicians are improving in their use of structured outcomes to track treatment response, the use of structured approaches to the measurement of adverse effects is still rather limited with few tools suitable for use in routine clinical practice available. As medications are used more frequently and for longer duration, accurate measurement of adverse events becomes even more important. The issues can be exemplified by the increased use of antipsychotics to manage nonpsychotic disorders such as aggressive behaviors associated with autism, intellectual disability, ADHD, and conduct disorder. At the time of starting, there is often an intention that this will be a brief intervention, but the absence of a planned exit strategy often leads to treatment over a much longer period of time. Although more recent medications are associated with less extrapyramidal side effects than some of the older typical antipsychotics, in particular haloperidol, the prevalence of obesity, diabetes mellitus, and metabolic and cardiovascular side effects is considerably higher in younger patients than they are in adults (Fraguas et al. 2011). Developmental factors also increase the impact of certain adverse events. For example, hypogonadism that can occur secondary to raised prolactin levels may have a more serious long-term impact on younger people who have not yet reached peak bone density (Haddad and Wieck 2004).

A greater effort by both clinicians and researchers to improve the routine measurement at baseline and follow up for all children and young people on psychotropic medication, and on managing adverse events when they do actually occur, is required to ensure safe practice and to improve the lives of those we treat.

Conclusions

Psychological and psychosocial therapies remain the first-line treatments for many child and adolescent mental health disorders and are an important component of a comprehensive treatment package for others. It is important, however, that clinicians develop an understanding of the potential role which medication can play, especially when psychological treatments have been unsuccessful in reducing symptoms adequately. It is however also necessary to recognize the limitations of the current evidence and to alert patients and their families of these uncertainties when suggesting the use of medication, particularly when this use goes beyond the evidence base. More high-quality treatment trials are required. This will require collaboration between academics and clinicians across a wide range of settings and also support from funding bodies and managers within health care, who need to ensure that these studies are recognized as an essential component of health-care provision.

Box 1 Questions to Ask Before Switching Medications or Adding an Additional One

1. Have I titrated properly?
2. Is the patient at the maximum dose?
3. Is this drug/preparation working well at any times during the day and do I need to change the dose or preparation to get a more balanced effect? – Particularly relevant for stimulant drugs in ADHD
4. Am I targeting the right symptoms?
5. Is there a behavioral explanation for the drug "wearing off" or is the patient becoming tolerant to this medication?
6. What else is going on in patient's life/family life, and are there non-pharmacological reasons for poor response?
7. Is the medication working but effects limited by side effects and if so can I manage this a different way?
8. Have I missed any comorbidity?
9. Is the diagnosis right?

Cross-References

► Services for Neurodevelopmental Disorders such as Autism Spectrum, Attention Deficit Hyperactivity Disorder (ADHD), and Tic Disorders

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Psychological Treatment of Mental Health Problems in Children and Adolescents

36

Manfred Döpfner and Charlotte Hanisch

Contents

Abstract

The psychological treatment of mental health problems in children and adolescents is described in the context of a multimodal treatment approach with interventions on the level of the patient, the family, and the (pre-)school according to the patient's needs. Moreover, treatment has to be adapted to the developmental level of the individual patient. Evidence-based mechanism of change is applied (e.g., resource activation, problem focusing, cognitive-affective clarification, active support for coping with problems). The treatment focuses on specific problem behavior and is individually tailored. Examples for multimodal child

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and adolescent psychotherapy for children with internalizing and externalizing mental health problems are described.

Keywords

Psychological treatment · Mental health problems · Externalizing problems · Internalizing problems · Children and adolescents

Psychological treatment is the most important and most frequently used approach to help children and adolescents with mental health problems. Several psychological treatment approaches have been developed in the last 100 years, the most prominent of which are psychoanalytic or psychodynamic treatment, cognitive-behavioral treatment, and systemic family therapy. In the past few decades, the main focus has shifted to interventions whose effectiveness has been demonstrated in empirical clinical trials (Fonagy et al. 2015). Most of these evidence-based treatments are cognitive-behavioral interventions. The term "evidence-based practice" describes the integration of this empirical approach with clinical expertise in the context of patient characteristics, culture, and preferences (American Psychological Association Presidential Task Force on Evidence-Based Practice 2006). Within this evidence-based practice approach, the concept of multimodal child and adolescent psychotherapy (MCAP) was developed (Döpfner 2009, 2013).

Multimodal Child and Adolescent Psychotherapy

Context Orientation and Multiple Intervention Levels

As illustrated in Fig. 1, mental health problems of children and adolescents manifest themselves in different social contexts (e.g., family, school, peer group). Figure 2 provides examples of the problem areas which can be frequently identified in patients with conduct disorder. Psychotherapy research has revealed that interventions that are targeted at improving one social context are generally more successful when they aim to change the problem in the specific context in which the problem occurs. Cognitive-behavioral interventions which take into account external stressors and even temporally remote events that may have direct effects on parents' reaction to their child have been found to be effective. Temporally remote events can include childhood experiences of the parents, which in turn influence their own parenting and subsequently the parent-child relationship. In many cases, mental health problems appear in several contexts. Therefore, in order to optimally treat the patient, interventions should often take place multimodally on several levels – that of the patient, the family, the kindergarten or school, and the peer group. Although intervention effects do sometimes generalize from one context to another, this is the

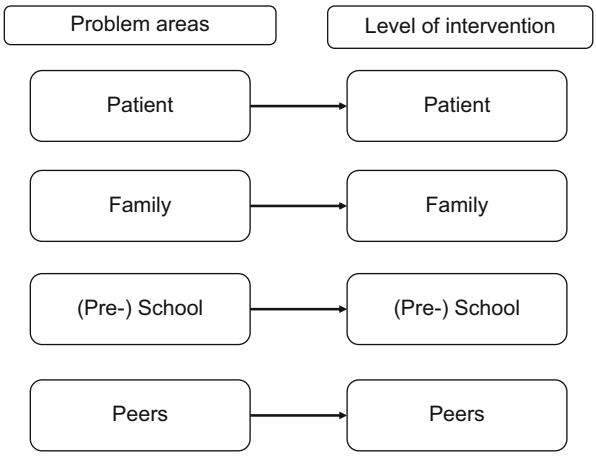

Fig. 1 Context orientation and multiple intervention levels in multimodal child and adolescent psychotherapy

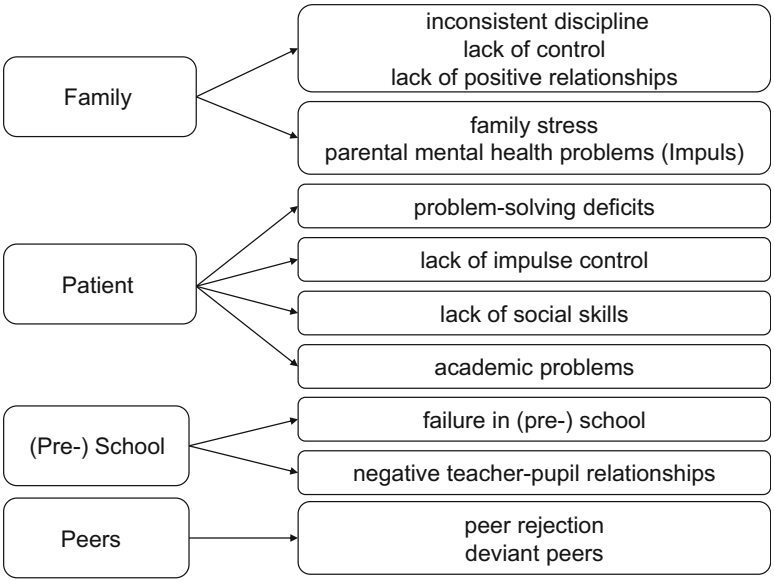

Fig. 2 Context orientation: problem areas in patients with conduct disorder

exception rather than the rule, underlining the importance of intervening on different levels according to the patient's needs. This is what we call multimodal child and adolescent psychotherapy.

Figure 3 shows examples of cognitive-behavioral interventions for patients with social anxiety on different levels of intervention. Family-focused interventions may encompass cognitive-behavioral interventions with parents in order to decrease overprotective parenting behavior by reducing anxiety and thoughts which foster

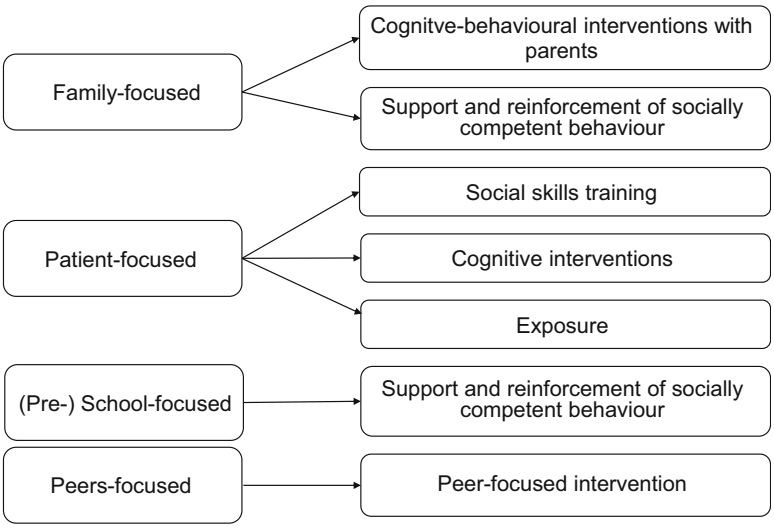

Fig. 3 Multimodal interventions in patients with social anxiety

such behavior. Additionally, the parents may be taught to support and reinforce socially competent behavior of their child. Patient-focused interventions may include social skills training, cognitive interventions, and exposure elements. For example, in social skills training, role playing and reinforcement may be used to teach the patient how to make contact with peers, how to enter a group, or how to develop assertiveness. Cognitive interventions may aim at modifying anxiety-provoking thoughts, while exposure to anxiety-provoking situations may be included in order to reduce anxiety through habituation.

School-focused interventions may focus on the support and reinforcement (potentially by the teacher) of socially competent behavior in the school setting.

Peer-focused interventions may be useful in some cases in order to integrate the patient into a prosocial peer group, in which they can experience more social support and consequently (re)gain confidence.

Developmental Orientation

Psychological treatment of children and adolescents has to take into account a wide range of developmental stages, and the interventions have to be adapted to the developmental level of the individual patient by including, for example, playful methods, cognitive and verbal techniques, as well as practice exercises. The focus of the employed interventions can shift, with younger children potentially benefiting more from family-focused interventions, whereas in older children, patient- and peer group-focused interventions might become increasingly important.

Evidenced-Based Mechanisms of Change

Based on the results of psychotherapy research, it was possible to derive general mechanisms of action across different psychiatric disorders. These mechanisms allowed for the conception of MCAP, independently of therapeutic schools. Grawe (1995) suggested four of these mechanisms as the basis for a psychotherapy for adults independent of a specific therapeutic approach. It is likely that these mechanisms are also valid for psychotherapy in children and adolescents. Additionally, these principles have to be realized not only in the work with the patient but also in the work with parents, teachers, and peers. The four principles derived by Grawe (1995) are discussed in detail in the following:

Resource activation: Resource activation refers to the patient as well as his/her caregivers and social environment and encompasses mostly unspecific modes of action such as the activation of positive potential, skills, characteristics, and motivation to change. This includes an accepting and empathetic therapeutic behavior toward the patient and caregivers, while enhancing their positive characteristics and motivation to actively cope with the problem. To this end, the therapist adapts his/her behavior to the developmental level and the expectations of the patient and caregivers. Another mode of action within the principle of resource activation is to strengthen the patient's and caregivers' expectation of success regarding the psychotherapy. Resource activation is a particularly important mechanism when it comes to psychotherapy for children and adolescents, as therapy is frequently initiated not by the patient but by the parents or other caregivers. Motivating the patient and if necessary the caregivers to participate in therapy and to change their behavior is therefore of utmost importance and is another aspect of resource activation. Lastly and crucially, the bond between therapist and patient/caregivers is a key mode of action within the scope of resource activation.

Problem focusing: According to this principle, the problem that needs to be treated has to be experienced in therapy. For this to occur, the problem needs to be defined and discussed in the treatment session. Problem focusing acts as a counterpart to the principle of resource activation and together, the two principles follow the dialectical approach. The goal is for patient and caregivers to gain new experiences in coping with the problem. Treatment should be designed such that it allows for problems to emerge during the treatment session. This can be achieved by using methods like role play in children with conduct disorder, in vivo techniques like exposure to a feared social situation or separation from the mother in an anxious child, or in sensu techniques like imagining a traumatic situation in a traumatized child. Through therapeutic homework, new experiences of coping with the problem should be acquired between sessions. To allow for the transfer from the therapy setting to everyday life, it can also be helpful to include on-site treatment and apply therapeutic interventions to the social context in which the problem occurs (e.g., at home/kindergarten/school).

Cognitive-affective clarification: To enable cognitive-affective clarification, the therapist psychoeducates the patient and caregivers and helps them to understand the individual problem, where it comes from and what might maintain it.

Psychoeducation does not merely entail the transfer of information, but includes the joint effort to develop a concept of the disorder and the interventions needed and to find answers to questions such as:

- Which factors contributed to the development of the problems?
- Which factors are maintaining the problems at the moment?
- Who would have to do what in order to make it possible to solve the problems?

Clarification of general beliefs or specific cognitions and expectations of the patients and their caregivers can take place through verbal interactions and discussions or through play interactions and creative techniques. To modify dysfunctional beliefs, cognitions, and expectations, various techniques can be employed. These include, but are not limited to, Socratic dialogue to address, question, and scrutinize beliefs, the checking of daily routines, play interactions, and imagination exercises.

Active support for coping with problems: The therapist helps the patient to develop solutions for specific problems and to implement these solutions in the real world (i.e., helps the child to cope with anxiety, anger, etc.). Coping with problems occurs against the backdrop of cognitive-affective clarification and includes all persons relevant for coping with a respective problem. A joint development of a problem solution is crucial, even for younger patients, who should be included in this process as much as possible. This principle constitutes the central mode of action of MCAP, which builds upon and interacts with the other three principles. For example, successful coping with problems increases not only the expectation of success and competence but also the therapy motivation, which feeds into resource activation.

Leading the patient and caregivers to experience successful coping with previously unresolved problems in the real world increases their expectations of success and faith in their own competence, which in turn facilitates behavioral change. An important basis for this concept is the self-efficacy theory of Bandura (1977), which suggests that psychotherapeutic interventions are successful if they change the patient's expectation of competence to cope with previously unresolved problems. According to Bandura, the goal of therapy should therefore be to establish an expectation of success and competence in the patient and caregivers.

The basis for implementing problem solutions in the real world is a behavioral analysis (Fig. 4). Interventions on all levels of the behavioral analysis can modify the problem behavior and lead to better coping with problems. On a situational level, the situations in which the problem behavior (e.g., aggressive behavior) occurs are first described in order for them to be graded and structured (e.g., conflict situations with peers on different levels). On a cognitive level, dysfunctional cognitions and problem-solving approaches in the specific situations have to be identified in order to be understood and modified through psychoeducation, various cognitive interventions, and problem-solving techniques. On a third level, dysfunctional affective and somatic reactions can also be identified and then targeted and modified through specific interventions (e.g., interventions to help the patient to calm down in conflict situations). To change the actual problem behavior directly, the training of specific

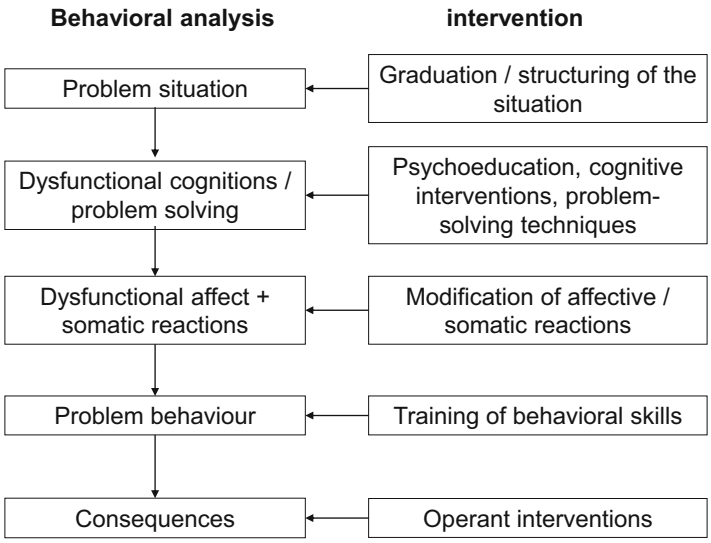

Fig. 4 Techniques for coping with problems

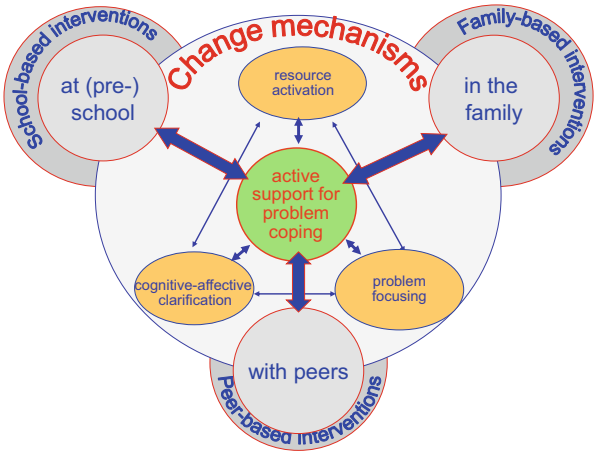

Fig. 5 Mechanisms of change in multimodal child and adolescent psychotherapy

behavioral skills can be useful, while operant interventions can modify the problem behavior indirectly through positive consequences of the functional behavior and negative consequences of the dysfunctional behavior.

Figure 5 summarizes the change mechanisms of MCAP. Active support for coping with problems is the central mode of action in MCAP, which is supported by the other three principles: (1) resource activation, (2) problem focusing, and (3) cognitive-affective clarification. All of these principles interact with each other in multiple ways. Interventions have to take place at the level and context in which the

problem occurs; therefore, patient-centered interventions are complemented by family-, school-, and peer-based interventions.

Focus on Specific Problem Behavior

One of the principles of MCAP is its transdiagnostic problem-oriented approach. This distinguishes MCAP from other, more disorder-oriented approaches and interventions based on disorder-specific treatment manuals, which are mainly guided by symptoms that define a diagnosis. MCAP focuses on specific problem behaviors which might be maintained by similar factors. Consequently, the functionality of the behavioral problems is included in the process of selecting interventions. For example, children who present ADHD symptoms at home can be treated with interventions similar to those used in children with oppositional problem behavior, if the two types of problem behavior are maintained by similar psychosocial factors such as a lack of reinforcement of appropriate behavior in specific situations at home. Following the same logic, different treatments may be required for the same phenotypic expression of the disorder if triggering and maintaining factors differ between patients.

Individually Tailored Treatment

MCAP is oriented toward the individual emotional, cognitive, and behavioral problems of the child. At the beginning of therapy, the specific problems to be treated and the context in which they occur are defined, and the process of change is monitored throughout the course of the therapy. While MCAP may use specific treatment manuals, it does not necessarily strictly follow a manual, but instead flexibly adapts according to the specific problems of the child, his/her developmental level, and the social context in which the problem occurs. With respect to specific interventions, standardized manuals provide a good basis, but they must be individually tailored to the needs of the patient and his/her family.

Evidence-Based Treatment

MCAP uses evidence-based interventions. Over the last decades, psychotherapeutic research has investigated the efficacy of psychological interventions in a large number of empirical studies. Systematic reviews and meta-analyses have demonstrated the effectiveness of these interventions in a spectrum of mental health problems in children and adolescents. For example, in a recent meta-analysis of more than 400 trials, Weisz et al. (2017) found small- to medium-sized effects of psychological interventions on the treatment of anxiety, conduct problems, problems of inattention, hyperactivity and impulsivity, depression, and also multiple problems. Many of the effects found immediately after the end of the interventions remained stable over time.

Multimodal Child and Adolescent Psychotherapy for Children with Internalizing and Externalizing Mental Health Problems

The following section describes evidence-based interventions for internalizing and externalizing problem behaviors in youth. As outlined above, the selection of the individual treatment components should be guided by the child's specific problem behavior. Rather than reporting evidence for brand-name intervention programs, we review the effects for treatment families. This more generic approach has been suggested by recent evidence base updates, in which common factors are identified across treatment programs and the evidence base for the respective treatment family is rated on one of five levels: level 1 well-established treatment, level 2 probably efficacious treatment, level 3 possible efficacious treatment, level 4 experimental treatment, and level 5 treatment of questionable efficacy (Southam-Gerow and Prinstein 2014). A consideration of evidence-based treatment families might help to achieve the goal of comprehensive geographic coverage, which individual programs have only been able to achieve in limited local areas.

Overall, in efficacy trials youth psychotherapy yields medium effect sizes at posttreatment and nonsignificantly smaller effects at follow-up assessments (Weisz et al. 2017). The effect size is strongest for anxiety (0.61), weakest for depression (0.29), and nonsignificant for treatment of comorbidities or co-occurring problems (0.15).

Interventions for Internalizing Problem Behavior in Youth

Internalizing problems are characterized by anxious or depressive behaviors; they affect academic achievement and social and peer relations and have a high impact on future mental health. We report well-established treatments for childhood anxiety and depression. It is important to keep in mind, however, that due to the interdependence of the disorders, most treatments have effects on both of these problem areas. At the end of this subsection, we briefly report on interventions for child obsessive-compulsive disorder (OCD) and for eating disorders, as treatments for these problems show a strong overlap with treatments for anxiety and depression, while also calling for distinctive therapeutic strategies.

Interventions for Anxiety in Youth

The first-line treatment for child anxiety is individual- or group-based cognitive-behavioral treatment (CBT; Higa-McMillan et al. 2016). This involves psychoeducation, somatic management skills, cognitive restructuring, gradual exposure, and, in social anxiety, social skills training. Younger children with severe social anxiety are best treated in the individual setting, whereas school children with less severe symptoms particularly benefit from group training.

Exposure is the key and most frequently used component of CBT for anxious youth and describes the coping with anxiety in real, anxiety-provoking situations. It is preceded by psychoeducation, which provides information about the interplay

between cognition, affect, somatic reactions, and behavior and about the effect of avoidance behavior on symptom maintenance. A hierarchy of anxiety-provoking situations is developed by ordering fear-provoking stimuli. Relaxation techniques target physical symptoms associated with anxious arousal and include progressive muscle relaxation and deep breathing. Cognitive restructuring first identifies maladaptive expectations, negatively biased perceptions or self-statements, and irrational beliefs. Evaluation of the cognitive distortions involves questioning potential biases and selective conclusions. Anxiety-increasing misinterpretations are then replaced by more assertive self-talk. During gradual exposure, the child is confronted with fear-eliciting stimuli without using the usual avoidance behavior. Gradual exposure means that the level of anxiety experienced during exposure practices is progressively increased. Homework assignments are important for the transfer to everyday life.

Besides using parents as co-therapists to support and reward young people's efforts to practice new skills, parents' beliefs and parenting behavior are addressed. Especially in younger children or in children with separation anxiety, parents' irrational thinking patterns might play an important problem-maintaining role. Here, coaching parents to adopt less overprotective parenting might first require cognitive restructuring of parents' beliefs about parenting. While a previous review found that parents' involvement did not necessarily increase treatment effects, a recent overview of the literature concluded that family involvement can be regarded as a well-established treatment and serves as a moderator of treatment effects (Higa-McMillan et al. 2016).

Interventions for Depression in Youth

CBT is the most comprehensively studied treatment for depression in youth and comprises psychoeducation, behavioral activation, cognitive interventions, and social skills training (Hussain et al. 2018).

Psychoeducation includes understanding the vicious circle of negative thinking, mood disturbances, withdrawal behavior, and lack of positive reinforcement and precedes the documentation of mood changes and their corresponding stimuli. These are then used for behavioral activation and consequently for increasing positive reinforcement. The key ingredient of CBT for youth with depression is the restructuring of depressogenic cognitions, which are characterized by negative thoughts about oneself, about others, and about the future. Patients selectively attend to and have stronger recall for negative stimuli. Causal attributions lead patients to blame themselves for failures and to not take credit for successes. This pessimistic thought pattern makes the selective perception of negative experiences and failure more likely and thus increases the probability of social withdrawal. During cognitive restructuring, negative thinking is identified and challenged, for example, by finding counterevidence for the assumption. Patients are then taught to develop more realistic cognitions.

Youth with depression often have deficits in social skills and problem-solving. These make maladaptive responses more likely and, in the case of failure, function as

proof for the negative thoughts. Therefore, skills training might also be an important treatment component. Skills training includes, for example, basic conversation techniques or strategies for making friends. Teaching problem-solving steps (identity the problem, generate many possible solutions, evaluate the pros and cons of each possible solution, choose one solution to try) broadens youth's general problem-solving skills. Comorbid sleep problems and anxiety might require the addition of relaxation training.

Treatment in younger children focuses on the behaviorally oriented components, e.g., behavioral activation and social skills training, rather than on cognitive restructuring.

Involving parents aims to inform parents about the maintaining factors of depressive symptoms and to encourage support and reinforcement of youth's newly acquired skills. Moreover, similar cognitive interventions might be useful in the case of parents' cognitive distortions. For younger children, or in parents suffering from mental illness, parental involvement is recommended. However, studies on the impact of parental involvement in CBT for child depression are lacking.

Besides CBT, interpersonal psychotherapy (IPT) is regarded as a well-established treatment for adolescent depression (Hussain et al. 2018). IPT focuses on building social support and on assisting individuals to deal with interpersonal conflicts, transitions, and losses. It is usually administered individually and comprises psychoeducation and interpersonal skills training.

Psychoeducation integrates common symptoms into what is called the "limited sick role," which compares depression to other illnesses that affect youth functioning and thus blames the illness rather than the youth for limited functioning. Similar to CBT, youth are encouraged to engage in all activities to the best of their ability. Feelings and events linked to relationships in the youth's life are then related to the current depression. Within these relationships, one of the following four problem areas is then identified as the focus of treatment: grief, role transition, interpersonal role dispute, and interpersonal deficit. Techniques that are used across each of these problem areas are affect identification and expression, communication and decision analyses, role playing, and homework.

Parents are involved in order to learn which effective skills have been acquired and what future challenges and warning signs for relapse might arise. Preadolescent children have also been successfully treated for depression using a family-based version of IPT, which addresses parent-child conflict and interpersonal impairment with the child and parent together (Dietz et al. 2015).

Schools and preschools are less involved in the treatment of internalizing behavior problems in youth. They do, however, play an important role in the prevention of anxiety or depression. Cognitive-behaviorally oriented programs which promote resilience yield positive, small effects (Dray et al. 2015). Generally, these programs inform youth about the impact of cognition on affect and behavior, teach them to differentiate between adaptive and dysfunctional thinking patterns, and facilitate the practicing of general emotional and social skills.

Interventions for Obsessive-Compulsive Disorder (OCD) and Eating Disorders in Youth

Children suffering from OCD have recurrent thoughts, urges, or images (obsessions) that they experience as intrusive and that cause significant distress. They might also show repetitive behavior in response to an obsession. The treatment of OCD in children shows a great overlap with the above-outlined treatment of child anxiety. CBT is considered as a first-line treatment for mild to moderate OCD (Freeman et al. 2014). One specific feature is that exposure is more comprehensively combined with response prevention. Response prevention, in which the child is prevented from engaging in compulsions or avoidance, is regarded as the most important component of CBT for OCD. As family members may accommodate to the child's OCD symptoms, it is important to involve families in treatment. Parents are taught how to refrain from accommodating to the OCD symptoms and are guided to help their child to accomplish homework assignments.

As eating disorders show high rates of comorbidity with anxiety and depression, depending on the individual problem behaviors, treatment might include some of the above-outlined therapeutic components. Interventions specific to anorexia nervosa involve a form of family therapy in which parents are trained in the management of weight restoration. Here, the focus is on eating disorder symptoms, e.g., behavior during family meals, rather than on general family dynamics. According to a review of the literature, this family treatment-behavior is the only well-established treatment for adolescents with anorexia nervosa and results in greater effects than individual CBT. There are no well-established treatments for adolescents with bulimia nervosa or binge eating disorder (Lock 2015).

Interventions for Externalizing Problem Behavior in Youth

Externalizing problems are characterized by oppositional, aggressive, hyperactive, and inattentive behaviors. As with internalizing disorders, they have a strong impact on overall functioning and future biopsychosocial health.

Interventions for Oppositional Defiant and Conduct Disorder in Youth

Behaviorally oriented parent training is regarded as a first-line treatment for decreasing child disruptive behavior problems (Döpfner et al. 2007; Kaminski and Claussen 2017). Delivered individually or in groups, these interventions focus on strengthening the parent-child relationship to foster the child's motivation to show desirable behavior and on providing the parents with more effective child behavior management strategies. Parents are trained to identify, define, and observe problem behavior in new ways before skill training is started. Here, parents are taught to nurture their relationships with their children by engaging in positive child-directed play activities, by concentrating on positive traits and competencies of their child, and by paying special attention to their own competencies and successes in parenting. Parents then learn how to set and clearly communicate developmentally appropriate rules and limits, how to use prompting and shaping, and how to implement positive

reinforcement procedures. When confronted with problem behavior, parents are taught how to replace harsh discipline strategies such as criticism and emotional or physical violence with positive strategies such as ignoring the behavior or natural and logical consequences.

Another well-established parent-centered treatment for child disruptive behavior is parent-focused therapy. This focuses primarily on parents' emotions, including emotion awareness and regulation as well as attitudes and perceptions about their child, rather than on behaviors. Parents are provided with knowledge about children's behavior, emotion regulation skills, and perspective taking and empathy.

Child-focused CBT interventions for oppositional defiant or conduct problems involve anger control, social skills, and problem-solving training using a combination of cognitive-behavioral intervention techniques. Meta-analyses have reported reductions in disruptive problem behavior following patient-focused interventions. Overall, the body of evidence for child-centered CBT met level 2 criteria of probably efficacious treatments (Kaminski and Claussen 2017).

Anger control focuses on high anger arousal as an antecedent of exhibited aggressive behavior, which is presumed to be caused by a wide range of deviant information processing of social cues or by a hostile attribution bias in peer conflicts. Youth are first taught the important role of dysfunctional cognitions prior to the feeling of anger and are then supported to strengthen accurate emotional awareness and learn positive self-instruction. To improve perspective taking, youth are encouraged to put themselves in the peer's position and to try to forecast the peer's cognitions and emotions. A focus on the emotions that the other might experience should decrease callous-unemotional traits. Social skills training focuses on finding and practicing prosocial solutions for conflict situations, getting in contact with others, and making friends. The following problem-solving steps train youth to slow down their impulsive responses: stop and think, recognize the level of physiological arousal and emotional state, define problems, develop several alternative responses to solve the problem, choose the best alternative based on anticipation of consequences, carry out the chosen course of action, give yourself credit for staying in control, and review the outcome.

School-based interventions are often conceptualized as preventive interventions and target the school environment, teachers, or children. Teacher training focuses on classroom behavior management strategies to help the teacher to become a more effective reinforcer of positive youth behavior. An example for the systematic use of reinforcement in classroom management is the Good Behavior Game (GBG; Barrish et al. 1969), in which after defining specific rules for a certain situation, teachers divide children into teams that compete with each other. The team with the lowest rate of rule breaking is rewarded. There is substantial empirical evidence in support of the GBG (Waschbusch et al. 2018). School-based interventions addressing youth more directly focus either on decreasing aggression and violence or on strengthening social and affective competence.

Multisystemic, multicomponent treatments combine interventions on various levels and are usually group-based (e.g., parent management training plus patient-focused interventions). The two multicomponent treatments described below can be

regarded as well-established treatments for adolescents with serious conduct problems (McCart and Sheidow 2016).

Multisystemic therapy (MST; Henggeler et al. 2009) is a comprehensive family and community-based treatment. As problems are presumed to be multi-determined by the reciprocal interplay of individual, family, peer, school, and community factors, clinicians work with all of these systems. MST is a high-intensity intervention and is delivered by a team of two to four full-time therapists, a part-time supervisor, and administrative support over 3 to 6 months. MST integrates evidence-based practices and is highly individualized.

Multidimensional Treatment Foster Care aims to improve the behavior of antisocial children in out-of-home care in the attempt to return them to their families (Chamberlain 2003). Foster parents are trained to enhance positive interactions; monitor adolescents' whereabouts, activities, and friends; and use effective parenting principles. Like in MST, this intervention targets all key settings in which the adolescent interacts. Besides the foster parent training, families are provided with ongoing case management and individual therapy for the adolescent. The average stay of adolescents in their foster families is 6 months. During this time, and in the 12-month aftercare, the biological parents also receive therapeutic support.

Interventions for Attention-Deficit/ Hyperactivity Disorder (ADHD) in Youth

For youth suffering from ADHD, behavioral parent training, behavioral classroom management, behavioral peer interventions, and organization training are well-established treatments. Combined training programs met criteria for level 2 (probably efficacious) (Evans et al. 2014).

Parent-centered interventions involve psychoeducation with the aim of fostering the understanding of symptomatology and etiology and of factors that cause problems and impairments to increase. Moreover, the same behavioral parent training interventions that are used to decrease disruptive behavior are also considered as first-line interventions for ADHD families. Whether such interventions decrease core ADHD symptoms or primarily reduce general impairment is a matter of debate (Daley et al. 2018; Döpfner and Van der Oord 2018).

School-based behavior management is regarded as a well-established intervention for school children with ADHD (DuPaul et al. 2012). The above-outlined GBG has been successfully used for preschool and school ADHD. The use of Daily Behavior Report Cards involves the setting, monitoring, and evaluation of individual behavior goals. When the child has reached the appointed goal, a previously defined reward is granted either at school or at home (Iznardo et al. 2017). Interventions for preschool and school teachers corresponding to parent training interventions are implemented in addition to these specific interventions.

Parent- and school-centered interventions can be complemented by child-based interventions. Whereas preschool children with ADHD might benefit from play training, child-focused CBT becomes especially important during school years and adolescence and involves the training of organization, self-management or self-instruction, impulse control, and emotion regulation. If peer conflicts are evident,

social skills training might be added as well. Due to the overlap of problem behaviors, child-centered interventions for ADHD correspond to those outlined above for youth with conduct problems. The only specific child-centered intervention is training which aims to improve organizational skills and learning. Here, strategies that teach the child adaptive school-based skills are considered to be well-established for elementary school students with ADHD (Evans et al. 2014).

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Care Transition from Child/Adolescents to Adult Services

37

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Contents

Abstract

In countries with distinct child and adolescent mental health services (CAMHS), access to continued care in adult services can be problematic for those who reach the CAMHS service boundary. This transition boundary occurs at a time of significant change for young people, both in terms of biological and social

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maturation. Care transition is associated with increased anxiety and uncertainty for young people and their parents, often due to a suboptimal transition process. Adult mental health services (AMHS) have high eligibility thresholds, meaning continuity of care is most likely for those with more severe mental illness. Those who do not meet this threshold are further disadvantaged by the variability in service provision for adult well-being services. Increased uptake of recent policy initiatives and expansion of new service models is needed to ensure young people can continue to access appropriate care into adulthood.

Keywords

Transition · Mental healthcare · Health services · Adolescent · Young people · Mental health

Introduction

Care transition refers to a purposeful and planned process that addresses young people's various needs as they move from child-centered to adult-oriented healthcare systems (Blum et al. 1993). Care transition is distinct from the transfer of care, which refers to the termination and re-establishment of care with another service provider (Paul et al. 2013).

The legal age for transitioning from child and adolescent mental health services (CAMHS) to adult mental health services (AMHS) is usually 18 years, although it can vary from 16 to 21 or 23 years depending on country and service (Signorini et al. 2018). The service boundary coincides, therefore, with a critical time period, when young people are at the cusp of adulthood, experiencing significant changes within the social, educational, and vocational domains of their lives (Hovish et al. 2012).

Young people needing continued treatment are not automatically transitioned to adult services. Instead, many experience discontinuity of care and fall through the gap between the services (Appleton et al. 2019; Singh et al. 2010b). Young people disengage or drop out of mental health services either before, during, or soon after transition, with potentially adverse consequences to their mental health and social and functional outcomes. Many experience discontinuity of care despite their willingness to engage with adult services. Poorly managed or lack of transitional care can jeopardize the continuity of care in adult-oriented services for those who need it (Appleton et al. 2019; McNicholas et al. 2015; Paul et al. 2015).

The importance of improving young people's transition from child- to adult-orientated health services has been recognized for 30 years, the division affecting also chronic physical conditions (e.g., type 1 diabetes, cystic fibrosis, and epilepsy) (Bloom et al. 2012; Crowley et al. 2011; Hart et al. 2019; Tuomainen et al. 2018). There has been a surge in transition-related research over the past 15 years, with many studies focusing on care transition in mental health services (Hart et al. 2019). This chapter concentrates on this literature.

Care Transition in the Global Context

Until very recently, most published research into mental health service provision for older adolescents has originated from a relatively small number of countries with distinct child/adolescent and adult mental health services: the United States (US), United Kingdom (UK), Australia, Republic of Ireland, Canada, Italy, France, and Sweden. MILESTONE, a European Union (EU) funded eight-country project focusing on various aspects of mental health service transitions, has extended research into other European countries (Tuomainen et al. 2018).

Underlying many transition problems is the lack of "parity of esteem" between mental and physical health, evident in many countries (Bailey et al. 2013). Not valuing mental health equally with physical health has resulted in significant inequalities between physical and mental health care, lower treatment rates for mental disorders, and serious underfunding of mental healthcare as compared to the scale and impact of mental health problems (Ngui et al. 2010).

The burden and public-health importance of mental health problems for young people worldwide are particularly significant (Patel et al. 2007). Health system responses to youth mental health have been especially deficient (Birchwood and Singh 2013). In most low- and middle-income countries, child and adolescent mental health services and resources, especially those focusing specifically on young people, are scarce or inaccessible (World Health Organization 2005, 2011). A chronic lack of resources and political will has resulted in a paucity of relevant policies, a shortage of child/adolescent mental health specialists, and insufficient financial resources dedicated to child/adolescent mental health services (Babatunde et al. 2019). In the absence of formal psychiatric services aimed at children and adolescents, most mental health care for young people in these countries is delivered in community or outpatient settings, usually from professionals in other sectors or from traditional healers or nongovernmental organizations, or within the context of adult services (Rey et al. 2015). In more severe cases, admission of adolescents to inpatient units for adults is a common happening (Patel et al. 2007). In these circumstances, care transition from child/adolescent to adult services is secondary or irrelevant, meaning transition literature comes predominantly from studies in high-income countries.

Psychopathology in Young People

The developmental course of psychiatric disorders explains why interruption of care at the child/adolescent and adult service boundary can be detrimental for young people.

The development and maturation of the brain are not fully complete until the age of 25 years. In adolescence, critical changes occur in the brain. These make the developing brain structurally and functionally vulnerable to various stressors (linked to diet, drugs, sex, and sleep) and risky behavior, which increase the risk of cognitive, affective, and addictive disorders (Arain et al. 2013; Keshavan et al.

2014; Paus et al. 2008). Indeed, roughly half of all lifetime mental disorders emerge by the age of 14, and over three quarters by the age of 24 (Kessler et al. 2007).

The age of onset (AOO) depends on the disorder and subtype. For example, for anxiety disorders, the mean age of onset ranges from early adolescence to young adulthood (Lijster et al. 2017). Schizophrenia spectrum disorders (i.e., schizophrenia and related disorders) can emerge in childhood or adolescence, but most frequently in early adulthood; for schizophrenia, the AOO is 15–35 years (Kessler et al. 2007). Eating disorders typically emerge between adolescence and young adulthood; for anorexia nervosa, the average AOO is 16–17 years.

Mental health problems frequently recur following periods of remission, and severe disorders usually develop on the back of less-severe problems (Kessler et al. 2007; Schraeder and Reid 2017). Mental disorders of young people will follow different trajectories. In a heterotypic pattern, a disorder in adolescence is a predecessor of a different disorder in adulthood; in a homotypic pattern, the main diagnosis will remain the same throughout (Collins and Munoz-Solomando 2018). In both cases, comorbid disorders may emerge; these being more likely to develop during adolescence and young adulthood. In a study focusing on diagnosis progression during the transition from child/adolescent to adult mental health services, 74 out of 98 young people (75%) had a new diagnosis in Adult Mental Health Services (Collins and Munoz-Solomando 2018), highlighting the complexity and continued development of mental illness in some individuals.

Thus, adolescence is a risk period for the onset of mental disorders. Some young people may be asymptomatic shortly before the transition boundary, but at high risk for recurrence during or soon after the transition period (Schraeder and Reid 2017). This unpredictability of the course of mental health problems contributes to the high numbers of transition-aged youth, who end up disengaging with or being discharged from mental health services albeit continued needs. This is unlike other chronic physical health problems, where service providers know that ongoing and long-term healthcare will be needed after the transition boundary (Schraeder and Reid 2017).

Transition Outcomes and Experiences

Expert estimates of young people in CAMHS requiring continued treatment in adult services vary considerably. In most European countries, it is 25–49%, although in some countries the estimates are lower (0–24%, e.g., Greece) or higher (50–74%, e.g., UK and 75–100%, e.g., the Netherlands) (Signorini et al. 2018).

Most studies focusing on transition outcomes have been retrospective case-note analyses by design and assessed service use or transition pathways after young people have reached the service transition boundary (e.g., Singh et al. 2010b; Stagi et al. 2015), some as part of service evaluation (Cappelli et al. 2016). Many studies have focused on young people with neurodevelopmental disorders, which are in many countries the most frequent diagnostic group receiving treatment in CAMHS (Moosa and Sandhu 2015; Ogundele 2013; Reale et al. 2014; Signorini et al. 2017; Tatlow-Golden et al. 2017). The incident rate of transition need for

young people taking medication for attention-deficit hyperactivity disorder (ADHD) has been calculated in the UK and Republic of Ireland to be 202–511 per 100, 000 people aged 17–19 per year, although only a fifth experience successful transition to adult services (Eke et al. 2019).

Transition Pathways

Adult Mental Health Services

A 2018 systematic review focusing on service use outcomes of young people who crossed the transition boundary of their CAMHS found that only 24% of young people transitioned directly to AMHS (Appleton et al. 2019). Thirteen included papers representing 10 studies or cohorts of young people, with 20–4226 participants from six countries: Australia, Canada, England, France, Ireland, and Italy. In three studies, a substantial proportion of the young people (42–84%) did not receive a referral to AMHS despite the ongoing clinical need for treatment (Appleton et al. 2019). In two out of four studies focusing on young people with ADHD, none of the young people transitioned directly to AMHS. In contrast, in a large Northern Irish study, 72% of young people at the transition boundary were referred to AMHS (269 out of 373), and 93% of these referrals were accepted by the adult service (252 out of 269) (Leavey et al. 2019). In a recent national surveillance study covering the United Kingdom and the Republic of Ireland, about half of the young people taking medication for ADHD (163/315) were referred to specialist adult ADHD services and 25% (81/315) to general AMHS, with 64% of these young people having a referral accepted (Eke et al. 2019).

Engagement with AMHS is variable once referral to the service has taken place. Eighty-six percent of young people in three studies had at least one appointment at AHMS (Ogundele 2013; Paul et al. 2013; Schandrin et al. 2016; Singh et al. 2010b); however, rates of engagement fell after this first contact (Appleton et al. 2019). In Northern Ireland, 92% (170/184) of young people attended the first appointment, but 51% (86/170) were discharged afterward (Leavey et al. 2019). Engagement with adult services appears more problematic for young people with ADHD (Eke et al. 2019).

European experts have estimated that between 20% and 30% of service users under 30 years of age in AMHS have had previous contact with CAMHS, with estimates varying from 10% to 70% (average 33%) (Signorini et al. 2018). In the survey, "previous contact" did not imply a direct transition from CAMHS. Indeed, in four studies, nearly a fifth of young people who were discharged from CAMHS was referred to AMHS by their GP (103/536, 19%) (Appleton et al. 2019). In Northern Ireland, this proportion was much smaller reflecting the higher number of initial referrals to AMHS (Leavey et al. 2019).

Alternative Destinations

Alternative destinations after the transition boundary are remaining in the same or moving to a different CAMHS, other community-based services, a GP/

physician, and private care (Appleton et al. 2019). A quarter (24.5%) of young people in ten studies remained in the same CAMHS; a fraction moved on to a different CAMHS or a private care provider (Appleton et al. 2019). The main reasons for young people remaining in CAMHS are nonreferral and a referral to AMHS being rejected (Appleton et al. 2019), but also young people or their parents/carers refusing referral (Leavey et al. 2019; McNicholas et al. 2015). The reasons for nonreferral include CAMHS clinicians thinking that young people do not meet the AMHS inclusion criteria or that adult services do not have the right expertise (Leavey et al. 2019; McNicholas et al. 2015; Paul et al. 2013). The percentage of unsuccessful referrals range from 3% to 73% in six studies (Appleton et al. 2019; Leavey et al. 2019). Discharge from CAMHS due to disengagement ranges from 3% to 40% of young people (Cappelli et al. 2016; Moosa and Sandhu 2015; Schandrin et al. 2016; Singh et al. 2010b; Tatlow-Golden et al. 2017).

These findings reflect the different ways in which CAMHS are funded and organized in various countries, and the availability of suitable adult services (Appleton et al. 2019; Schraeder and Reid 2017). Service provision varies also within countries as is demonstrated by the four English studies included in the systematic review (Memarzia et al. 2015; Moosa and Sandhu 2015; Ogundele 2013; Singh et al. 2010b) and the study from Northern Ireland (Leavey et al. 2019). The findings also suggest major flaws in the quality of the transition process.

Outcomes Linked to Transitioning to AMHS

Currently, there has been little quantitative analysis regarding biopsychosocial outcomes linked with transitioning to AMHS (Appleton et al. 2019). One longitudinal prospective study found only 6% of young people had a successful transition outcome (being in good mental health, employment, and having low scores on the GHQ [general health questionnaire] and PBS [barriers to services questionnaire] up to 12 months after leaving CAMHS or local-authority care (Memarzia et al. 2015).

An international interdisciplinary panel has identified outcomes for successful health-care transitions for adolescents and young adults with special health-care needs (across conditions and settings) through a 3-stage Delphi process (Fair et al. 2015). These covered individual outcomes (quality of life, understanding the characteristics of conditions and complications, knowledge of medications, self-management of own condition, adherence to medication, and understanding health insurance options), health services outcomes (attending medical appointments, having a medical home, and avoidance of unnecessary hospitalization), and social outcomes (having a social network of friends) (Fair et al. 2015). Quality of life was the highest-rated outcome with broad agreement.

A new tool called the Transition Related Outcome Measure has been developed specifically for use in mental health services (Tuomainen et al. 2018). Together with the Transition Readiness and Appropriateness Measure (TRAM), it can help manage and monitor the transition process and outcomes (Singh et al. 2017).

Transition Experiences

Young People

For most young people, transition is a time of upheaval (Broad et al. 2017). They have likened the process to "moving house during a flood," in which rapid and pressured decisions about an unknown future have to be made (Wilson et al. 2015). As they cross the boundary between services, young people must navigate the divide between childhood and adulthood. This can result in them having to change their social identity (McNamara et al. 2017). The adoption of an identity as an adult with a mental illness who requires ongoing care can result in a successful transition to AMHS.

The upper age limit for CAMHS is a time of several other life transitions, such as from school to work or higher education or moving out of the family home (Broad et al. 2017).

These concurrent life transitions can make young people feel more vulnerable, leaving them without the support they have been accustomed to. This, in turn, can make it more difficult for young people to navigate the transition between CAMHS and AMHS.

Young people who are in local authority care also face the transition to independent living when they reach adulthood. They struggle with feelings of abandonment as they leave foster care, which can be exacerbated by a failure to transition to adult mental health care after CAMHS (Butterworth et al. 2017). Without mental health support, they fall into gaps between services or join a long-waiting list for further support.

Parents/Carers

Parents/carers are often excluded from decisions about their child's ongoing care, as they reach the CAMHS transition boundary. The involvement of parents/carers in transition decisions happens only in some countries (13 out of 28 EU countries), although this may be limited to being informed about the procedures and characteristics of transition (Signorini et al. 2018). Parents/carers are also typically less involved in their child's care following the transition to AMHS, which results in further anxiety as they are not kept informed of changes in their child's health (Hill et al. 2019; Jivanjee et al. 2009).

A recent study on young people with ADHD highlights, however, the crucial role parents play in gathering, translating, and applying key information, to help young people navigate and access services after the service boundary (Price et al. 2019). Young people with neurodevelopmental disorders are more reliant on help from parents than those with physical conditions because the key symptoms of ADHD can hamper the processing and managing of information. Brain development is also delayed in ADHD (Shaw et al. 2007).

Barriers/Facilitators to Good Quality Care Transition

Most of the retrospective cohort studies assessing service use outcomes have analyzed factors associated with the likelihood of transitioning or not transitioning to AMHS. Qualitative interviews engaging service users, carers, and mental health

and social care professionals have also been conducted to better understand barriers/facilitators to smooth mental health-care transitions from CAMHS to AMHS (Belling et al. 2014; Broad et al. 2017; Hill et al. 2019; Lindgren et al. 2014; Loos et al. 2018; McLaren et al. 2013).

Individual/Service User Level

Factors Associated with Transitioning/Not Transitioning to AMHS

Young people are more likely to transition to AMHS if they have severe or enduring mental illness (Singh et al. 2010b), a diagnosis of psychosis (Leavey et al. 2019; McNicholas et al. 2015), schizophrenia/related disorder (Stagi et al. 2015), personality disorder (Stagi et al. 2015), pervasive developmental disorder (Stagi et al. 2015), or a mood disorder (Perera et al. 2017) or if they have a comorbidity (Singh et al. 2010b). In England, being admitted under the Mental Health Act or having had an inpatient stay due to mental illness has been shown to increase the likelihood of transitioning to AMHS (Singh et al. 2010b).

Correspondingly, young people taking prescription medication, especially antipsychotics, at the time of transition has been shown to increase the likelihood of transition to AMHS (Leavey et al. 2019; Singh et al. 2010b). Also, having a diagnosis or risk assessment in CAMHS has been associated with the likelihood of referral and engagement with AMHS (Cappelli et al. 2016; Leavey et al. 2019).

Considering factors associated with personal and family background, young people classed as not in education, employment, or training (NEETs) are more likely to be referred to AMHS (Leavey et al. 2019). Paternal mental health problems have also been shown to increase the likelihood of the referral (Leavey et al. 2019).

In contrast, young people with a diagnosis of an emotional or neurotic disorder, those with a neurodevelopmental disorder (ADHD or Autism Spectrum Disorder – ASD), or those with Oppositional Defiant Disorder have been found in most studies to be least likely to access AMHS after leaving CAMHS (Cappelli et al. 2016; Islam et al. 2016; Perera et al. 2017; Tatlow-Golden et al. 2017). In some instances, young people with a diagnosis of ADHD have been most likely to refuse a referral to adult services (McNicholas et al. 2015). Young people with a higher score on antisocial behavior or with anxiety disorder have been also shown to be more likely to miss or cancel appointments during the transition process, declining further service input from AMHS (Cappelli et al. 2016).

Interestingly, and more recently, young people in Northern Ireland with a diagnosis of ADHD or those receiving ADHD medication were among those more likely to be referred and remain in adult services (Leavey et al. 2019).

Young Person's Perspective

Young people have described some of the problems they face when reaching the age of transition. These include a perceived lack of knowledge about their diagnoses, available treatments, and risks and benefits of prescribed medications (Broad et al. 2017). Lack of understanding of the transition process and not having the skills and

knowledge of how to manage their mental health independently can further hamper transitioning, as has been discovered in studies involving young people with ASD (Cheak-Zamora et al. 2013) and ADHD (Price et al. 2019). These young people need and are happy for their parents' help to help secure continued care (Price et al. 2019).

Clinician Qualities, Relationships, and Practices Related to Transitioning

One of the most frequently identified care-related barriers is a lack of preparation in the run-up to the CAMHS service boundary, with transition decisions not made until the young person reaches the age cut-off, or the young person not feeling informed about their transition (Price et al. 2019). This has left young people feeling uncertain and anxious about their transition (Burnham Riosa et al. 2015) or feeling as though the process is rushed, giving them no time to consider their options (Wilson et al. 2015). A reluctance to leave one therapeutic relationship behind to start another with someone new is also a well-established factor discouraging young people from accessing further care (Broad et al. 2017).

Researchers have identified four factors which should be in place for an *optimal transition* (Paul et al. 2013):

1. A period of parallel care or joint working between the two services
2. Continuity of care in AMHS for at least 3 months, or appropriate discharge
3. A complete handover of the young person's information to the AMHS
4. At least one joint meeting should take place between members of both CAMHS and AMHS (including the young person)

A very small proportion of young people who transition to AMHS experience optimal transition (4–13%) (Eke et al. 2019; Memarzia et al. 2015; Schandrin et al. 2016; Singh et al. 2010b). None of the young people who transitioned to AMHS in Northern Ireland experienced optimal transition (Leavey et al. 2019). Only 38% (96/252) experienced a transition-planning meeting and 18% (46/252) a period of parallel care. Mere 3% (8/252) experienced optimal information transfer.

Organizational Level

One of the main barriers to a successful transition is how mental health services are structured. Due to the historic divide between child and adult psychiatry, the respective services have different philosophies and models of care (Rey et al. 2015; Singh et al. 2005). CAMHS provides care with a developmental approach, often involving the young person's family (McLaren et al. 2013). In contrast, AMHS use a biomedical model of care with more emphasis on personal responsibility (Vyas et al. 2015) and focus on those with severe mental illness such as schizophrenia (McGorry 2007). Navigating the different service models and cultures between the

two services is hard and can put young people off from engaging with AMHS (Mulvale et al. 2016). A lack of transition protocols between the services contributes to the difficulties experienced at the service boundary (van der Kamp 2018).

Different treatment thresholds between child/adolescent and adult services are another challenge when trying to access continued care. AMHS tend to have much stricter eligibility criteria and higher illness thresholds than CAMHS (Belling et al. 2014). This is thought to be in part due to the difference in care philosophies between the two services and also due to a pressure on resources, meaning AMHS must prioritize those that are most severely ill (Belling et al. 2014). As a result, young people are frequently told that they are not ill enough to access care at AMHS (Wilson et al. 2015).

A lack of mental health services for adults hinders continued care in some areas. The availability of services is location-dependent, leading to a "postcode lottery" as to who can access appropriate adult care (van der Kamp 2018). This contributes to long waiting times for AMHS, which can range from 55 to 110 days for those referred (Cappelli et al. 2016; McNicholas et al. 2015; Schandrin et al. 2016). Young people with neurodevelopmental conditions, such as ADHD and ASD, and other particular diagnoses are especially disadvantaged due to a dearth of adult services specializing in these conditions (Hall et al. 2015; McConachie et al. 2011). A lack of adult well-being or third-sector-based services for those who do not meet the treatment threshold for AMHS exacerbates the problems (van der Kamp 2018).

Improving Care Transition

The problems and barriers that hamper optimal transition between child and adult mental health services are complex (Hovish et al. 2012). One possible solution is to improve transition training, as this has been identified as an area in which psychiatrists lack specialist knowledge. A recent review identified only two national training programs on transition in Europe (UK and Ireland) (Russet et al. 2019). A survey conducted of psychiatrists training in Europe found that only 17% of countries offered theoretical training and 28% offered practical training in transition between CAMHS and AMHS (Hendrickx et al. 2019). Almost all respondents identified further transition training as necessary. This current lack of knowledge could contribute to the poor transitional care experienced by the majority of young people. A way forward could be to develop evidence-based training approaches on transitional care into the training of mental health-care professionals.

There have been various attempts to improve transition experiences and outcomes for young people, focusing on different aspects along the transition pathway. Five types of intervention models aimed at improving transition can be identified; we will focus on these in turn. The first three deal with the gap between CAMHS and AMHS and address core elements of transition programs and interventions. These include transition policy, tracking, and monitoring of young people approaching the service boundary, assessing transition readiness, transition planning, transfer of care, and transfer completion (Cleverley et al. 2018). The two latter intervention models are

linked to large scale transition programs addressing multiple facets of young people's lives and the development of new youth-friendly services or restructuring of existing ones, to shift the transition boundary away from the critical age of 18.

To date, few intervention or evaluation studies have been adequately powered randomized controlled trials or case-controlled studies, and there is no clear evidence of the greater effectiveness of any particular transition model (Paul et al. 2015).

Protocol and Reciprocal Agreement Model

The "protocol and reciprocal agreement model" focuses on the development and implementation of transition policies, protocols, and reciprocal working arrangements between CAMHS and AMHS, which include transition planning meetings and periods of parallel care (Hovish et al. 2012; Paul et al. 2015). This model is prevalent in the UK, one of two European countries that has written national or regional policies or guidelines for the management of service-user transition from CAMHS to AMHS available (Signorini et al. 2018). The UK also has a written national guideline to manage the interface between the services (National Institute for Health Care Excellence 2016; Singh et al. 2016), something found in only three other European countries. The guidelines are not disorder-specific, but cover young people using mental health or social services (National Institute for Health and Care Excellence 2016). These include:

- Making sure transition is developmentally appropriate, taking into account the young person's maturity, psychological status, cognitive abilities, and social and personal circumstances in a move away from a rigid service age boundary.
- Ensuring transition support is person-centered, focusing on what is positive and possible for the young person.
- Treating the young person as an equal partner in making transition decisions and ensuring transition addresses all outcomes that are relevant to the young person, such as education.
- The use of joint working between the child and adult social and mental health services, e.g., through shared transition protocols.
- The use of a named transition worker for each young person to help them move between services.

Despite policies and guidelines, mental health services in England have suffered from a policy-practice disconnection and organizational differences between CAMHS and AMHS, with few service users benefitting from optimal transition (Hovish et al. 2012; Paul et al. 2013; Singh et al. 2010b).

However, in Northern Ireland, improved transitions have been linked to service response and improvement based on the evidence of previous transition-related research and service-specific transition protocols (Leavey et al. 2019). Yet, without a *regional* policy or protocol on transition, there is still considerable variability between service providers in how they deliver transitional care. The quality of care

varies even between teams within the same provider, highlighting the need to ensure that all mental health-care professionals within a service are aware of, and make use of, transition protocols.

The Shared Management Framework Model

The "shared management framework model" uses transition teams or co-ordinators or transition clinics to assist with the transition (Paul et al. 2015). If a transition worker stays with the service user and continues to work with the new care coordinator in AMHS for some time, they can, together with joint appointments between CAMHS and AMHS, ensure relational and therapeutic aspects of continuity of care. In the UK, designated transition workers with posts split between AMHS and CAMHS have been highly successful in managing smooth transitions (Singh et al. 2010a). In Canada, a shared management model with individualized transitional care plans and a transition coordinator resulted in the reduction of the number of young people waiting for a referral and an improvement in access to AMHS (Cappelli et al. 2016).

However, skilled transition workers are uncommon and may be lost in restructuring or during cost pressures. In times of fiscal austerity, creating new posts such as transition workers can be difficult. Transition workers can also blur clinical responsibilities and supervision, fragment working practice, and divide loyalties across teams (Singh et al. 2010a).

In a shared management model without a specific transition worker, a UK service streamlined transition pathways for young people with ADHD with a Lean approach, including a joint ADHD transition clinic in which the handover from CAMHS to AMHS was done (Moosa and Sandhu 2015). A Lean approach is underpinned by a group of staff with high morale willing to shift working patterns and processes, and can be achieved where there the organizational culture facilitates change. Over 12 months, the UK service radically reduced the number of patients on the waiting list for transfer from CAMHS to AMHS (134 to 14) and the waiting time for transition (12 to four months) (Moosa and Sandhu 2015).

Managed Transition Model

A "managed transition model" is underpinned by a standardized assessment of the needs of young people approaching the service boundary, shared decision-making, and good information flow between services (Singh et al. 2017). In most countries, a standardized assessment is not routine practice; only three out of 28 EU countries conduct such assessments at the local or national level (Lithuania, Sweden, and Ireland) (Signorini et al. 2018). The Transition Readiness and Appropriateness Measure (TRAM) assessing young person's needs from three perspectives (young person, parent/carer, and clinician) was developed specifically for mental health services and is accompanied by the Transition Related Outcome Measure (TROM) (Santosh et al. 2020; Singh et al. 2017; Tuomainen et al. 2018).

A Managed Transition model based on the TRAM, aimed at supporting decision-making and communication, has been shown to improve young people's outcomes in eight European countries (Singh et al. 2017) (Singh et al. under review). Managed transition is far less resource intensive and costly than comprehensive large-scale transition programs.

"Got transition" tools cover all conditions and provide supports, templates, and guides for primary-care and specialty-care practices for initiating transitional care quality improvement. https://www.gottransition.org/resources/

Transition Program Model

The "transition program model" relates to large-scale comprehensive programs, which include supports for young adults or young people across various life domains (Paul et al. 2015). These have been largely carried out in the US, and typically focused on either the child/adolescent or the adult health-care system. The number of programs providing support to transition-age youth only (primarily 16–25) is fewer in number. Apart from mental health support, the programs have provided a range of services, such as those linked to housing, independent living, vocational, substance abuse, education, recreation, and delinquency rehabilitation (Davis et al. 2018).

A recent example is YouForward, in Massachusetts, USA (Henry et al. 2019). This program is for young people aged between 16 and 25, and aims to bridge the gap between child and adult mental health services and works to engage the most hard-to-reach young people in mental health care, with specific outreach efforts to minority groups, such as LGBTQ (lesbian, gay, bisexual, transgender, and questioning or queer) young adults, and those without a stable home. The YouForward model operates using drop-in centers to minimize the barriers to accessing support, with no screening procedures to determine eligibility. As well as offering basic amenities, these drop-in centers help young people join a community and act as a gateway to accessing further support from other services. YouForward has been successful in helping young people access education, employment, and housing (Henry et al. 2019).

Due to their complexity, US-style transition programs have been difficult to replicate locally or scale-up elsewhere (Paul et al. 2015), and many have not been properly evaluated. Cross-age collaboration is higher in programs focusing on transition-age youth, compared to the child-only and adult-only programs (Davis et al. 2018). A perception that funders want more cross-age collaboration appears to be positively associated with cross-age collaboration.

Youth-Friendly Service Model

A youth-friendly service model refers to a mental health service aimed at young people typically between the ages 12 and 25, although the age range may vary (Hetrick et al. 2017; Rickwood et al. 2019; Vyas et al. 2015). Apart from eliminating

transition at age 18, this model of care addresses barriers to help-seeking and service engagement.

Youth mental health services are characterized by working in partnership with other health and social care services, providing integrated "one-stop" services in one location, with the main impetus of improving accessibility. Commonly, they offer walk-in sessions and self-referral, are located centrally and/or close to public transport, provide designated youth-friendly drop-in spaces and activities, and engage young people in the development of the service (Hetrick et al. 2017; Rickwood et al. 2019). Interventions are geared toward individual counselling, therapeutic groups for young people, and family therapy. Peer support workers feature too, with peers with or without lived experience providing support to clients (Hetrick et al. 2017).

Many different integrated youth mental health models have been developed internationally (Hetrick et al. 2017). Service networks have evolved in Australia (headspace), the Republic of Ireland (Jigsaw), France (Maison des Adolescents), New Zealand (Youth One Stop Shop), and Canada (Foundry, ACCESS Open Minds). In Australia, headspace centers aimed at young people aged 12–25 have been established across the country (current total over 115, and several new services opening by 2022), comprising worldwide the largest national implementation of a consistent primary-care model (Rickwood et al. 2019). Single services have been developed in the UK (e.g., Norfolk Youth Service, Forward Thinking Birmingham), US (Supporting Positive Opportunities with Teens), Israel (Adolescent Health Service), and Singapore (Community Health Assessment Team). No single-service model constitutes best practice (Hetrick et al. 2017), and guiding principles for youth mental health services have been published to inform the development of services (Hughes et al. 2018).

Youth-friendly services have been rated positively and resulted in improved engagement by young people and decreased emergency admissions (Hetrick et al. 2017). Between 52% and 68% of young people accessing services included in a systematic review experienced reductions in symptoms, including self-harm, suicidal ideation, and impaired social, and vocational functioning (Hetrick et al. 2017).

However, the establishment of new service models is not without problems. Most recently in Norfolk, UK, a service aimed at 14–25 year olds was successful in reducing the number who dropped out of care at 18, yet this negatively impacted on the ability of the service to accept new referrals (Wilson et al. 2018). The evaluation of a newly developed 0–25 service in Birmingham, UK, found that a shortage of medical staff, poor service infrastructure, and inadequate or incompatible data management systems hampered care provision, despite widespread support for the model (Birchwood et al. 2018).

Involving Young Service Users

To ensure the optimum effectiveness of any new models of care, young people (and where relevant, parents and other stakeholders) must be consulted when designing improvements to current transitional care and the development of youth-friendly services. Youth participation in decision making, leadership, service provision, and

Table 1 Youth recommendations for positive service experiences and clinical practice for CAMHS–AMHS care transition. (Adapted from Broad et al. 2017 and Price et al. 2019)

Pre-transition: CAMHS
Useful CAMHS clinician qualities: tenacity, flexibility, instilling hope, providing support and reassurance, nonjudgmental, good listener
Sharing of key information well in advance in a staged process, with time for the young person to reflect and discuss options
Involvement of young person in transition planning collaboratively
Involvement of parents/carers
Early notification of transition to AMHS
Preparation for transition
Explanation of differences between child and adult services
Sharing of information about the new clinician/team
Communication of the physical location of adult services
During transition: CAMHS-AMHS
Development of individualized care plans focusing on young person's goals of functioning
Provision of increased autonomy in decision-making
Provision of point of contact during the transition
Community supports and primary-care physicians to provide "scaffolding" across the transition from CAMHS to AMHS
Gradual and flexible timing of the transition, taking individual needs into account
Sharing of information between CAMHS and AMHS
Care continuity (joint working or parallel care between CAMHS and AMHS)
Relational care continuity to reduce the fear of losing relationships with CAMHS staff and to promote comfort with AMHS
System-level continuity to reduce gaps
Post-transition: AMHS
Staff support and practical structure
Autonomy in treatment decisions
Choice about parental involvement
Physical care environments geared toward young adults
Informational continuity (i.e., sharing of clinical information between CAMHS and AMHS)

service development has been instrumental in the development of a number of the above services or service networks (Rickwood et al. 2019).

Table 1 collates young people's views and recommendations on how to ensure positive experiences regarding care transition from CAMHS to AMHS (Broad et al. 2017; Price et al. 2019).

Conclusion

In countries with distinct child/adolescent and adult mental health services, young people with mental disorders face a large barrage of complications and barriers at the service boundary, which results in many of them experiencing discontinuity of care.

These barriers originate and affect at different levels: the organizational level, the service provider or clinician level, and the individual service user or personal level.

One of the great challenges for transition research is to establish how to bridge the divide between the two different models of care and therapeutic approaches present in child/adolescent and adult services. Currently, there is no one "gold standard" model for improving transitional care, although several different service models have been trialed internationally.

While large scale service restructuring may prove to be successful and cost-effective in the long-term, planning and implementing such service transformation is a lengthy process and may not be affordable or feasible. An interim solution is needed to ensure that young people can transition into adulthood with the support they need and to reduce undesirable outcomes and societal costs. Without this, we face letting down our young people at a time when they need support the most.

Cross-References

- ▶ Epidemiology of Child Psychopathology
- ▶ Gaps Between Knowledge, Services, and Needs
- ▶ Mental Health Strategy and Policy
- ▶ Services for Neurodevelopmental Disorders such as Autism Spectrum, Attention Deficit Hyperactivity Disorder (ADHD), and Tic Disorders
- ▶ Trends in Child and Adolescent Mental Health Prevalence, Outcomes, and Inequalities

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Part VIII

Mental Public Health Strategy and Policy

Mental Health Strategy and Policy

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Rural vs Urbanized Communities and First World vs Developing World

Dutsadee Juengsiragulwit and Anula Nikapota

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Abstract

Urbanicity is raising concern on mental health impact since 2000. The United Nations predict that the vast majority of the human population will live in urban rather than rural areas by 2030. Some previous studies have shown that urbanicity causes a negative impact on adults' mental health as well as children's, especially on emotional and behavioral problems. This chapter aims to discuss the impact of urbanicity on child and adolescent mental health (CAMH) in both lower-and middle-income and high-income countries. With regard to mental health strategy and policy, the PESTLE model for assessing opportunities and threats for the organization before planning mental health strategy in urban or rural areas will be discussed. Possible solutions to design appropriate child and adolescent mental health service in rural or urbanized areas will be proposed.

Keywords

Child and adolescent mental health · High-income countries · Low- and middle-income countries · Rural · Urban

Introduction

Urbanicity is raising concern on mental health impact since 2000. The United Nations predict that the vast majority of the human population will live in urban rather than rural areas by 2030 (United Nations 2018). Some previous studies have shown that urbanicity causes a negative impact on adults' mental health as well as children's, especially on emotional and behavioral problems (Evans et al. 2018). This chapter aims to discuss the impact of urbanicity on child and adolescent mental health (CAMH). With regard to mental health strategy and policy, the PESTLE model for assessing opportunities and threats for the organization before planning mental health strategy in urban or rural areas will be discussed. Possible solutions to design appropriate child and adolescent mental health service in rural or urbanized areas will be proposed.

Urbanicity and Child and Adolescent Mental Health

Considering features of urban environments and the impact on mental health, two key dimensions were noted, urbanization and urbanicity. "Urbanization" refers to change in size, density, and heterogeneity of cities, while "urbanicity" refers to the impact of living in urban areas at a given time (Vlahov and Galea 2002). Although living in urban area is attractive for most people due to various reasons such as easier job access, higher salaries, accessibility to medical care, better transportation system, high-quality schools, child care centers, etc., growing evidence indicates that living in the cities is more stressful compared with living in semirural or rural areas. Air pollution, noise pollution, relatively nature-deficit area, limited social support from family or friends, higher crime rate, or higher living expenses can be causal factors of stress in urban residents and impair their quality of life (Kennedy and Adolphs 2011; Amato 1993; Hofferth and Iceland 1998; Paykel et al. 2000; Bernam et al. 2012).

Level of urbanicity results in different kinds of child and adolescent mental health problems. Rural area is suggested to be associated with adolescent parenthood, up to three times more prevalent in rural areas compared to urban areas globally (World Health Organization 2018a). In urban or megacities, especially in developing areas, air pollution such as dust, high NO_2, or PM2.5 is unavoidable since air pollution regulation is not well established in such areas (World Health Organization 2013a). Association between child mental health problems and air pollution was found in a longitudinal cohort study from the UK. It noted that air pollutions received at age 12 were significantly associated with increased odds of major depressive disorder at age 18, even after controlling for common risk factors (Roberts et al. 2019). A seminal study comparing children living in rural towns on the Isle of Wight to those living in inner-city London found that rates of both conduct disorders and emotional disorders were higher in residents of urban compared to rural areas (Rutter 1981). The results were replicated by a Dutch general population study that examined whether urbanicity was independently associated with more behavioral and emotional problems in primary school-aged children and whether it remained after controlling for other major risk factors for mental health problems in children. Analysis of data in 4 age groups i.e., 8, 9, 11, and 12 years old showed that children who lived in more urban areas were significantly more likely to exhibit behavioral ($p < 0.001$) and emotional ($p < 0.001$) problems. This effect remained when controlling for neighborhood socioeconomic status, gender, ethnicity, family socioeconomic status, parental symptoms of psychopathology, parenting stress, and parenting practices (behavioral: $p = 0.02$, emotional: $p = 0.009$). Like research in adults, urbanicity seems to be independently associated with behavioral and emotional problems in children. A possible underlying mechanism is that the city is a stressful environment for children to grow up in, which contributes to an increased risk for mental health problems.(2) Disadvantaged neighborhoods increased the risk of developing emotional disorder twice for youths living in urban areas versus nonurban areas. In urban centers, living in a disadvantaged neighborhood was associated with 59% (95% confidence interval 25–103) increased adjusted odds of emotional disorder (Rudolph et al. 2014). Growing up in urban areas was found

associated with a twofold adulthood psychosis risk, and this association replicates for childhood psychotic symptoms (Newbury et al. 2016, 2017). Urban poverty could be another factor affecting CAMH. In a Great Smoky Mountain Study, researchers conducted a naturalistic experiment to evaluate children's emotional and behavioral problems before and after money provision for the Cherokee parents after opening the casino. Results showed that children's emotional and behavioral problems decreased significantly after their parent's poverty diminished. Possible mediator suggested in the study is parental supervision. The study suggested that poverty leads to inadequate parental supervision which eventually engenders the child's emotional and behavioral problems (Costello et al. 2003). Urbanicity was associated with increased likelihood of having been racially bullied. Urban bully victims were also more likely to have been bullied about money than nonurban bully victims (Goldweber et al. 2012). Surprising results from a primary emotional traits study in parallel sample from Germany and China showed that higher scores in the urbanicity index in childhood were associated with fear and sadness only in adult Chinese females. These effects seemed to be driven by living in Chinese megacities (over ten million populations), because a parallel sample from Germany and China in smaller urban cities resulted in weaker but similar effects in females in both countries. Additional associations could be observed with higher play and urban upbringing in Chinese males. With small correlations and multiple testing issues in this study, interpretation should be done with caution, and researchers are encouraged to consider urbanicity variables in personality neuroscience and personality-oriented clinical psychiatric research (Sindermann et al. 2017).

Impact of urbanicity on child mental well-being is not only by direct effect of stressful or toxic environment but also from indirect effect of upbringing by stressful parents when they live in an urban compared to a rural area. Parenting stress plays an important role in child mental health outcomes. One study investigated the relationship between parenting stress and child behavioral problems from ages 3 to 9 years old and found that behavioral problems and parenting stress covaried significantly across time for children with normal or delayed development. The analyses supported that the relationship between two factors seemed to be bidirectional (Neece et al. 2012). Another study regarding parenting stress illustrated that parenting stress mediated the relationship between potentially traumatic events that the child experienced and internalizing problem behaviors at 6 months (Whitson and Kaufman 2017). The relationship between urbanicity, parenting stress, and child and adolescent mental health is shown in Fig. 1.

Rural communities can provide health advantages for their habitants. High levels of green space presence during childhood are associated with lower risk of a wide-spectrum of psychiatric disorders later in life. The association remains even after adjusting for urbanization, socioeconomic factors, parental history of mental illness, and parental age (Engemann et al. 2019). Children in rural areas are more likely than urban children to live in safe and supportive communities. However, they are less likely to have access to amenities such as recreation centers or parks or playgrounds as well as health-care center than their urban counterparts (U.S. Department of Health and Human Services Health Resources and Services Administration 2007; Imig et al.

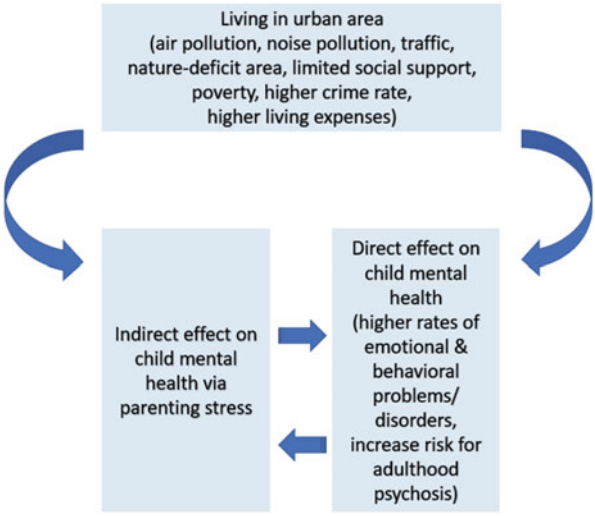

Fig. 1 Relationship between urbanicity and child and adolescent mental health

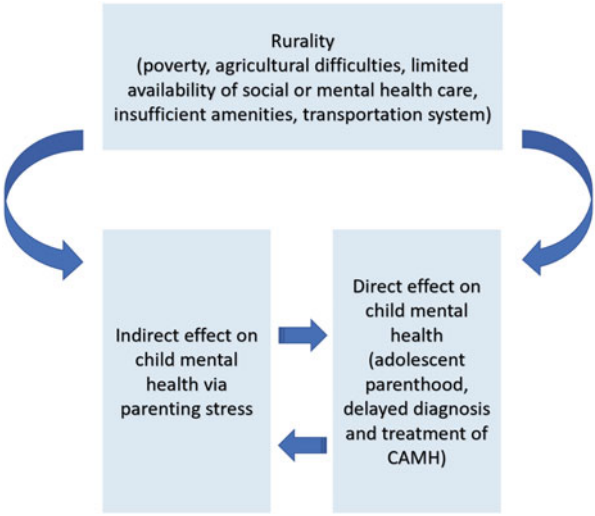

Fig. 2 Relationship between rurality and child and adolescent mental health

1996). Although parental stress seemed to be lower in rural areas (Moore et al. 2005), various stressors, such as living in high poverty and distant areas, uncertain employment, experiencing agricultural difficulties, rural restructuring, or limited medical and behavioral health resource availability, could be sources of parental stress and influence their child's development and mental well-being. The relationship between rurality, parenting stress, and child mental health is shown in Fig. 2.

Mental Health Strategy and Policy in Rural and Urban Area

CAMH strategy and policy in rural and urban areas may differ in various aspects. The Ottawa Charter for Health Promotion will be a core concept for discussion on CAMH promotion and prevention in rural and urban areas. For child and adolescent mental disorder treatment and rehabilitation, the six building blocks for health systems which were proposed by the World Health Organization will be used as a framework for discussion.

Child and Adolescent Mental Health: Promotion and Prevention in Rural and Urban Areas

In 1986, the World Health Organization (WHO) arranged the first International Conference on Health Promotion, and the Ottawa Charter was first presented to achieve Health for All by the year 2000 and beyond (World Health Organization 1986). It is a socio-ecological conceptualization of health promotion that provides diverse actions from individual behavioral change to systems and policy level approaches (Kickbusch 1986). From this Charter, health promotion is "the process of enabling people to increase control over, and to improve, their health. To reach the state of complete physical, mental and social well-being, an individual must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector but goes beyond healthy life-styles to well-being." The Charter articulates core values of "equity, participation and empowerment" and proposes a framework of three strategies (advocacy for favorable conditions for health, enabling all people to reach their full health potential and mediating between different interests in society for the pursuit of health) and mentioned five action means, i.e., building healthy public policy, creating supportive environments, reorienting health services, developing personal skills, and strengthening community action (World Health Organization 2009). Caring, holism, and ecology are essential issues in developing strategies for health promotion. Therefore, social ecology like urbanicity should be considered in each phase of planning, implementation, and evaluation of child and adolescent mental health promotion activities.

Building Healthy Public Policy

The WHO emphasized the importance of "Health in All Policies" to work on public policies across sectors and with communities (World Health Organization 2014). They illustrated steps in developing a child and adolescent mental health policy as shown below:

(1) Gather information and data for policy development.
(2) Gather evidence for effective strategies.

(3) Undertake consultation and negotiation.
(4) Exchange with other countries.
(5) Set out the vision, values, principles, and objectives of the policy.
(6) Determine areas for action.
(7) Identify the major roles and responsibilities of the different stakeholders and sectors.

Summarizing these seven steps with CAMH local policy in rural and urban area, the steps should be contracted to five essential steps, i.e.,

(1) Gather community context, CAMH information, and data for local policy development.
(2) Gather evidence including local intelligence for effective strategies.
(3) Set out the vision, values, principles, and objectives of the policy.
(4) Public hearing including community stakeholder's participation.
(5) Identify the major roles and responsibilities of the different stakeholders and sectors.

CAMH promotion will be more effective if it is operated within non-health sectors like education sector or in community rather than in health sector. Hence, developing CAMH promotion policy is challenging due to the need for intersectoral collaboration. Generally, there are fewer stakeholders in rural or semirural areas and less complicated structure of local authorities comparing with megacities. This relatively simple context may be an advantage in building intersectoral linkage, but in the other way around, it reflects comparatively limited resources in rural communities and may restrict the variety of strategies used in such area.

Information about local intelligence is as important as evidence-based practice in community CAMH. The importance of local initiatives is highlighted in rural area where the initiatives may not be evidenced due to the lack of researchers or experts in CAMH although it was effective in that context. However, ongoing outcome evaluation or implementation research should be planned with community stakeholders to ensure the efficacy of such local initiatives in real-life practice.

Although these steps are essential components of developing healthy public policy, the third step "set out the vision, values, principles and objectives of the policy" and the fourth step "public hearing including community stakeholders participation" were considered the most important key success factors for community mental health projects. Shared vision and values with all community stakeholders will unite them together with sense of belonging. Their ownership and participation will enable a long-term teamwork which eventually lead to sustainable outcome. Creating community participation in megacity or urban areas is a challenging process since social cohesion in such areas is lower than its counterpart. Community in a big city may include people living in the same habitat or online social group or even parents of children in the same school. Community context and information will guide CAMH community practitioners who are community leaders and stakeholders in such area.

Another issue about public policy in low- and middle-income countries (LAMICs) is a special economic zone, which is an economic strategy deployed in many countries. The environmental impact assessment (EIA) and health impact assessment (HIA) policy are always included in operational plan, but mental health impact assessment (MHIA) policy is not yet established. Evidence from the US National Survey of Drug Use and Health (NSDUH) in 2009–2011 suggested that the prevalence of major depression or serious mental illness in adolescence and adulthood in small metropolitan areas and semirural areas was slightly higher than in large metropolitan areas, with statistically significant odds ratios after adjustment ranging from 1.12 to 1.19 (Breslau et al. 2014). This information should be considered, and the MHIA especially in terms of parenting stress and the impact of parents with mental illness in children and adolescence should be surveilled.

Creating Supportive Environments

Creating supportive environments was defined as "developing physical and/or social environments in ways which support health and protect against physical hazards and socially and psychologically damaging practices" (Ottawa Conference Report 1986). The core elements of effective interventions leading to supportive environments are described below (CYCC Network 2014).

Family Centered

Family relationship is an essential social environment in a child's life. Healthy family relationships shield children from developing emotional and behavioral problems, while poor family function has a negative impact on a child's mental health. A family-centered program with a focus on enhancing positive family relationships by improving communication and problem-solving skills will provide protective factors for children and reducing risk factors for developing disruptive behavioral problems (Thompson et al. 2005). Parenting programs can be targeted at parents of children with, or at risk of, developing conduct disorder and are designed to improve parenting styles and parent-child relationships. Reviews have found parent training to have positive effects on children's behavior and that benefits remain 1 year later (Dretzke et al. 2009; Lundahl et al. 2006).

In LAMICs, rural families are more likely to be extended and skipped-generation households since domestic migrations from rural to urban areas are common. Thus, CAMH practitioners should take family structure into account when designing family-centered intervention in such areas.

Community Based

A famous proverb "It takes a village to raise a child" reflects the importance of building a supportive community for a child. Physical and social environments are embedded in communities which will have direct and indirect influences on children's behaviors and upbringing. Social risk factors like poverty, vulnerable community, deviant peers, and neighborhood characteristics are interconnected, dynamic, and reciprocal. Community-based interventions create social connectivity and support families by identifying, empowering, and utilizing children's natural

support networks together. Since CAMH resource in LAMICs is scarce, community-based action should be done under a family-community-schools collaboration.

Youth Engagement

Meaningful adolescent and youth engagement is "an inclusive, intentional, mutually-respectful partnership between adolescents, youths, and adults whereby power is shared, respective contributions are valued, and young people's ideas, perspectives, skills, and strengths are integrated into the design and delivery of programs, strategies, policies, funding mechanisms, and organizations that affect their lives and their communities, countries, and world"(World Health Organization 2018b). Engaging youths regardless of their socioeconomic status, ethnics, gender identity and orientation, religion, disability, political affiliation, or physical location will create sense of belonging and being accepted as part of communities. Youth engagement will eventually empower them to lead the project with support of adults.

Cultural Sensitivity

Cultural bias or lack of understanding contributed to inequalities and disparities in mental health care. It is essential to ensure access to equitable services to culturally diverse communities. CAMH promotion and prevention in ethnic minorities in LAMICs are not usually given priority since such service for general population is still lacking. Cultural sensitivity is a fundamental issue that should be considered when implementing effective CAMH strategy for ethnic minorities. For example, in some ethnic groups, parents are respected as god so they will not hug or play with their children when applying child developmental stimulation program. Reading books for their kids is almost impossible because there is no writing in their language. In such situation, engaging the literate siblings or childcare staff in the program would be helpful. Cultural sensitivity in urban areas tends to be less diverse than that in rural areas or megacities. CAMH practitioners should refine CAMH program before implementation in that areas.

In short, combination of action by youths, families, and communities with consideration of cultural sensitivity forms core elements of creating a supportive environment. Moreover, since the emergence of the digital age, social environments move toward social online and network. This surreal social environment provokes various CAMH problems, e.g., game or Internet abuse, cyberbullying, sexual or emotional abuse on social media, etc.

Reorienting Health Services

Reorienting health services is essentially about shifting the focus of health-care sector from treatment and rehabilitation to an increasing focus on health promotion and prevention. The Ottawa Charter mentioned "Health services need to embrace an expanded mandate which is sensitive and respects cultural needs. This mandate should support the needs of individuals and communities for a healthier life, and open channels between the health sector and broader social, political, economic and physical environmental components." In other words, it expands health-care service from medical approach to well-being approach which needs a change of health

personnel's mindset and service reorganization to capture the total needs of the individual as a whole person (Ottawa Charter). Interpreting this principle into practice, health-care practitioners should gradually shift their focuses from clinical tasks to community health works since most well-being improvement strategies occur in non-health sectors which are based in the community.

The role of CAMH practitioners in CAMH service reorientation is particularly important since knowledge and skills on CAMH promotion and prevention are not well established in social and public sectors so the tasks are relying on CAMH practitioners' guidance. For example, a study from the UK revealed that detecting the signs and symptoms of mental illness in young people is a challenge even for general practitioners (Hinrichs et al. 2012). A qualitative study from Nicaragua unveiled that doctors and nurses were reluctant to deal with young people with suicidal problems at primary health care which was more likely to be caused by feelings of incompetence, lack of time, lack of privacy, and lack of human resources and difficulties in communicating with young people rather than from negative attitudes (Medina et al. 2014). With this challenge, either in developed or developing countries, CAMH practitioners are invited to reconsider their roles on CAMH promotion and prevention in collaboration with primary health-care practitioners and local communities. Integrating CAMH into primary care services can contribute to greater equality of access, because such services will serve more people in need (World Health Organization 2018c).

For urbanized cities, shifting the mindset of CAMH practitioners could be more challenging since CAMHS in higher-resource areas are far more advanced and tend to be designed as specialized clinics: either disorder-based clinic or intervention-based clinic rather than mental well-being clinic. Without CAMH promotion and prevention, the clinics will gradually become overcrowded over time since most CAMD are chronic illnesses, and the patients are aggregated in the clinic. If so, clinicians will be overwhelmed and end up with endless requests for more resources which lead to wider inequitable service comparing to those in rural areas. Service reorientation will cut off this vicious cycle and engender better CAMH resource management.

In rural areas where CAMHS is scarce, it is a chance for CAMH practitioners who establish the service to "orientate and organize" the service in balance of clinical approach and well-being approach. If CAMH practitioners engage CAMH promotion and prevention strategy in their plan earlier, they may be overwhelmed with all four dimensions of CAMH work (promotion, prevention, treatment, and rehabilitation) in the first step. But after the system is set up, their team will enlarge to include staffs in non-health sector. For example, the project entitled "Health and Educational Regional Operation: HERO" developed in northeastern of Thailand is a collaborative platform between community hospitals and schools under supervision of CAMH specialists. At that time, there were 17 child psychiatrists for four million children; therefore, it is impossible to provide individual working with the whole population. Schoolteachers were trained with a scalable experiential learning workshop to gain behavioral modification skills for managing children with emotional and behavioral problems. Outcome shown by the SDQ improved in all domains with moderate effect size including children's academic achievement. About half of at-risk children returned to normal range and were not referred to specialist clinics.

Those with persistent emotional or behavioral symptoms were referred for diagnosis and treatment, which increased service accessibility of ADHD from less than 5% to 21.4% within a year. Teachers eventually deploy the skills learned in the workshop to normal children and effects in increasing positive behaviors (Juengsiragulwit et al. 2018). The study supported a transdiagnostic approach in early intervention. Specialists' clinical task will be focused on treatment of complex CAMD, leaving noncomplicated case management to nonspecialists in their areas.

Developing Personal Skills

Developing personal skills aims to empower the individual and give them more control over health or, in other words, promoting health through providing health information, education, and enhancing life skills. It includes the development of health literacy, promoting protective behaviors, understanding of the links between risk behaviors and lifestyle diseases, and enhancing the individual's skills for navigating the health system and appraise health information (World Health Organisation 1986). Health literacy was defined by the European Health Literacy Consortium as "people's knowledge, motivation and competences to access, understand, appraise and apply health information in order to make judgements and take decisions in everyday life concerning health care, disease prevention and health promotion to maintain or improve quality of life during the life course" (Kickbusch et al. 2013).

Inadequate mental health literacy is a major barrier for help seeking in adolescents with mental health difficulties (Gulliver et al. 2010; Evans-Lacko et al. 2012), societal stigma, and discriminating behaviors (Rusch et al. 2011; Thornicroft 2008). Various studies from developed countries focus on improving child and adolescent mental health literacy. A qualitative study entitled "NePP: Needs for primary prevention in families affected by parental mental illness" conducted in 2015–2017 confirms earlier results of the study on international health literacy and emphasizes that shame/stigma are important determinants of help seeking and mental health literacy. The results have been translated into the conceptual framework of the research project "IMPRES: Improving mental health literacy to reduce stigma" which aims at development, implementation, and evaluation of an intervention to address mental health literacy and stigma in children and adolescents. The researchers hope that destigmatisation in children and adolescence may lead to destigmatization in the future society (Wahl et al. 2018). To improve service accessibility through anti-stigmatization, an educational program is a potential method for enhancement of mental health literacy (Kelly et al. 2007). However, there were limited studies regarding mental health literacy in adolescence, especially in LAMICs (Rahman et al. 1998). A randomized controlled trial in 380 students in 22 classes from 10 nongovernment secondary schools examines the impact of "Head Strong," a school-based educational intervention, on mental health literacy, stigma, help seeking, psychological distress, and suicidal ideation. Participants were randomly allocated to receive either Head Strong or Personal Development, Health and Physical Education (PDHPE) classes. Outcome was assessed pre- and post-

intervention and at 6-month follow-up. Literacy improved, and stigma reduced in both groups at post-intervention and follow-up, relative to baseline. However, these effects were significantly greater in the Head Strong condition (Perry et al. 2014).

Developing CAMH personal skills involves not only knowledge and skills specific to mental health but also includes impact of general health on mental health, family contexts, social, and spiritual perspectives. Therefore, it requires multi-sectoral involvement, e.g., schools, primary care, social welfare or social institution, NGOs, and community.

Child and adolescent personal skills sets are various and overlapping. School-based social and emotional learning (SEL) programs help children and young people to recognize and manage emotions, set and achieve positive goals, appreciate the perspectives of others, establish and maintain positive relationships, make responsible decisions, and handle interpersonal situations constructively (Elias et al. 1997). Repeating evidence shows that SEL participants demonstrate significantly improved social and emotional skills, attitudes, behavior, and academic performance. The SEL consists of five components, i.e., (1) self-awareness, (2) self-management, (3) social awareness, (4) relationship skills, and (5) responsible decision-making. All five components overlap with the life skill components recommended by the WHO. Life skills training/education is a transdiagnostic intervention which has been proven for prevention of substance dependence, teenage pregnancy, conduct behaviors, behavioral addiction, etc. (Weisen et al. 1997). Analyzing both programs, child and adolescent personal skills encompass cognitive, social, and emotional skills development for promoting protective behaviors and prevent negative mental health outcome from their life experiences. Quality of SEL or life skills training in urban and rural areas may differ based on quantity and quality of the teachers. In remote areas, especially in LAMICs, there may be only 1–2 teacher in a primary school. It is almost impossible to accomplish mental health skills training for children in such schools. In that case, family and community participation would play a major role in arranging life skills training for children in cooperation with schools.

Strengthening Community Action

Health promotion generally operates by engaging community and cooperating with the community to set goals, priority, and plan and implementing it together to achieve better health outcome. Rural and urban communities are markedly different. Simplicity and stronger social cohesion are advantages of rural communities, while higher CAMH resources and advocacy in urban settings are superior. Generally, practical steps in community mental health action that can also apply for CAMH are as follows:

Community Engagement and Collaboration

Building strong coalition with various stakeholders in community, e.g., community leader, school director, traditional healer, local authorities, etc., is a fundamental step

of community mental health work equal to building therapeutic alliance in individual psychotherapy. If the alliance does not exist, the next step cannot be done. Since community stakeholders are diverse, community mental health works are more complicated than school mental health. Engagement and collaboration with school and other educational partners are important in community CAMH. Schools are often the strongest social and educational institution for CAMH intervention. Teachers can actively involve in CAMH programs, and the intervention can reach generations of children (Hendren et al. 1994). However, teachers in limited resource areas are as overwhelmed as CAMH practitioners. Therefore, engaging schools and teachers should be done in empathic ways.

In LAMICs or in indigenous areas, traditional healer or wisdom elites can be part of influential community leaders. A systematic review on effectiveness of traditional healers in treating mental disorders in 2016 concluded that traditional healers can provide an effective psychosocial intervention which might help to relieve distress and improve mild symptoms in common mental disorders, e.g., depression and anxiety, but not change the course of severe mental illnesses like psychotic disorder. There was no research mentions efficacy of traditional healers in CAMH (Nortje et al. 2016). From adult evidence, building good rapport with indigenous healers could be useful, for instance, if CAMH knowledge can be provided and disseminated through ritual procedures that children and families are familiar with.

Community Analysis

Community contexts are varied across settings. CAMH practitioners should collect adequate information until the community concerns and community resources are identified. Community key players may not engage in the first step at the same time. So, information recollection may need to be done if indicated. In CAMH, community concerns encompass the child's emotional-behavioral-social difficulties, parent's and teachers' attitudes and concerns on the child's difficulties, and community participant's perspectives on CAMH. For example, a 3-year-old child with delayed speech may be recognized as normal variation in underdeveloped areas, while in high-resource setting, their counterparts may have much earlier access to CAMHS or pediatric unit for developmental assessment. Community concerns help practitioners understand and formulate nature of CAMH problems in that community, but community resources will guide them for possible solutions. Resource holders and resource persons either specialized or nonspecialized in CAMH should be engaged as early as possible to participate in planning of community CAMH projects.

Setting Shared Goal and Setting Priority

It needs empathic negotiation to achieve the shared goal with school and community. Shared goal will encourage sense of teamwork and strengthen coalition between community and CAMH practitioners. CAMH work can support teachers in classroom management and improve children's academic achievement. It can support social workers in the institution to manage the child's emotional and behavioral

problems and improve their quality of life. While setting shared goal, either well-being approach or symptomatic approach is recommended. Disorder approaches that medicalize children' emotional and behavioral problems should be avoided. If the project starts with mental disorders, all stakeholders will perceive the child's difficulties as a disease and therefore refer them for treatment in health-care setting rather than trying to help or support the child by themselves.

Basically, CAMH problems are various. Prioritizing CAMH issues will guide direction for CAMH work. To prioritize, there are criteria for decision-making suggested by the WHO and allied organization (World Health Organization 2017) which can be modified into "4-I" abbreviation, i.e.,

(1) "Impact": Magnitude of the problems, e.g., number of death or injury or prevalence of risk behaviors
(2) "Identification": Identifying groups of children and adolescents most affected, e.g., vulnerable group like children with poverty, parental loss, parental mental disorders, etc.
(3) "Intervention": Availability of effective interventions and its feasibility in delivering in particular community with different socioeconomic and cultural differences
(4) "Implementation": Potential for scaling up the intervention to achieve expected outcome in target group

Formula of success in implementation science which comprise of effective intervention, effective implementation, and enabling contexts is useful in developing implementation plan (Hanson et al. 2016). Setting priority by school or community will enhance their sense of ownership and eventually sustain the CAMH work either in rural or urbanized area. Suggested targets for CAMH care across intervention levels are depicted in Table 1 (Garland et al. 2013).

Community Empowerment

Enhancing community capability in promoting health conditions of the people is a pivotal point of community mental health work. Empowering them to provide evidence-based interventions is a sensible method to leverage CAMH and well-being and support sustainable health promotion. Lists of evidence-based intervention for adolescent mental health can be explored in the Global Accelerated Action for the Health of Adolescents (AA-HA!) Guidance to Support Country Implementation. For example, after a disaster, promoting normal recreational activities for young people, restarting formal or informal education and involvement in concrete and purposeful common interest activities (Regional Office for the Eastern Mediterranean, World Health Organization 2012), and deploying psychological first aid techniques to provide general support for adolescents and their parents (Stone 2016) are evidence-driven practices that CAMH practitioners should empower the community to engage and take part in. Community empowerment and creating sense of

Table 1 Care improvement targets for children's mental health care across intervention levels

Level of intervention	Care improvement targets		
	Service access and engagement	Delivery of evidence-based practices	Outcome accountability
Federal and state policy or funding	Expand coverage for behavioral health services and coordinate across service sectors	Incentivize evidence-based practice and support training and infrastructure development	Build incentives for outcome accountability
Provider organizations	Support integration of mental health and primary care services and outreach to underserved communities	Build/reinforce sustainable infrastructure for evidence-based practices, including optimal organizational culture and climate and secured time for training/supervision	Utilize measurement feedback systems (MFS) to assess treatment processes, client outcomes, and costs
Individual providers	Train on evidence-based engagement strategies, with attention to cultural sensitivity	Provide effective training in evidence-based practices (assessment and treatment) that provides ongoing consultation/ supervision	Train on collection and use of MFS outcome data in clinical care
Client/family	Train and support family advocates/peer educators; reduce stigma; empower consumers to engage providers; teach self-advocacy	Educate consumers regarding evidence-based practices and expectations and encourage consumer activation	Educate consumers regarding differential quality in providers and value of outcome monitoring

Evidence-based stands for evidence based

ownership are the most critical steps in community mental health action. Powerful community will raise community awareness on health promotion and draw community resources to enhance self-help and social support.

Child and Adolescent Mental Disorders: Treatment and Rehabilitation in Rural and Urban Area

The challenge of poorly developed child and adolescent mental health service (CAMHS) in LAMICs has been described for more than 40 years (Patel et al. 2007a). Despite this long-standing recognition, the gap between needs and the resources provided remains large. For example, in a cross-sectional study of children and adolescents in a low-income urban area of Brazil over 1 year, only 14% of the

children with mental health problems could access treatment (Lund et al. 2009a). Challenges in closing this treatment gap include difficulty in accessing and using services, stigma associated with mental disorder, urban-based specialist provision of CAMHS in countries where most of the population is concentrated in rural areas, and few inpatient beds allocated for CAMH care (Juengsiragulwit 2015).

To provide equitable and efficient CAMHS, a well-functioning health system working in harmony is required. In 2007, the World Health Organization (WHO) proposed an analytical framework to describe health systems. It consisted of six core components, i.e., service delivery, health workforce, health information systems, access to essential medicines, financing, and leadership and governance as illustrated in Fig. 3 (World Health Organization 2010a). The WHO six building blocks will be used as a tool to analyze CAMH provision in rural and urbanized communities.

Service Delivery

Since resources in LAMICs are scarce, the stepped care model will provide appropriate service design that utilizes the limited resource efficiently. The model has two principles: treatment should always have the best chance of delivering positive outcomes while burdening the patient as little as possible and a system of schedule review to detect and act on non-improvement must be in place to enable stepping up to more intensive treatments, stepping down where a less intensive treatment becomes appropriate, and stepping out when an alternative treatment or no treatment becomes appropriate (National Institute for Health and Clinical Excellence (NICE) 2011). Applying this model in LAMICs, CAMHS in rural and urban area can be merged into one service system in some areas due to shortage of CAMHS specialist. The author proposed four steps for developing CAMHS in LAMICs.

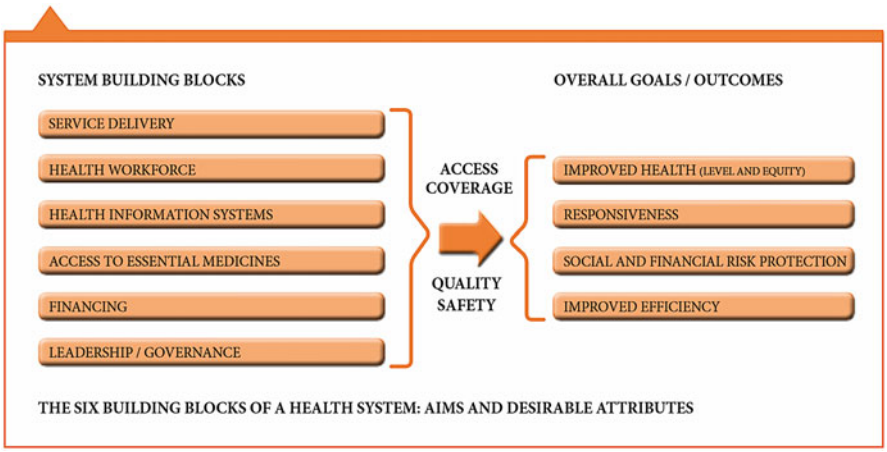

Fig. 3 The six building blocks of a health system: aims and desirable attributes (World Health Organization 2007)

CAMHS Need Assessment

Child and adolescent mental disorders are far from the center of attention in LAMICs, where communicable diseases are more prevalent. Rahman and colleagues discussed the three broad methods used to analyze CAMH needs – epidemiology of mental health problems and their risk factors, comparative need assessment, and corporate need analysis. The latter involves synthesis of views on the mental health needs of children from those agencies involved in their care and seems to be a reasonable approach in LAMICs (Rahman et al. 2000). For example, in rural or remote areas, services for children with neurodevelopmental disorders (NDD) seem to be prioritized and settled before those of emotional and behavioral disorders (EBD). There are several reasons that could explain this phenomenon. Firstly, developmental problems are more concrete compared with emotional and behavioral problems. Generally, parents or caregivers can observe developmental delays more easily than detecting childhood emotional disorders. Secondly, maternal and child health (MCH) were significant health aspects leading to well-established MCH services. CAMHS for children with NDD then can be appended on existing MCH service and structure. Lastly, children with NDD present their deficit in their preschool age which is the window of opportunity for human development and eventually attracts stakeholders to engage in the service. Comprehensive assessment of CAMHS demand will guide CAMH practitioners in developing an appropriate service plan either in rural or urban areas.

Clients Classification Based on Clinical Severity

Categorizing the patients by their clinical severity is a fundamental process for stepped care model. For example, patients with prodromal or mild symptoms could be placed at primary care center, while patients with severe NDD or EBD should be referred directly to tertiary care center. Resource in the area will determine characteristics of the patients in each group and level of classification. Characteristics of the patients including referral criteria for each group need to be defined precisely so it can be applied effectively in referral system. Patients with prodromal or mild symptoms who do not respond to low-intensity intervention in primary or secondary care center should be referred to CAMH specialists in proper time to avoid adverse outcome of delay effective intervention provision. The figure below proposed a service model for NDD or EBD in LAMICs.

Identification of Effective Intervention for Each Category

Evidence-based biological and psychosocial interventions for children with CAMD in each category should be collected and assigned to differential health-care setting in the model. Discussion with all stakeholders regarding which setting should provide what kind of treatment is essential. For example, although stimulant is a

drug of choice for treatment of ADHD, access to stimulant is restricted due to stimulant control regulation or financial problems in some LAMICs. Therefore, agreement and commitment of all stakeholders should not be omitted. For primary care setting, psychosocial interventions such as developmental stimulation, behavioral intervention, and individual counseling are basic services that could be deliverable even in LAMICs. Medication and in-depth psychotherapy would better be provided by secondary or tertiary care.

Implementation Design

Several authors stressed the potential of CAMHS delivery through existing pediatric or primary health-care services, especially for rural populations (World Psychiatric Association 2005a). Kieling and colleagues noted that integration of child mental health care with other pediatric and primary care services, such as the integrated management of childhood illness and Mother and Child Health Programs, might benefit both mental health outcomes and physical outcomes for children and adolescents (Kieling et al. 2011). There are three models for integration of CAMHS in primary care services, i.e., (1) replacement model, CAMH specialists work and take charge of the patients in that setting instead of primary care practitioners, (2) collaborative care model, CAMH specialists collaboratively work with primary care practitioners to provide CAMHS, and (3) consultation-liaison model, primary care practitioners are in charge of the service and consult CAMH specialists for planning and treatment (Thornicoft et al. 2011). In LAMICs and rural areas where there is shortage of CAMH specialists, the first model is almost impossible. Collaborative care model in combination with consultation-liaison model would be appropriate and can provide a sustainable CAMHS in the target area. From the author's experience, applying an "intermittent replacement model" in countries with high urban-rural resource disparity is helpful. By this fashion, a group of CAMH specialists who generally work in an urban area move to provide CAMHS in rural or low-resource areas intermittently. This strategy, in other words "Caravan model," will be sustainable only if collaborative care model is deployed in parallel. However, implementing CAMHS in areas with differential levels of urbanicity should be done with caution. Adopting effective model developed in urban areas to local areas or vice versa is not recommended. Socioeconomic and cultural contexts should always be reviewed.

Due to emerging of the digital age, telepsychiatry and/or digital applications begin to play a role in CAMHS provision. Research about telemedicine usage in children and adolescents launched more than 20 years ago, and the outcome indicated that telepsychiatry is feasible, acceptable, and well tolerated. It can be used in various purposes such as pharmacologic care, psychotherapeutic care, consultation and psychosomatic care, or applying as school-based telepsychiatry or telepsychiatry in juvenile corrections (American Academy of Child and Adolescent Psychiatry (AACAP) Committee on Telepsychiatry and AACAP Committee on Quality Issues 2017). Telepsychiatry would be of great benefit for dispersed rural populations who encounter difficulties in accessing CAMH care. However, studies in child

telepsychiatry are limited even in high-income countries. Hence, clinicians should apply telepsychiatry with socioeconomic context and practice with caution (Fig. 4).

Chatbot therapy is another solution to close the service gap for digital natives. Woebot, Wysa, Joyable, and Talkspace are examples of mental health chatbots in a niche market (Legg 2018). The World Health Organization also established "The STARS project" in March 2018. This aims to create digital psychological intervention for adolescents aged 15–18 years old globally who are experiencing high levels of psychological distress. The initial prototype is tested in five settings, i.e., Jamaica, Nepal, Pakistan, South Africa, West Bank, and Gaza Strip. The results show that most adolescents had access to a smartphone, and they enjoyed using chatbot technology. Digital self-help, accessed through smartphones and computers, provides opportunities for overcoming barriers to mental health treatment, as the user can choose when and where to use it (World Health Organization 2019).

Health Workforce

Geographical distribution of health workers is skewed toward urban and wealthier areas worldwide. The geographical imbalance of health workforce exacerbates the inequity of health services (Araujo and Maeda 2011). This situation is particularly true for LAMICs where shortage of CAMH workforce is one of the major challenges for CAMHS provision (Patel et al. 2007b; Syed et al. 2007). Compounding staff

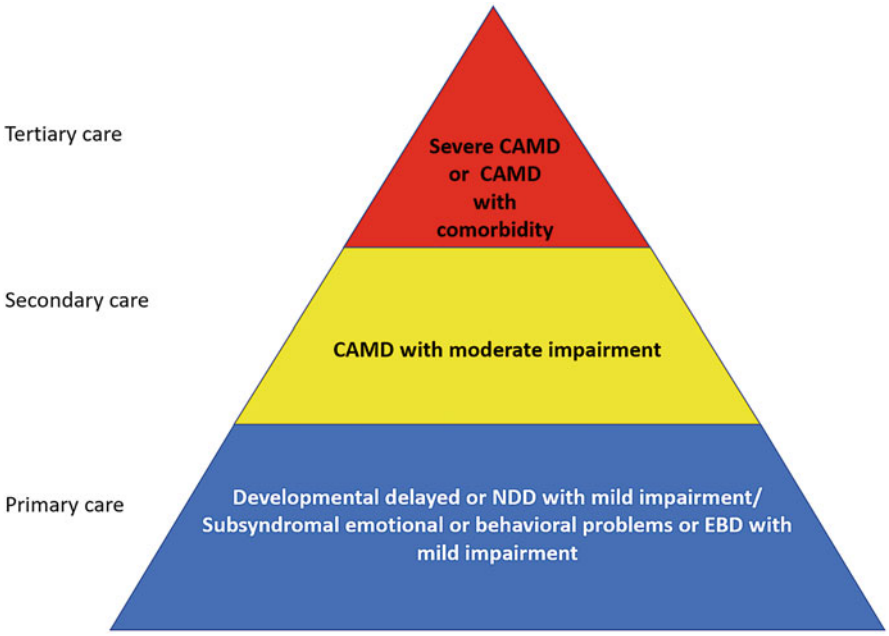

Fig. 4 Proposed service model for CAMHS in LAMICs

shortages, most mental health professionals are required to work in adult mental health services and therefore have less time for CAMHS. Overloaded services, shortage of funds and personnel, and under-recognition of the importance of CAMH can lead to low motivation for primary health-care workers to provide CAMHS (Nikapota 1991).

Regarding mental health workforce, the WHO recommended workforce planning and training in 2005 as revealed in Fig. 5 (Funk 2005). Workforce planning must be done in correlation with service delivery model. For example, in urbanized area where there are adequate and accessible CAMHS clinics, community health practitioners may be required only to assess CAMH problems and proper referral to specialist clinic. But in rural areas, they may have to assess CAMH problems, early or brief intervention, and postintervention assessment before proper referral to distant specialist clinic.

In terms of quantity, estimating the number of mental health workforce started from (1) CAMH needs analysis, (2) service delivery design, (3) task or function assignment, and (4) workforce competency identification which finally bring about the number and type of personnel. In the examples from South Africa, Lund and colleagues developed a spreadsheet model to calculate the human resources and costs required to improve the poor coverage of CAMHS. They calculated that per 100,000 population (of which 43,170 would be aged under 20 years), the minimum

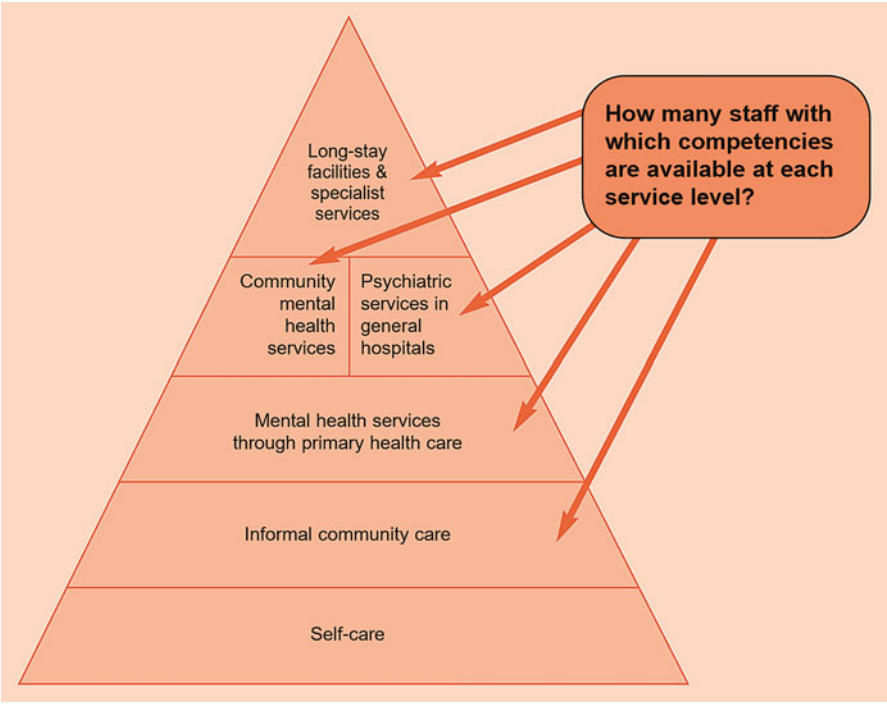

Fig. 5 Assessing current staff supply at all services level (WHO 2005)

coverage of full-time staff would need to be 5.8 in primary health-care facilities; 0.6 in general hospital outpatient departments; 0.1 in general hospital inpatient facilities; 1.1 in specialist CAMHS outpatient departments; 0.6 in specialist CAMHS inpatient facilities; 0.5 in specialist CAMHS day services; and 0.8 in regional CAMHS teams. These minimum requirements were substantially less than that being provided (Lund et al. 2009b). To alleviate the workforce shortage, evidence supported the use of "task shifting strategy" in transporting evidence-based practice for CAMHS in LAMICs (Huang et al. 2015). Task shifting involves (1) modifying the intervention for provision by nonmental health providers, (2) training nonmental health providers in the modified intervention, and (3) establishing regular supervision and monitoring by mental health specialists (Gopalan 2016). Nonetheless, task shifting approach may increase workload for nonmental health providers which may be inadequate as well. In 2010, the WHO suggested the member countries "to increase the availability of motivated and skilled health workers in remote and rural areas through improved attraction, recruitment, and retention of health workers in these areas." Possible strategies for attraction, recruitment, and retention of health workforce in rural or distant area included (1) education, e.g., recruit students from rural backgrounds, establish health professional schools outside major cities, assign clinical rotations in rural areas during studies, and develop curricula that reflect rural issues or continuous professional development for rural health workers; (2) regulation, e.g., subsidized education for return of service, enhanced scope of practice, and provide different types of health workers; (3) financial Incentives, e.g., provide appropriate financial incentives, professional and personal support, distribute better living conditions, and create safe and supportive working environment; and (4) outreach support, e.g., career development programs, professional networks, public recognition measures, etc. (World Health Organization 2010b).

Regarding workforce quality, or in other words, workforce competency, continuous educational and training is a continuous process that should be integrated in CAMHS planning. Fundamental competency is listed as diagnosis, prescription, referral, communication, administrative task, counseling, crisis intervention, knowledge of psychotropic drugs, psychoeducation, support advocacy, prevention, and promotion (Kelly et al. 2007). Especially under task shifting strategy, workforce competency should be a central concern to ensure success of CAMHS (Fig. 6).

Health Information Systems

A mental health information system (MHIS) is a system for collecting, processing, analyzing, disseminating, and using information about mental health service and mental health needs of the population it serves for enabling planning and decision-making in all aspects of the mental health system. Moreover, developing service system is a dynamic process which contributes to activate change of information system. Information can be divided into four types (World Health Organization 2005a):

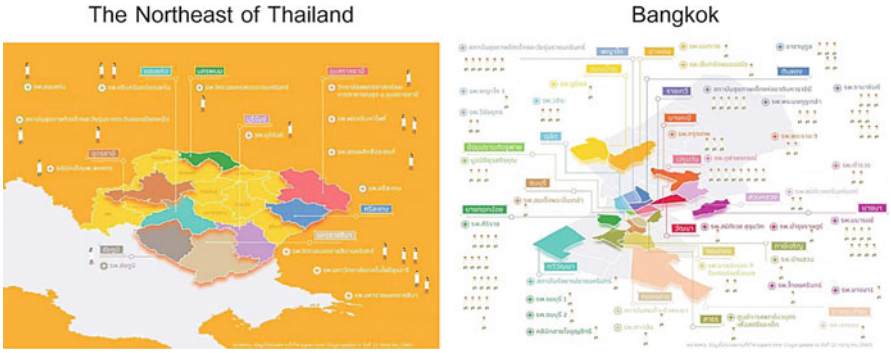

Fig. 6 Comparison of the density of child and adolescent psychiatrist between the northeast and capital city of Thailand

(1) Episode-level information is required to manage an individual episode of service contact.
(2) Case-level information is required to care for an individual service user.
(3) Facility-level information is required to manage the specific service facility.
(4) Systems-level information is required to develop a policy and plan for the mental health system.

MHIS development process is similar to that of service design. It started from need assessment, followed by situational analysis, implementation, and evaluation. In LAMICs, developing MHIS is usually incomplete due to resource constraint and leads to imprecise decision-making. The "start small but keep the big picture in view" principle suggested in the WHO documentation is pivotal for MHIS planners in LAMICs. Minimum dataset of CAMH needs and CAMHS in LAMICs were suggested below.

Example of a relationship between health information system and CAMHS decision-making was shown in the infographic below. Information about location of CAMHS and child psychiatrists between the northeastern, the distal and less developed region in Thailand, and Bangkok, a megacity, was graphically compared in the infographic below. Information about poor distribution of health-care workforce was presented to policy makers and professional training institute and eventually influenced a resource allocation and recruitment of health care workforce from rural areas as a priority (Child Psychiatric Association of Thailand 2019).

In general, case-level information or, in other words, CAMH clinical outcome indicators in each setting are varied. It is hard to compare and identify national treatment goals without a single set of indicators. Hence, developing single national set of CAMH service and clinical outcome indicators is highly recommended. With shared indicators, each setting in the same level with similar context can benchmark and learn from each other how to provide effective CAMHS. Noteworthy,

benchmarking is not developed for a competition but rather a learning process that encourages CAMH practitioners to improve their service provision and follow the good practice setting.

Another problem of information system in the LAMICs is the linkage of service information between settings. Without information linkage, it is possible that the patients may receive redundant services from different settings they were referred. This is a waste of service provision that can be eliminated by service model design and effective information linkage. Service bundle should be analyzed and linked with information system. In urban areas, information linkage can be easier in terms of technology and staff, but the challenge may be in the cooperation of various stakeholders. In contrary with urbanized areas, cooperation with fewer stakeholders may ease the linkage of information in rural areas, but major obstacles might involve technological problems like poor Internet signal or lack of staff for putting data in.

Access to Essential Medicines

Even essential adult psychotropic medicines are routinely unavailable in public health facilities in LAMICs (Wagenaar et al. 2015), availability of child and adolescent psychotropic medication is undoubtedly restricted. In 2013, the WHO launched the 18th WHO model list of essential medicines including medicines for mental and behavioral disorders as described in Table 2 (World Health Organization 2013b). However, prescribing of psychotropic medicines for CAMD is somehow different from that of adult mental disorders, e.g., "start low, go slow" principle, lack of evidence to support usage of Amitriptyline for treatment of depressive disorders in children and only marginal evidence for that of adolescents (Hazell and Mirzaie 2013), etc. The author suggested the evidence-based medication use for CAMD that would be available in LAMICs in Table 3.

As the evidence illustrated, the most of essential psychotropic drugs for CAMHS are part of essential medicine list in adults except for methylphenidate hydrochloride (MPH) which is a first-line medication for children with ADHD (Storebo et al. 2015). According to the prevalence and service user's profile, methylphenidate should be placed in a high rank of essential medicines in CAMHS. However, since it is an amphetamine derivatives, MPH is categorized as a Schedule II drug under the Convention on Psychotropic Substances that requires medical prescriptions for supplying or dispensing and therefore limited the usage as an essential medicine (International Narcotics Control Board 2003). The regulation is sensible, especially in urban or developed areas where methylphenidate was illegally used for attention focusing, weight loss, or euphoric effects by college students and adolescents (Bogle and Smith 2009). But the possibility of this illicit usage is low in distant areas where the drug availability is limited. To increase service accessibility, MPH prescription should be viewed as an essential medication that can be prescribed by child psychiatrists, general psychiatrists, pediatricians, or family physicians who receive adequate training for CAMD diagnosis and treatment.

Table 2 Recommended minimum dataset of CAMHs in LAMICs

Category	Suggested minimum dataset
Episode-level [52]	(1) Patient identification and demographic information: Name, date of birth or age, gender, address, education (2) Parental information: Name, age, gender, current employment status, housing/living arrangements, education, citizenship, language, religion (3) Administrative data: Admission and discharge dates, category of payment (4) Clinical data: Prior receipt of care, medical history, presenting problems, discharge diagnosis (5) Discharge data: Place of referral, guardian/person to notify (6) Event data: Date and time of event, event type, place of service and responsible clinician, staff member reporting, patient(s) involved, event program, and event identifier (7) Workforce registry data: Name, gender, date of birth, specialty, educational and certification data
Case-level	Percentage of children with neurodevelopmental disorders that improved after intervened Percentage of children with neurodevelopmental disorders that are included in educational system Percentage of children with ADHD improved after intervened Percentage of children and adolescents with emotional disorders improved after intervened
Facility-level	Average number of children with CAMD in each service setting Average number of referred in and referred outpatients Top CAMD rankings in each setting
System-level [36]	Prevalence of common CAMH problems (either developmental or emotional or behavioral problems based on stakeholder concern) Prevalence of CAMD in each area Number of CAMH practitioners per 10,000 populations Distribution of CAMHS practitioners by occupation/specialization, region, place of work Annual number of graduates of health professions educational institutions per 100,000 population, by level and field of education Number and distribution of health facilities per 10,000 population Number and distribution of inpatient beds per 10,000 population Number of outpatient department visits per 10,000 population per year CAMD accessibility rate Total expenditure on CAMH General government expenditure on CAMH as a proportion of general government expenditure (GGHE/GGE) The ratio of household out-of-pocket payments for health to total expenditure on CAMH

Financing

Financing is a mechanism by which plans and policies are translated into action through resource allocation (World Health Organization 2003). With adequate financing, CAMH service delivery, CAMH workforce development and training, essential medicines for CAMD, and management of information system and other

Table 3 Model list of essential medicines for mental and behavioral disorders by the WHO and the suggested evidence-based medication usage in children and adolescents in LAMICs

Indications	List of medicines for adults	Suggested evidence-based medication for children and adolescents
Psychotic disorders (Kumar et al. 2013)	Essential list – chlorpromazine fluphenazine haloperidol risperidone Complementary list – clozapine	Second-generation antipsychotics, e.g., risperidone, clozapine Other typical antipsychotics In the adult list
Depressive disorders (Hetrick et al. 2012)	Amitriptyline Fluoxetine (aged above 8 years old)	Fluoxetine
Bipolar disorders (Cox et al. 2014)	Carbamazepine Lithium carbonate Sodium valproate	Second-generation antipsychotics, e.g., risperidone Lithium carbonate Sodium valproate
Anxiety disorders (Ipser et al. 2009; Patel et al. 2018)	Diazepam	Selective serotonin reuptake inhibitors (SSRIs)
Obsessive- compulsive disorders (60)	Clomipramine	Selective serotonin reuptake inhibitors (SSRIs)
Disorders due to psychoactive substance use	Nicotine replacement therapy Methadone	Suggested as adult list

infrastructures are possible. In 2016, the World Bank estimated that the annual cost for scaling up basic package of cost-effective mental health-care interventions is approximately US$2 per capita for low-income countries, US$3-US$4 for LAMICs, and US$7-US$9 for Latin America and the Caribbean. For LAMICs, this corresponds to 4–6% of total health expenditures (Mnookin 2016). Disproportionately, between 2007 and 2013, total spending on mental health in LAMICs came to only US$0.61 per capita which was five to eight times fewer than that expected (Gilbert et al. 2015). CAMH expenditure is generally subsumed into the mental health expenditure and therefore is squeezed into a smaller proportion of general health expenditures (World Health Organization 2005b). Nevertheless, it is irrational and unfair to request more CAMH expenditures while the budget for life-threatening conditions is still insufficient. In 2003, the World Health Organization published a guidance package on mental health financing and recommended eight steps to achieve adequate financing for mental health, i.e., (1) understand the broad health-care financing context, (2) map the mental health system to understand the level of current resources and how they are used, (3) develop the resource base for mental health services, (4) allocate funds to address planning priorities, (5) build budgets for management and accountability, (6) purchase mental health services to optimize

effectiveness and efficiency, (7) develop the infrastructure for mental health financing, and (8) use financing as a tool to change mental health service delivery systems (WHO MH financing).

Since children and adolescents are not directly responsible for mental health, care payment is not by themselves but taken via their parents or carers. Their carers' attitude toward benefit of treatment comparing with the cost they spend could be an obstacle for young people's access to CAMH care. This phenomenon could be more prevalent in rural or high-poverty area, especially in LAMICs, which eventually left CAMD untreated or delayed treatment. Considering this difficulty and applying the WHO recommendation, possible strategies for effective CAMH expenditure management were discussed below.

Prioritizing Areas of CAMH Investment

There are several aspects for considering areas of CAMH investment, e.g., age group and societal concern on CAMH, cost of untreated CAMD, socioeconomic status of the individual and the country, etc. Regarding age group, the groundbreaking study, "The life-cycle benefits of an influential early childhood program," showed that high-quality early childhood development program targeting disadvantaged children from birth to five generates 13.7% per annum, and the benefit-cost ratio is 7.3. It produces substantial beneficial impact through better outcomes in education, health, social behaviors, crime, and employment with greater monetized benefits for males after following the participants through their mid-30s (Garcia et al. 2016). A well-known study from Nobel Laureate economist, Professor James J. Heckman, found that comprehensive early childhood programs for children under 5 years old can produce higher return on investment (13% per annum) than those previously established for preschool programs serving at 3–4 year-old (7–10% per annum). For school-aged children, an economic study from the UK suggested that (1) parenting programs are cost-saving to the public sector over the long term with the main benefits accruing through the health care and criminal justice system with the benefit-cost ratio of 8:1 when the costs of crime are included, (2) school-based social emotional learning is cost-saving to the public sector after 5 years through reduction of heath care cost and crime-related impacts of conduct problems from 9% to 3%, and (3) school-based intervention to reduce bullying appears to offer good return on investment on long-term outcome based on improved future earnings (Knapp et al. 2011). The evidence suggested that early childhood development should be a priority for children under 5 years old especially for disadvantaged families like in LAMICs, rural areas, or even urbanized high-poverty areas (Richter et al. 2016). Parenting intervention, school-based SEL, and anti-bullying program are important CAMH interventions that would be worthwhile for investment in school-aged children.

Considering untreated CAMD, ADHD places a substantial economic cost on patients, families, and third-party payers, and its treatment which focused on methylphenidate is cost-effective with the ratios ranging from $15,509 to $27,766 per

quality-adjusted life year (QALY) gained (Matza et al. 2005). Costs for individuals with conduct disorders rose around ten times higher than those with no problems by age 28, with a mean cost of £70,019 accruing by criminality, educational provision, foster, and residential care, and only small proportion of the costs fall on health services. The costs per family of parent skills training or education range from £629 to £3839 which lead to a ratio ranging from £6288 to £38,393 per quality-adjusted life year (QALY) gained (Dretzke et al. 2005). For emotional disorder, a Dutch study revealed that cost of illness in adolescent depression is €37.7 million a year in adolescents aged 12–21 (Bodden et al. 2018). Another review of economic studies on CAMD in 2014 found that most articles focused on autism spectrum disorder, ADHD, conduct disorder, and anxiety or depression. The reviewer concluded that the support costs for children and adolescents with ASD may be higher than both ADHD and CD. Nevertheless, the differences between the samples and methodology are employed making the comparison between studies difficult (Beecham 2014). Due to the limited amount of economic study for CAMD treatment, research gap on economic burden, social return on investment, and benefit-cost ratio of CAMD treatment are highlighted.

Regarding socioeconomic status of the individual and the country, it is suggested that investment for CAMH promotion and prevention should be prioritized in low resource settings, e.g., rural area, high-poverty area, and remote area. For children and adolescents under socioeconomic adversity, government financial support for accessing CAMH promotion, prevention, and treatment will provide a great benefit toward the whole life of the child. In urban or high-resource area, CAMH professionals, who are concentrated in urban areas, tend to focus more on clinical tasks rather than community or public mental health work. Their attentions move toward treatment and rehabilitation rather than promotion and prevention which are cheaper and effective in reducing their work burden. Therefore, the balance between CAMH promotion and prevention and CAMD treatment and rehabilitation should be thoughtfully considered.

Building of a Coalition with CAMH Stakeholders

After prioritization for areas of investment, the issues will determine the stakeholders involved in the financing process. Coordinating effectively with CAMH stakeholders like educational sectors or social welfare sectors or justice system is a fundamental step for CAMH financing management. Financing always depends on politics, advocacy, and social expectations. The coalition will expand concern and importance of CAMH to all stakeholders and raising higher societal expectation (WHO MH Financing). In urban areas, coordinating with NGOs or private sector to co-provide standard CAMHS is another strategy to increase accessibility to CAMH service for the families that can afford for the service and leave the government resources for those who cannot.

To achieve this process, CAMH practitioners need to understand the goal and the context of the stakeholders including the goal or target of the funders in order to

develop a win-win proposal to the policy makers. For example, the project proposal request for funding from the World Bank should mention the economic outcome of CAMH interventions. The projects proposed to educational sector should focus on academic achievement or school benefits of CAMH interventions.

Financial Resource Allocation

The characteristics of good financing for mental health are the same as those of good financing for general health services (World Health Organization, 2000). There are three principal considerations. Firstly, "people should be protected from catastrophic financial risk," i.e., minimizing out-of-pocket payments on affordable goods or services. Most CAMH problems are chronic so it is important to consider not only the cost of individual treatments or services but also the whole cost of long-term treatment. Secondly, the healthy should subsidize the sick. Finally, the well-off subsidize the poor. This is the hardest characteristic to ensure, because it depends on the coverage and progressivity of the taxation system and on who is covered by social or private insurance. As always, the magnitude and direction of subsidy depend on the services that are covered.

For the area with underdeveloped CAMHS, a major focus is the development of a mental health infrastructure that includes legislation and the proposed initial activities so-called a pilot or demonstration projects, while in urban or high-resource settings, funding may be arranged for CAMH institutions or pooled into adult mental health service (WHO MH financing). To reduce inequity between rural and urbanized area, financial allocation can be used as a tool to encourage equitable CAMHS in which underserved children and adolescents should be provided broader support to leverage their quality of life.

Leadership and Governance

Without guidance for developing child and adolescent mental health policies and plans, there is the danger that systems of care will be fragmented, ineffective, expensive, and inaccessible (World Health Organization 2005b). From the six building blocks framework, the indicator of leadership and governance is policy index that can archive from review of national health policies in respective domains. Leadership and governance in building a health system involve ensuring that strategic policy frameworks exist and are combined with effective oversight, coalition building, regulation, attention to system design, and accountability. Accountability in governance involves (a) understanding of how services are supplied, (b) financing to ensure adequate resources are available to deliver essential services, (c) performance around the actual supply of services, (d) receipt of relevant information to evaluate or monitor performance, and (e) enforcement or rewards for performance (World Health Organization 2010c).

Mental health policy refers to an organized set of values, principles, and objectives to improve mental health and reduce the burden of mental health disorders in a population (World Health Organization 2005c). The Atlas: child and adolescent mental health resources, published by WHO in 2005 (World Psychiatric Association 2005b), reported a survey of information on countries worldwide; 192 countries were contacted and 66 responded. Of the responding countries, fewer than one third had an institutional or governmental entity that had clear responsibility for CAMHS (Belfer and Saxena 2006). A 2010 overview of policy and legislative frameworks in four African countries – Ghana, South Africa, Uganda, and Zambia – found that two had published or drafted policies, but none had a recent national mental health plan to support implementation of CAMHS (Kleintjes et al. 2010). Current draft or new legislation in these countries addressed none or only a few of the six provisions in the WHO legislation checklist for the protection of minors, e.g., a recommendation for separate mental health facilities for children and adults in Ghana and a recommendation for provision of age-appropriate services in South Africa (Minde and Nikapota 1993). According to the situation above, conclusion can be drawn that CAMH policy is not well established in LAMICs where most of their population live in rural areas. This hampers the situation of CAMHS provision in remote areas.

Despite consensus on the importance of leadership and governance in improving health outcomes, they remain inadequately monitored and evaluated. There are two types of indicators proposed for measuring governance, i.e., rule-based indicators and outcome-based indicators. The former measures whether countries have appropriate policies, strategies, and codified approaches for health system governance, e.g., whether the country endorses a national essential drug list or mental health policy. The latter measures whether rules and procedures are being effectively implemented.

Retrieving the recommended core indicators from the WHO documentation, there are five indicators that can apply with CAMH. Firstly, existence of an updated national mental health strategy that linked to national CAMH needs and priorities. Formulating national CAMH policies and strategies is a basic function of government sector. CAMH strategy should encompass the future vision, objectives, and strategic focus and outlines the measures to achieve the objectives. It should also outline priorities and expected roles of different actors and estimate resources needed to achieve the goals. It reflects national needs and priorities which will foster political support and ownership of policies.

Secondly, existence of an updated national medicine policy should include essential drug for CAMD with good governance on procurement. It should cover three objectives: (1) ensuring equitable availability and affordability of essential medicine; (2) ensuring that all medicines are safe, efficacious, and of high quality; and (3) promoting rational use of medicines by health-care professionals and consumers.

Thirdly, the WHO recommended indicator on child health includes only immunization program. When applying with CAMH, ensuring nurturing parenting and

caring and supportive environment should be considered as mental immunization. Children either in rural or urban areas, high- or middle- or low-income countries should be assured a growing up with adequate nurturing and supportive environment. Provision of such mental immunization should be integrated in primary care of early childhood service.

Lastly, there should be mechanisms, such as surveys, for obtaining opportune client input on appropriate, timely, and effective access to health services. Surveys of patient satisfaction and utilization of health services are useful tools for obtaining information on the quality and responsiveness of health services. Such surveys may measure inputs (including whether facilities are properly equipped with essential medicines), processes (including whether waiting times are reasonable and treatment protocols are followed), and outcomes (including whether CAMH interventions improve quality of life). Hence, an indicator that measures whether consumer satisfaction is considered in the assessment of CAMH reflects the responsiveness of health systems.

With good governance and supporting policy, the other five building blocks of CAMH system will be able to operate effectively. However, policy and governance for CAMHS in urban areas tend to be scrutinized closer by consumers comparing with its counterpart since people living in big cities are more likely to engage in policy advocacy and human rights protection. Empowering people in rural areas to advocate on their needs will improve CAMH service gap and in the end improve their quality of life.

Table 4 Possible opportunities and threats in urban and rural area – a situational analysis for child and adolescent mental health strategic planning with the "PESTLE" (Penkalla and Kohler 2014)

PESTLE	Urban	Rural
Political	+ Actively involvement in political system	– Quality of local governance is varied and unpredictable
Economic	+Better employment opportunity– High poverty in specific areas	+ Lower cost of living – Higher prevalence of poverty
Social	+Wider stakeholders' involvement and social resources – Deprived neighborhoods with lower social cohesion – Higher criminality	+ Higher social cohesion – Limited resources for educational and health care services
Technological	+/– Easily access to electronic or digital equipment/signal	– Limited access to digital technology
Legal	+ Actively advocate for rules and regulations	+ More flexible rules and regulations
Environmental	+Better transportation and access to CAMH care– Air pollution – Traffic noises	+ Better green space + Lower population density – Difficulty in transportation

+ possible opportunities – possible threats

Table 5 Possible strategic actions for CAMH promotion, prevention, and service applied in urban and rural areas

Urban	Rural
Child and adolescent mental health promotion and prevention	
Building healthy public policy Ensure financial and social support for vulnerable children and adolescents Online social marketing for CAMH public policy	Building healthy public policy Ensure financial and social support for vulnerable children and adolescents Empowering and engaging people in policy advocacy
Creating supportive environments Parent skills training for supportive family environment either face to face or digital channel Enlargement of green spaces in public areas of megacities	Creating supportive environments Parent skills training for supportive family environment
Reorienting CAMH service Provision of effective, low-intensity, transdiagnostic CAMH promotion or prevention intervention by nonspecialists or non-health practitioners, e.g., SEL, life skills training, etc. Initiating brief and simple early detection measures which does not increase burden CAMH-related workforce Increasing physical activities and reducing screen time.	Reorienting CAMH service Provision of evidence-based, low-intensity, transdiagnostic CAMH promotion or prevention intervention by nonspecialists or non-health practitioners, e.g., SEL, life skills training, etc. Initiating brief and simple early detection measures which do not increase burden on CAMH-related workforce
Developing personal skills E-learning for child and adolescent mental health literacy Chatbot therapy for children and adolescents with psychological distress	Developing personal skills E-learning for child and adolescent mental health literacy Group-based mental health literacy learning in underdeveloped area
Strengthening community action Strengthening online social network for CAMH promotion Encouraging public private partnership (PPP) for CAMH promotion and prevention	Strengthening community action Enhancing community cohesion and community empowerment Applying effective implementation model for demonstrated CAMH promotion and prevention project
Child and adolescent mental health service	
Service delivery Either replacement model, collaborative care model or consultation-liaison model of community mental health service are possible Integrating CAMHS with primary health care Controlling quality of telepsychiatry service Integrating service provision with private sectors for early child development or CAMH plan (Khan et al. 2018)	Service delivery Collaborative care model of community mental health service is suggested Applying stepped care model Integrating CAMHS with primary health care Establishing and expanding telepsychiatry service
Health workforce Encouraging CAMH promotion and prevention mindset	Health workforce Integrating community mental health session in professional training course

(continued)

Table 5 (continued)

Urban	Rural
Increase health workforce by partnership with nongovernment stakeholders E-learning for workforce capacity building	including experience in rural areas Intermittent replacement model to allocate urban resources to rural CAMHS needs
Health information systems Developing digital CAMHS database Co-creation of benchmarking CAMH indicators across the country	Health information systems Developing digital CAMHS database Co-creation of benchmarking CAMH indicators across the country
Access to essential medicines Ensure compliance and continuation on essential medicines	Access to essential medicines Requesting for essential medicines subsidization in low-resource setting
Financing Advocating for bundle payment to decrease redundant costs between health care setting Advocating for financial allocation to encourage equitable CAMHS for underserved children and adolescents	Financing Advocating for financial allocation to encourage equitable CAMHS for underserved children and adolescents
Leadership and governance Strengthening law enforcement in child protection to ensure safety and nurturing social environment for all children. Campaigning with non-health and nongovernment sectors in advocating CAMH policy	Leadership and governance Strengthening law enforcement in child protection to ensure safety and nurturing social environment for all children

SWOT Analysis and Strategic Planning

In organizational strategic planning, a situational analysis is a first step that needs to be done thoroughly. One well-known analysis model is SWOT analysis. SWOT stands for strengths, weaknesses, opportunities, and threats. The former two elements, strengths and weaknesses, are internal or intra-organization factors, while the latter two elements, opportunities and threats, are external or extra-organization factors. To gather and assess external factors, PESTLE analysis is a framework broadly used in business companies and in hospital administration (Ritson 2008). Urbanicity is clearly an external factor that can be both opportunities and threats for any organizations. In Table 4, both positive and negative aspects of urbanicity toward CAMH will be illustrated.

Considering CAMH promotion, prevention, service, and SWOT analysis in LAMICs discussed above, possible strategies that apply strengths and opportunities of urbanicity and rurality to tackle CAMH problems are proposed in Table 5.

Possible strategic actions above are only some examples of measures that could be utilized in rural or urban areas. CAMH practitioners should analyze and develop CAMH action plan based on the socioeconomic and cultural context of their own countries.

Conclusion

Conceptual framework for health promotion and prevention is different from treatment and rehabilitation. CAMH practitioner should identify their objectives clearly in order to apply proper framework before strategic planning. Taking urbanicity in to account would support practitioners in understanding context of such areas and will eventually lead CAMH plan in a proper direction.

Summary

Urbanicity is growing up and affects CAMH problems. CAMH promotion and prevention and service provision are also influenced by the level of urbanicity. CAMH practitioners in LAMICs are encouraged to explore strengths of urbanicity or rurality in their contexts and apply such strengths in CAMH strategic planning.

Cross-References

- ▶ Movement of Peoples
- ▶ Socioeconomic Inequalities and Mental Health Problems in Children and Adolescents
- ▶ Toxins and Pollution

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Part IX

Health Economics

A Public Health Response to Mental Health 39

Melissa A. Cortina

Contents

Abstract

There is a high global burden of mental health disorders that is widely acknowledged, and the increasing demand on services coupled with insufficient funds and capacity in existing services calls for a more joined-up approach to better support children and young people (CYP). This chapter provides an overview of a suggested public health response to address the increasing burden of mental health disorders globally.

The ▶ Chap. 38, "Mental Health Strategy and Policy" provides information about developing services in Low and Middle-Income Countries (LMICs) and the

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challenges that arise. This chapter considers key approaches and strategies that can be adopted to assure the global need for child and adolescent mental health services is met and key considerations in planning services and determining the most appropriate response.

There has been global recognition of the importance of mental health and well-being in the last decade. The UN Sustainable Development Goals (SDGs), particularly Goal 3, relate to overall health and well-being for all at all ages (Saxena et al., 2015). The World Health Organisation's (WHO) MH Action Plan (Saxena et al., 2015) was a milestone for mental health, putting international focus on a long-known but previously neglected problem. It aims to (1) strengthen effective leadership and governance for mental health; (2) provide comprehensive, integrated, and responsive mental health and social care services in community-based settings; (3) implement strategies for promotion and prevention in mental health; and (4) strengthen information systems, evidence, and research for mental health (WHO, Draft comprehensive mental health action plan 2013–2020.Pdf, pp 1–27, 2013). Through an increased focus on whole population mental health promotion, mental disorder prevention, and early intervention, the future cost and impact can be reduced (Campion, Public mental health: evidence, practice and commissioning. Royal Society for Public Health, May 2019).

Keywords

Global mental health · Public health · Community-based · School-based

Introduction

By taking a public health approach, this chapter will outline key areas for consideration in developing services to support CYP MH. The Centers for Disease Control and Prevention (CDC) developed public health emergency management (PHEM) principles to help nations strengthen public health emergency management. These principles can be applied to mental health as they provide guidance around anticipating, preventing, preparing for, detecting, responding to, controlling, and recovering from consequences of public health threats in order to minimize health and economic impacts. PHEM principles can be employed to guide the development of services to support CYP mental health and prevent disorder. The global burden of mental illness accounts for 32.4% of years lived with disability (YLDs) and 13.0% of disability-adjusted life-years (DALYs), which is more than previously has been estimated (Vigo et al. 2016). The increasing rates of mental health difficulties and likely underestimated global burden of mental health make mental health a priority, if not a public health emergency. Multiagency working, evidence-based strategies, sharing of information, clear guidance and communication of key messages, and coordinated implementation of intervention/services are therefore crucial to planning services.

The Need

Globally, there are increasing rates of mental health problems in children and young people (Kieling et al. 2011; Moffitt 2009; Prince et al. 2007). This is confounded with the fact that despite the high level of need, there is a considerable treatment gap – CYP with the highest level of need are the least likely to access services, and only a minority of people with mental disorder receive treatment (WHO 2018). For many of those who do receive treatment, the treatment is minimally adequate (Thornicroft et al. 2017). In 2004, only 30–40% of children and young people in the UK who experienced clinically significant mental disorder were offered evidence-based interventions at the earliest opportunity (Green et al. 2005). The treatment gap is likely due to a range of factors such as stigma, lack of detection, limited help seeking and awareness, poor mental health literacy, perceived need (Campion 2019), lack of clinical skills, negative attitudes toward treatment, low-quality treatment, as well as discrimination, and availability of services. In addition there is a public mental health implementation gap due to lack of public mental health knowledge and training, lack of targeted policy, inadequate resource allocation, and limited understanding of the unmet need (Campion 2019). Overburdening of clinical professionals, staff shortages, lack of mental health policy, and not meeting thresholds for services are all barriers to accessing services. These issues are exacerbated in low-income settings (Omigbodun 2008), and children from low SES backgrounds are at higher risk than those from high SES backgrounds (Spencer et al. 2015). Therefore, the development of any services to support CYP needs to address these challenges and take into consideration at-risk groups to better support CYP.

Innovation and Scale-Up of Services

Since the Lancet Commission in 2007 (Lancet Global Mental Health Group et al. 2007; Prince et al. 2007) calling for action in relation to mental health, there have been a number of calls to scale-up services in order to treat, detect, and support the recovery of CYP with mental health disorders. The WHO made three key recommendations for the policy, planning, and service organization: (1) to deinstitutionalize mental health care; (2) to integrate mental health into general health care; and (3) to develop community mental health services (WHO 2010). The WHO's Movement for Global Mental Health (MGMH) has called the for scaling up curative mental health services, particularly in low-resource settings drawing on evidence-based and human rights-based principles. The most recent Lancet Commission in 2018, 12 years after the first, also calls for a scaling up of services (Patel et al. 2018); Box 1 highlights four key innovations in global health interventions that should be scaled up. A number of challenges related to the treatment and implementation gaps need to be addressed for a scaling up of services to be feasible, such as stigma, mental health literacy, negative attitudes toward treatment, and treatment quality (Campion 2019). In addition, scaling up needs to go beyond reactionary services and include preventative services as well.

Box 1 (Patel et al. 2018)
Four innovations in global mental health interventions should be scaled up:

- Task sharing of psychosocial interventions to nonspecialized workers as the foundation of the mental health-care system
- Coordination of this foundation with primary and specialist care to achieve a balanced model of care
- Adoption of digital platforms to facilitate the delivery of interventions across the continuum of care
- Implementation of community-based interventions to enhance the demand for care

The sections below will discuss how these innovations can be implemented and the challenges overcome particularly in regard to policy, task sharing, setting-based approach, and multiagency working, drawing on and contributing to evidence-based practice.

The Lancet Commission makes key recommendations as to how to reframe mental health needs within the sustainable development framework so that (1) mental health is recognized as an essential component of universal care coverage, (2) mental health is protected with public policies and care frameworks, (3) there is strengthened public awareness of and engagement with people with mental disorders, and (4) enhanced investments are made for mental health, innovation, and implementation guided by research which will strengthen monitoring and accountability for global mental health (Patel et al. 2018). Box 2 describes the aspects of mental health care deemed pioneering by the Lancet Commission.

Box 2 (Patel et al. 2018)
Aspects of mental health care that are pioneering across the whole of health care:

- The reconfiguration of care away from hospitals and into community settings
- A commitment to involving patients and family members in planning and providing services
- Providing aspects of social interventions alongside psychological and pharmacological treatments tailored to the needs of a specific individual (the hallmark of person-centered care) through multidisciplinary teams
- A focus on comorbidity and multimorbidity across mental and physical long-term conditions

Policy-Based Approaches

Despite mental health taking a more prominent role globally since the 2007 Lancet series "No health without mental health" and a number of other global initiatives (e.g., MH Action Plan and WHO MHGap), few WHO member states have mental health policies. Of the 177 WHO member states that completed the most recent Atlas questionnaire (91% of total), only 48% have developed or updated their policies or plans for mental health in line with international and regional human rights instruments (Hanna et al. 2018). Clear mental health policies are vital to planning services and creating a public mental health agenda locally.

There are numerous social determinants of mental health and well-being (as highlighted in ▶ Chap. 38, "Mental Health Strategy and Policy") which have cultural influences and variations (Canino and Alegria 2008) and need to be reflected in local mental health policies. A biomedical model treats mental health disorders as having a biological, organic, or physical cause, focusing on genetics, neurotransmitters, neurophysiology, etc., and relies heavily on diagnostic criteria for the classification of disorders (Andreasen 1985). The Biopsychosocial model recognizes the interaction of a person and their environment and that mental health difficulties arise from the interaction of biological, psychological, and social factors (Engel 1977). Psychological mediation models build on the biopsychosocial model and propose that the disruption or dysfunction in psychological processes can be the final determinant in the development of mental disorder as the biological, social, and individual factors act on psychological factors concurrently (Kinderman 2005, 2009). There is emerging evidence that an integrated approach supports multi-agency- and community-based approaches to mental health support and provides better support to complex needs (Naylor et al. 2017). There has also been a push to move away from diagnostic models which may be harmful and to focus on alternative evidence-based models (Timimi 2014). Appropriate models should be considered in policy and planning, as cultural factors need to be considered.

A Whole Systems Approach

Mental health policies need to take in the wider system around the child and be culturally appropriate. Atilola adapted Bronfenbrenner's ecological model (Fig. 1) to take into account the care system around a child (Atilola 2017). Although developed with the sub-Saharan African context in mind, this theoretical methodology can be useful to conceptualizing the development of mental health policies and services globally. Tackling risk factors for mental disorder such as parental factors (e.g., poor attachment, poor-quality relationship, parental mental disorder) and childhood adversity are key to promoting mental health and well-being (Campion 2019). Services that are family centered and community based, engage youth, and are culturally sensitive will be most conducive to creating a supportive environment for CYP (see ▶ Chap. 38, "Mental Health Strategy and Policy"). A setting-based approach can facilitate the consideration of the care system around the child.

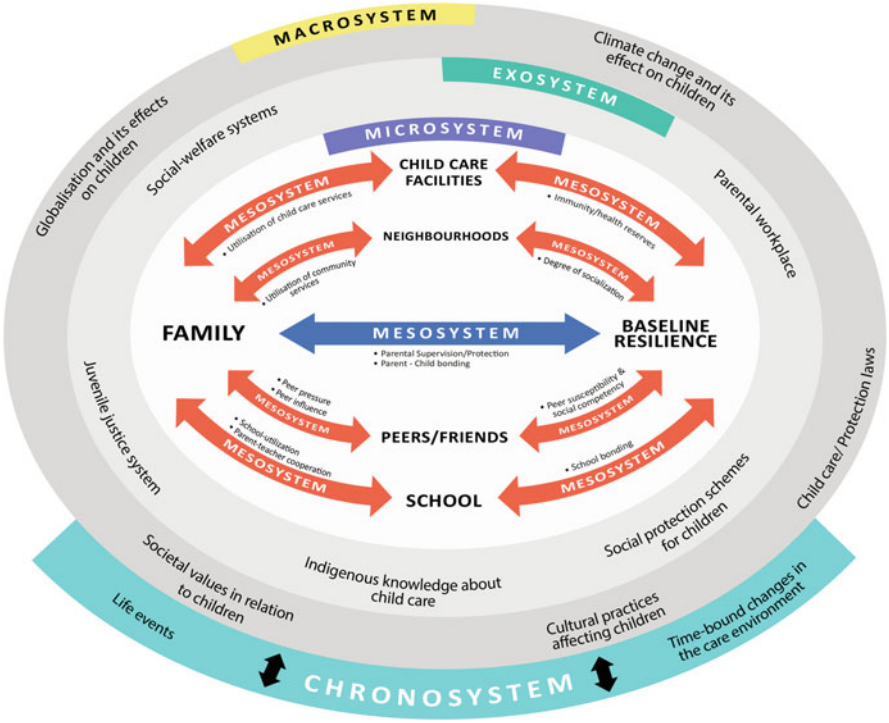

Fig. 1 Ecological care environment of children from mental health perspectives, adapted from Bronfenbrenner's ecological model. (Adapted from Atilola 2017)

A whole systems approach is conducive to a stepped care model in which access to services gradually increases access with severity of difficulties; low-level difficulties could rely on self-help-type interventions, those with moderate difficulties receive support in community settings, and those with more severe difficulties would see a specialist or psychiatrist (Patel et al. 2018). A stepped care approach can help alleviate burden on existing services and improve access, providing more acceptable access to lower-level care at home or in the community (see ▶ Chap. 38, "Mental Health Strategy and Policy" for challenges in service access).

Public mental health interventions include mental disorder prevention as well as mental health promotion at primary, secondary, and tertiary levels. Campion (2019) suggests ways for facilitating improved coverage for primary, secondary, and tertiary prevention of mental disorder (Table 1). Alongside these methods, mental health and well-being promotion should be accounted for in mental health policy, taking into account the levels of the care environment depicted above.

The following sections discuss a setting-based approach, joint working, digital technology, and evidence-based strategies as key points in primary, secondary, and tertiary prevention.

Table 1 Facilitating improved coverage of primary, secondary, and tertiary prevention

Primary prevention	Secondary and tertiary prevention
(1) Setting-based approaches	(1) Screening and education
(2) Addressing socioeconomic inequalities	(2) Improving population literacy
(3) Particular interventions including parenting interventions, addressing parental mental disorder and child adversity	(3) Setting-based approaches
(4) Digital technology	(4) Maximizing existing resources through self-help, less intense intervention, improving concordance with treatment, and task shifting
(5) Legislation and regulation	(5) Digital technology
	(6) Parenting interventions
	(7) Legislation and regulation

Note: *Primary prevention* aims to prevent mental disorder from happening in the first place by addressing risk factors. *Secondary prevention* involves the early identification and treatment of mental disorder. *Tertiary prevention* involves the prevention of relapse and associated impacts of mental disorder including reduced life expectancy from physical illness, health risk behavior, suicide, and stigma

Setting-Based Approach

Recent recommendations favor a decentralization of services and a shift toward a setting-based approach (Eaton et al. 2011; Patel et al. 2007, 2018; Saxena et al. 2015). This will move support into communities, through community centers, antenatal groups, schools, and general practice (Campion 2019), and provide better access to otherwise hard to reach groups. It also may reduce the stigma associated with accessing help and subsequently improve access (Pinto-Foltz and Logsdon 2009). As part of this decentralization, programs can be scaled up within primary care settings alongside robust evaluation (Eaton et al. 2018). Schools offer a key community-based setting to support and promote CYP mental health and well-being and provide a unique opportunity to reach more CYP than clinical services alone. School-based services provide access to a large proportion of CYP who may otherwise not access services and can have a positive impact on the psychological, educational, and social impact (Cortina et al. 2008; Rones and Hoagwood 2000) and have shown positive effects (Sanchez et al. 2018). Targeted, school-based programs, particularly in primary schools, can positively support the MH of CYP (Wolpert et al. 2013). Moving services into the community creates a wider reach, imbedding them into society, and enables the maintenance of cultural appropriateness. This approach can work particularly well in low-income areas with limited access to services. It can involve training up local staff which in turn frees up more experienced staff to deal with higher levels of difficulties and offers the opportunity for earlier intervention (Caulfield et al. 2019). With this model, CAMH practitioners will still play a key role, but resources can be managed better with the decentralization of services (see ▶ Chap. 38, "Mental Health Strategy and Policy").

Making Use of Existing Services

A setting-based approach can improve access to services, increase the uptake of currently existing services, remove a barrier to accessing such services, and improve the perspectives on the need for care. However, this decentralization relies heavily on task sharing, a shift whereby basic mental health training is provided across sectors (Patel et al. 2018). Task sharing (sometime referred to as task shifting) allows for care to be transferred away from hospitals and into community settings.

Involving children and young people in the planning of services will help to identify area-specific priorities, as success is more likely when service users and parents/carer are involved in the planning and implementation of services (Naylor et al. 2017). Co-production with service users in terms of planning and development will enable services to be more acceptable and, ultimately, effective (Mental Task Force 2016).

A balanced care model can take the ecological care environment of the child into consideration and offer a flexible and evidence-based approach to intervention. Figure 2 depicts the different characteristics of services across varying income levels, drawing on setting-based services and collaborative working across sectors (Patel et al. 2018).

Promotion of Joint Working Across Sectors

Mental health is "the unique outcome of the interaction of environmental, biological, and developmental factors across the life course" (Patel et al. 2018). In light of this, a multipronged and multidisciplinary approach is essential. There needs to be a culture of cross-sector working, particularly in hard to reach areas, in order for there to be a public health response to mental health. Those supporting CYP cannot work in isolation – there are numerous social determinants of mental health that need to be addressed alongside prevention and intervention services (WHO and Calouste Gulbenkian Foundation 2014). Intersectoral working brings together city planners, schools, policy makers, psychiatric and nonpsychiatric professionals, primary care professionals, nurses, and all relevant stakeholders alongside families and service users (Chandra and Chand 2018). For example, in England, the Mental Health Services and Schools and Colleges Link Programme, a groundbreaking initiative, funded by the Department for Education (DfE), to help clinical commissioning groups (CCGs) and local authorities (LAs) work together with schools and colleges and other key stakeholders to provide timely mental health support to children and young people has been rolled out nationally. It works to empower staff by brokering contact, sharing expertise, and developing a joint vision for CYP mental health and well-being in each locality. Joint working, however, does not come without challenges, which are discussed in ▶ Chap. 38, "Mental Health Strategy and Policy" in relation to both rural and urban areas. A shared language around mental health is crucial to overcoming these barriers as it can help tackle stigma (Richards 2018) and promote joint working (Salmon 2004). Joint working can help maintain a

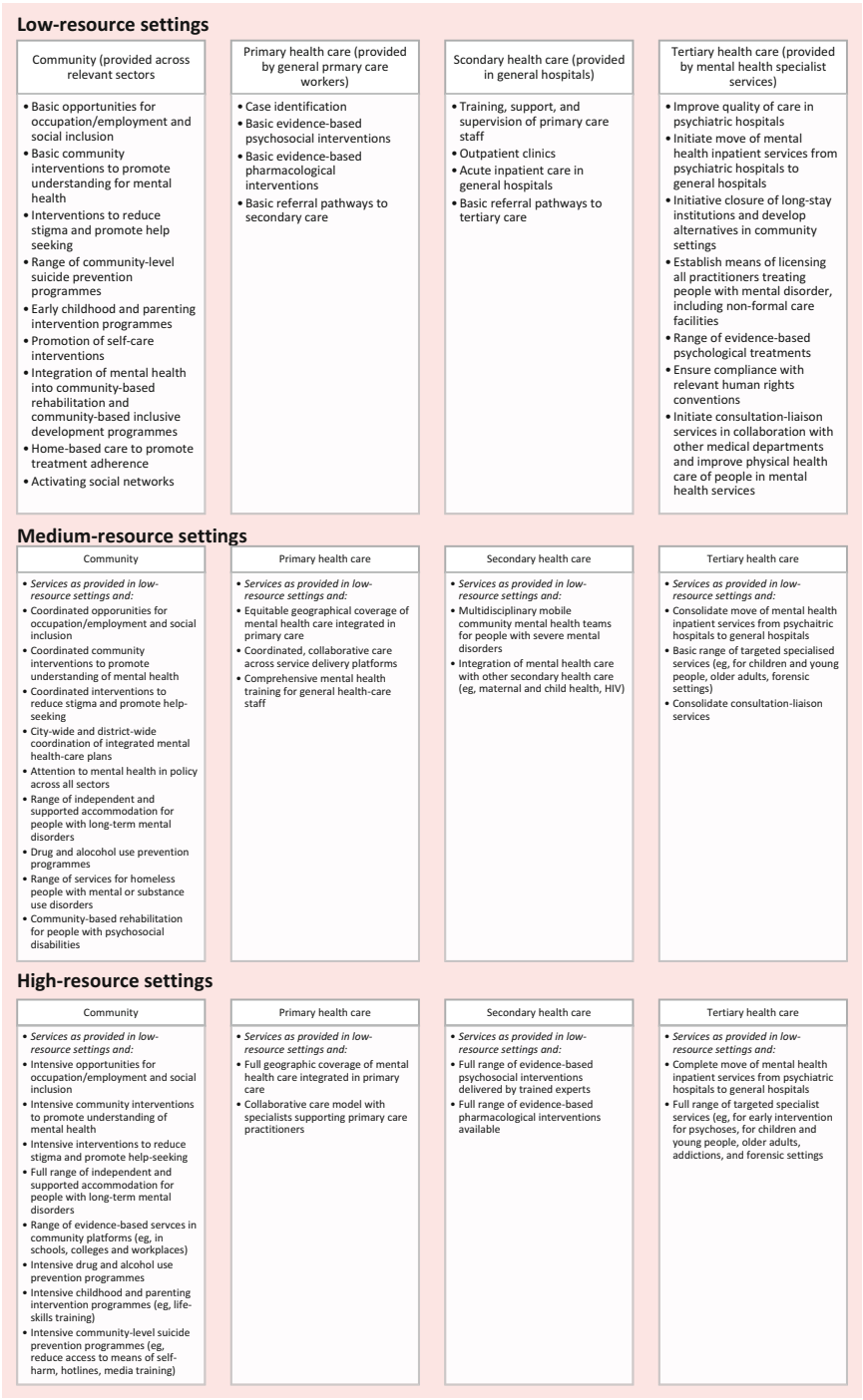

Fig. 2 Characteristics of services across income levels. (Adapted from Patel et al. 2018)

person-centered approach but requires a shared understanding of the roles, remit, and responsibilities of other agencies (Salmon 2004).

Assessment of Need Across Sectors

Alongside appropriate mental health policy and a setting-based approach, a mental health needs assessment is essential to adequately plan services. This should involve an appraisal of the levels of mental disorder and well-being, risk and protective factors, current services and uptake, epidemiology of high-risk groups, coverage and outcomes of other public health interventions, estimated economic costs of mental disorders, the size and cost of the gap in provision, current expenditure on mental health, and estimated impact and associated economic savings (Campion 2019). Local needs assessments can help to understand patterns of problems and priorities (Harrington et al. 1999). A workforce assessment should also be carried out in order to determine the level and availability of skills (see ▶ Chap. 38, "Mental Health Strategy and Policy") and need for additional training. Mental health is typically lacking in Joint Strategic Needs Assessment (JSNA) with fewer than half of the JSNA in England including mental health (Campion et al. 2017). The authors suggest that mental health needs assessments are necessary across primary and secondary care for both mental health promotion and mental health disorder prevention as well as well-being promotion which can help build an evidence base.

Evidence-Based Strategies

Service planning should draw on and contribute to the existing evidence base. The mental health evidence base varies depending on disorder and level of difficulty. For example, children with developmental disorders benefit from community-based, family-focused rehabilitation programs (Patel et al. 2018). School-based interventions have been shown to be effective (see above and ▶ Chap. 38, "Mental Health Strategy and Policy"). Much of the data, however, on the effectiveness or impact of interventions are not centralized, making it challenging for policy makers and service planners to utilize. The Mental Health Innovation Network (MHIN) aims to "support bold ideas to improve treatments and expand access to care for mental disorders through transformational, affordable and cost-effective innovations that have potential to be sustainable at scale" and build an evidence base that can more easily be drawn upon (Mackenzie 2014). Learning and development from the MHIN evidence base can help inform mental health policies and the development of services to support children and young people's mental health.

Routine monitoring and evaluation are imperative to ensure that context appropriate progress is being made, which is even more important when funding is limited. Providing services that are not working as well as they could when funding is scarce is not a responsible use of resource. Services and programmes need to be monitored so that the limited funding available can be allocated appropriately and

effectively and, where possible, adaptations made. The coordination of this data globally can help build a robust evidence base and contribute to a profile on CYP mental health (Patton et al. 2012).

Conclusion

Although much progress has been made in regard to the objectives of the mental health action plan, considerable work still needs to be done (Hanna et al. 2018). An evidence-based and public health approach, focusing on different levels of intervention and utilizing integrated working across sectors, is key to developing mental health services for children and young people. Simply targeting disorders through clinical services is not enough – there need to be a joined-up approach and task shifting, decentralizing services and moving them into more accessible primary care, community, and school settings. There are numerous evidence-based interventions for mental health problems that can have a positive impact on CYP. Needs assessments in local areas can help identify the appropriate way forward alongside service-user involvement in planning. We can learn greatly from public health: it will be more effective to tackle the problems of mental health from multiple angles in order to create sustainable change and better support and healthy development for children and young people.

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► Mental Health Strategy and Policy

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Part X

Education and Training of Child Mental Health Professionals

Education and Training

40

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Abstract

This chapter highlights the variety of needs for education according to the professional situation in different communities. It describes the competencies that need to be developed for senior clinicians. Frameworks for training are described, and the various methods of teaching are considered. The future scientific developments that will need to be included are outlined, together with the advances in knowledge and skills transfer made possible by electronic media.

Keywords

Competencies · Speciality · Training · Skills · Knowledge · Teachers · Psychiatry · Pediatrics · Child Mental Health · Child and Adolescent Psychiatry

Introduction

The development of child and adolescent mental health services (CAMHS) is a national priority for many countries.

The challenges are several. For example, the needs vary greatly. In some places, there is a dearth of trained and skilled professionals but a wealth of intelligent and motivated people to train. There the priorities will probably be to train people who can become the main trainers in their region (see ▶ Chap. 38, "Mental Health Strategy and Policy").

In other parts of the world, there are many skilled practitioners, but their contribution has to be restricted to those who can pay. The challenge then is to develop skills in methods appropriate to the poorest and to plan public health approaches. This may mean developing therapeutic skills in community workers and surveying the needs of the population so as to inform politicians and other funders (see ▶ Chap. 39, "A Public Health Response to Mental Health").

In others again, services may be provided only by disciplines such as general adult psychiatry and/or pediatrics. The key training need may then be to insert child mental health training into the curricula of those other disciplines (see ▶ Chaps. 31, "Education in Mental Health" and ▶ 30, "Mental Health in Schools").

Some parts of the world are better resourced but even here the volume of mental health difficulties that needs intervention exceeds the specialist resources available.

The Challenge of the Prevalence of Mental Health Problems Among Children and Adolescents

Historically, we have known that the prevalence of child and adolescent mental health problems around the world has been about 10%. More recently it seems to be climbing (NHS Digital 2018; Office for National Statistics 2018) for UK statistics as one example with the rate having risen from 1:10 in 1999 and 2004 to 1 in 9 of all

children and young people. This is probably a due to a mixture of better recognition of such difficulties and real increase in the prevalence. For example, the prevalence of autistic spectrum disorder has increased markedly as a broader concept has developed and as the presentation in girls has been realized to be a bit different from that among boys. For different reasons, there has been a dramatic rise in some countries in the prevalence of self-harm among young people with a very marked excess among those with mental health difficulties.

The question then arises of how societies are going to manage this and provide appropriate treatments for the numerous children and young people concerned. This is important not only on humanitarian grounds but also because of the very high economic cost directly and indirectly because of the loss of talent and working capacity in adult life and the consequences for their families, present and future.

A public health approach to this problem might be most appropriate. One reason for this will be the mismatch between the size of the child mental health workforce and the number of children who need support. In brief, even in wealthy countries, it is unlikely that all the children with mental health difficulties can be seen and treated using the current models of intervention. This suggests a stratified approach based on need. There will be a large group that are vulnerable but who have not yet begun to show mental health disorders. For this group anything that can be done to reduce factors that are tending to push them towards frank psychopathology, such as bullying in schools, is likely to be helpful. This should be coupled with universal measures that will increase the resilience of individual children and that will support their peers to help vulnerable children maintain appropriate friendship circles and acceptance in and out of the class. Embedded in this approach will be the need to skill up people who are present where children and young people spend significant time together. For the most part, this will be in schools. However, many teachers have never been taught about mental health interventions and that is not why they went into teaching. Equally, they are usually very busy trying to do their "day job" without taking on any proposed additional workload. It may be argued that they cannot successfully help children to achieve academically unless the young people are able to learn, and it is known that mental health difficulties get in the way of doing so. Essentially, a change in culture in schools generally will be needed to make progress in this regard. This may be best achieved by exposing trainee teachers to teaching in their teacher training about Child and Adolescent Mental Health alongside their learning to teach. It is also likely to work best in schools by recruiting teachers already there to leadership roles with regard to pupil resilience and simple interventions. Such roles will only work if they are appropriately supported by more experienced and skilled mental health professionals. This may be achieved by support from existing CAMH services, where they exist or creating new mental health teams in schools to support teachers and also to do direct work with children where they show difficulties that are beginning to affect their daily lives.

In developing such models, it will be important to consider how these new services can be funded, can attract appropriate people to work in them and how they can bridge existing, related services constructively; appropriate help should be

delivered by the right people in the right places. Avoidance of competition and silo effects where resources are duplicated or become very isolated are two traps to avoid in planning and delivery.

In some countries in Africa and elsewhere, the pressure on teachers and primary school places makes this type of solution unrealistic for the present.

Whatever the context, and whatever the training need, an early step in developing training must be to understand where the gaps lie (see ▶ Chap. 5, "Gaps Between Knowledge, Services, and Needs"). Each country needs to make its own plans.

The mix of professionals who have been given any training or who have acquired skills by experience and supplemented their knowledge also varies considerably.

Some of the challenges facing those who must organize provision of CAMHS services however they are provided can be seen by looking at the provision of child and adolescent psychiatrists around the world. The demand for child and adolescent psychiatrists continues to far outstrip the supply worldwide and also a severe maldistribution of them is seen. Different traditions and cultural contexts have influenced the development of child and adolescent psychiatry (Mian et al. 2015). For example, in the Far East, Hirota and colleagues (2015, 2019) found that 12 of 17 countries recognized Child and Adolescent Psychiatry as a specialty or subspecialty. Japan faces the challenge of insufficient trainers and slots available to train the number of young psychiatrists who wish to specialize in CAP. The net result is that CAPs form only 3% of the psychiatric workforce, so that many children are seen by adult psychiatrists. To try to overcome this challenge, related specialists in medicine (adult psychiatrists and pediatricians) are being offered a curtailed training to give them some knowledge and skills. In Europe, the figures are better, but there are still some countries that do not recognize the specialty at all or do not provide a specialist training. It is likely that this applies to other countries.

CAMHS Training

Training systems need to respond to trainees' needs. There is clearly a general competence in CAMHS that is essential. Every senior child mental health professional must be able to make good therapeutic relationships with children and their families, know their psychopathology, and have a good grasp of child development. These are core skills.

For child and adolescent psychiatrists (CAPs) in particular, their value will derive from the breadth and depth of their training (see Table 1).

Table 1 provides a list of competencies that all psychiatrists should show if they are to work with young people.

The list in Table 1 is not, of course, comprehensive. There are other skills to inculcate: information technology for instance, because satisfactory note-keeping and evaluation remain necessary clinical skills.

There is a disadvantage in over-comprehensive lists of what must be learned. It is possible to crowd out the intensive specialist training that is required by, say, a

Table 1 Competencies required for child and adolescent psychiatrists

Establishing and maintaining therapeutic relationships
Safeguarding children
Undertaking clinical assessments
Managing emergencies
Pediatric psychopharmacology
Understanding and using psychological therapies
Assessing and treating neuropsychiatric problems
Managing problems of children with learning disabilities
Pediatric liaison
Working with networks
Medicolegal issues
Inpatient and day patient care
Working with adolescents
Understanding and treating substance misuse
Transitions into adult life
Training
Research and scholarship
Management

trainee preparing themselves for intensive residential work, or an academic high-flier needing to develop research. Comprehensive lists of competencies nevertheless allow trainees and trainers to make a check of the training.

Another implication is emphatically that learning has not finished when training ends. Trainers and trainees should be committed to continuing professional education. There will be many advances that will have to be learned over the course of a career. For example, the advent of video technology was an important step. When one could record what a trainee was doing and play it back, it made it possible to see what they did and where the gaps were in their competence and skills. Biological knowledge and the results of clinical trials have increased rapidly and will continue to do so (see "Rapid advances," below). Trainees will work in a world that we cannot wholly foresee, so they need to have acquired the ability to maintain and increase their knowledge and their skills.

Acquisition of a Wide Range of Skills and Knowledge

The list in Table 1 seeks to address the wide range of activities that a child and adolescent psychiatrist may encounter in the course of their career: Not only the knowledge of how to assess and treat should be instilled, but also how to make that knowledge useful. The relationships made in the clinic are a very important part of the therapeutic endeavor. Necessary skills for active listening include: learning to communicate that one is listening to the problem that has been presented; feeding

back from time to time about what one's understanding is about the problem; giving information back in clear ways that can be understood readily by the child and the family.

To a varying extent, the CAPs in a new environment will have to learn the skills of management. Trainees, when they have completed their training and gone into independent practice, often say that they have been well equipped for all the clinical problems that they would encounter – but not for the political challenges such as interdisciplinary conflicts or conflicts with managers. Indeed, it is hard to teach people politics, or how to cope with difficult colleagues, except by supervision of their doing it. So people after training may wish to return for advice to their mentors. Research is also an important part of what trainees need to acquire: ours is a scientific profession; it is changing; and the understanding of science-based knowledge is best developed if trainees have engaged to some extent in research, whether primary research or reviewing primary research. The essential skill set is to be able to assess the contribution that research can make for the care of their individual patients. Beyond that it is desirable to have carried out original research but not essential. Research also helps to develop their skills in managing projects of whatever nature during their careers.

Professional attitudes can and have to be learned: for instance, the abilities to be positive about multidisciplinary work, and respectful in working with other colleagues; the ability to cope with change, because change is happening rapidly; commitment to self-evaluation and to improving one's practice by understanding what one does and how that relates to what other people do. Personal integrity is not so much to be taught as to be developed. Role models and professional traditions contribute importantly to this. It will help in their own education if they can train alongside other non-medical professions who will interact with and contribute to services.

In learning all these skills and treatment techniques, there are a variety of different competencies to be mastered. In each different skill, one should consider different levels; first of all, competence to deliver the technique under supervision; secondly, independent competence so that, left to themselves in practice, they can practice safely and independently; and thirdly, the level of mastery, which is the level where professionals have become experts in the subject to the extent that they can deal with the most complex cases and teach other people. The goal will not be full mastery of every skill. Rather, the notion is that every trainee should become independently competent in most areas of skill and have mastery of a few.

Knowledge has increased more rapidly than has the human brain. Inevitably, therefore, specialization has increased. A psychiatrist may now be working exclusively with adolescents. Another psychiatrist may work solely in neuropsychiatry: working with neurodevelopmental problems, coping with autism, ADHD, Tourette disorder, and the problems of children with learning disability and /or epilepsy. A third may specialize in work especially with younger children where key problems are those of family breakdown and abuse; where child protection and good liaison with social services are crucial; and intensive family-based interventions may be demanding.

Frameworks for Training

An example of training development can be taken from the authors' experience in the UK. Fifty years ago, the training in the UK was essentially an apprenticeship. After a three-year training in general psychiatry, there was a four-year "higher training" in child and adolescent psychiatry without formal appraisal at the end. The model had the limitations of being very intensive in time and variable in quality, and it included the possibility of learning only one way of working. The Royal College of Psychiatrists therefore developed an appraisal system based on a national committee whose members would go around the country and inspect the different schemes. Some small schemes merged, and there was a greater emphasis on academic learning through seminars and reading. Formal appraisals of individual trainees were developed, first by the training schemes and then by a regional process from the postgraduate dean who oversaw all medical disciplines.

A contrasting example comes from a residential course also held in the UK, to which clinicians came for a one-year course – initially it was a university diploma, but after a few years it developed into a full- or part-time M.Sc. Students came from adult psychiatry, pediatrics, social work, or clinical psychology. The course was specifically designed for an overseas group. Hence each teaching occasion required time for discussion of cultural issues and service developments in the different countries. It was important to discuss the implications of research since most of the research would be from Europe or North America whereas the students were for example from Japan, India, Pakistan, Mexico, Chile, and Saudi Arabia. Hence time was needed for discussion of how that clinical situation or family situations might be played out in their own countries and how that might influence what was seen, so that the teaching became culturally relevant. Emphasis was given to the fact that most of the data was Euro-centric or North American. Some time was always spent to identify what further research there should be to clarify certain issues.

The primary training outcome was to ensure that clinicians who obtained the Diploma were "clinically safe," so that they could work with children and families independently. Additional aims were to provide knowledge and skill acquisition to enable clinicians to participate in or contribute to service development and research.

Good English language ability was required so that they could experience and profit from clinical experience and supervision.

The academic teaching was organized so that essential content was delivered prior to the students commencing a clinical placement. The clinical supervision came from consultant child and adolescent psychiatrists. The therapeutic modalities taught included aspects of behavior therapy and CBT, psychopharmacology, aspects of family therapy, and psychoanalytic psychotherapy (awareness only) with skills developed in talking individually to children. Continuous evaluation of clinical skills and clinical performance was provided by the supervisors.

In the final module, there were sessions on teaching skills and service planning/development. They included discussions on advocacy, e.g., how to persuade

politicians, and senior administrators within ministries, about service needs. Students also presented papers from a preselected reading list, in order to deepen knowledge and learn analytic and presentation skills.

Assessment included evaluation of clinical skills, written examination, dissertation, evaluation of performance in seminars, and a 3000 word clinical essay.

Students were expected to be the primary therapist in at least 3 cases, with a further 12 in which they had some involvement. A log book was presented to the examiners certified by the clinical tutor.

The value of the course was assessed as very good by the trainees, and over the 30 years of its existence most of its graduates are in senior clinical positions in their home countries. We had anticipated that many would stay in the UK, but happily only a few have done so. The scaling up of the course now requires the clinical aspects of the training to be supervised in the students' home countries and in the local languages. The didactic and dialectic aspects are increasingly being provided remotely.

Methods for Learning

Several models of how to teach are available, classifiable into didactic, dialectic, interactive, and self-generated.

Didactic: where a student is listening to a lecture or reading a book or a website and there is a body of knowledge to be passively acquired.

Dialectic: in which the student is building up a personal synthesis as a trainee by working with supervisors who have different attitudes and different professions. By observing what they do, he or she is not simply passively acquiring their skill; they are noticing and resolving the conflicts between what different senior people do and acquiring their own blend of knowledge and skills. It emphasizes that the trainee, rather than the trainer, is the owner of the training.

Interactive: emphasizing the importance of having a relationship with a supervisor, in which there is a mutual process of understanding. The student should be conveying to their supervisor very clearly what they do and do not know, and the supervisor should be clearly conveying back to the students what he or she thinks the students do and do not know.

Self-generated learning: where trainees are themselves setting what they need to learn.

There is no single right method. It is probably an advantage to have several methods of instruction going on at the same time.

With increasing experience, trainees will learn how to cope with complex cases and emergencies such as acute psychosis, self-harm, family, and child protection emergencies. There should be more and more self-criticism and self-evaluation. At the same time, more confidence is expected, and the ability to supervise and train other people.

Rapid Developments in Science and Delivery of Teaching

Science

Genetic research has accelerated in recent year and is likely to continue to do so. At first the clinical relevance has not been great. The impact on professional understanding has indeed been important. The discovery of genetic influences has corrected tendencies to overemphasize and oversimplify the impact of the early environment. DNA testing, however, has played little part in assessing individuals except in very specialist settings. Plenty of genetic changes have proved to be associated with clinical conditions – but virtually all the genes found have only tiny effects considered singly and are influential only in unfathomably complex interactions with others. The advent of polygenic DNA profiling, however, is likely to change that. This process begins with the identification of large numbers of genetic changes associated with a condition (such as schizophrenia). Robust findings have emerged from genome-wide association studies, with more than 100 genes known confidently to be involved in schizophrenia. If all those genes are then assessed in each individual case, it allows calculation of the probability of a clinical outcome. That will be useful in itself – for instance, in deciding which teenagers with hallucinations or delusions are actually at genetic risk for schizophrenia. It will also allow precision in aspects such as the likelihood of associated features such as the probability of response to antipsychotic drugs or, if genetic risks can be excluded, the need for intensive environmental assessment. If some of the known risks in a disorder (e.g., of blood cancers in Down syndrome) can be discounted for an individual, then the benefits for families could include a reduction in onerous multiple visits to clinics with different specialities.

It seems likely that clinicians will soon be able to use more precise knowledge of the risks for the individual. In the longer term, selection for different therapies is likely to be informed by genetic and neuroimaging findings. This does not mean that psychological understanding will become redundant. If anything, the need for clinicians to understand neuroscience will become greater because of the ethical and practical problems that can be expected from increasing knowledge. How will insurance companies react? How will institutions react to privacy issues? How will affected individuals change self-image? Will parents reject those at highest risk? Will inequality of care be heightened? More training will be needed by the CAMHS specialists of the future.

Parallel advances are being made in other relevant areas of biology including brain imaging and sophisticated processing of EEGs. It will be important for CAP specialists of the future to have enough grounding in these technological and scientific advances to be able to understand the relevance for their own practice.

Advances in Knowledge and Skills Transfer Using Electronic Media

As the number of people who need to have knowledge about child mental health increases, one question that arises is whether and how modern internet-based

technology systems might aid this. Are there ways to use this technology to increase knowledge for members of the public and for non-mental health and mental health professionals? Are there ways that the technology can be used to increase peoples' skills in helping young people who are in difficulties? The reason to ask these questions separately is that helping people to learn skills has always been thought of as requiring face-to face training and an apprenticeship style of teaching.

There are very many sources of "information" on the internet, ranging from evidence-based material, through opinions of individuals which may be presented very convincingly but have little evidential basis, to material that advertises particular products or points of view. Some material is dubious and potentially harmful to vulnerable groups. Self-help forums span the informative through to misleading and sometimes actively harmful material. Equally, they can be supportive or actively destructive, for example encouraging self-harm and suicide. It is more important than ever to assess material of its truthfulness and reliability before relying on it.

Knowledge

E-learning is now quite widely used across industry and in medicine to teach knowledge about particular topics. There is nothing that suggests that this approach cannot be used to teach aspects of mental health. Critical to any such attempt is the need to specify the target audience carefully at the outset. This is as true for e-learning as it is for articles and books on paper. Writing for the general public and those professionals without some specialist knowledge has to make few assumptions about what the learner knows already. It has to be written in very accessible language bearing in mind the likely reading age of the population at large.

It should be written in relatively small chunks – the attention span of many people is normally 20–30 min; this means that an article to be turned into an e-learning session should be 2000–2500 words and not longer. The technical skills of having the learning logically and creatively meeting the three or four specific learning objectives for a session requires educationist skills, and these are combined with the skills of skilled programming found in an instructional designer. The availability of good e-learning packages and attractive, appropriate graphics helps greatly to produce an attractive and informative session that can be logically used by the learner. In addition, an early decision needs to be taken about the use of self-testing and whether the use of the material is to be monitored by somebody supervising the learning.

Technically, the material is much more useful if it is available in formats to suit PC through to smartphones.

Skill Development

More recently, e-learning platforms, such as MindEd (www.minded.org.uk), are developing skills and knowledge based on case studies with embedded video clips for reflection and analysis as a single learner or in a small group face-to face teaching workshop. The latter is likely to be the more useful as it allows role-play and feedback as well as discussion of the material.

Another way to improve skills in relation to child mental health teaching to non-specialist audiences is to use teleconference, regular "meetings" of a group of

learners with a specialist as facilitator. This reduces the time commitment, eliminates or reduces travel, and allows for peer learning as well as the input of specialist knowledge and advice. It can be combined with use of e-learning platforms to enhance knowledge, problem solving, and trying interventions which can then be honed or replaced if they are only partially effective. This style probably works best if there are periodic face-to-face meetings of the group. It has to be clear that the specialist is providing information and consultation advice. They are not taking on clinical responsibility for young people that they have never seen.

There has been some enthusiasm for the idea of using a massive open online course (MOOC) to spread knowledge about child and adolescent mental health. The International Association of Child and Adolescent Psychiatry (IACAPAP) has created a basic course for non-specialists about child and adolescent mental health using the formats of (Falissard et al.) and the USA at University of Colorado (Nicklas et al.). A challenge of a MOOC-based approach is that specialists provide the basic course material, but then it is very largely the peer learning group alone that guides the course and the answers to the reflective material embedded in the course. It has yet to prove its value in child mental health as a tool.

It is possible that a variation on this with much closer monitoring of learning and skills by trained professionals could be very useful. However, that would need significant funding and would pose the potential problem of who carries responsibility for the advice offered to students.

A further use of the MOOC is as a self-help tool. Such a model has been used by the University of Sydney (Kumar) and in The Netherlands and in the UK (Meurs and Oldehinkel).

The use of artificial intelligence (AI) algorithms for detection of anxiety and depression and other mental difficulties, possible self-help, or professional learning about child and adolescent mental health is still in its infancy, but there is some claimed success with recognizing anxiety and depression in children's speech patterns (McGinnis et al. 2019). This may be an approach that will aid diagnosis and interventions in the future.

Why Have Medical Specialists in Child Mental Health?

Why should medically trained doctors be delivering mental health services for children and young people? They are expensive in most places because of their medical training, and many treatments in child and adolescent mental health are based on talking and doing. Medication has a more limited role. Could not the limited role of prescriber be provided by pediatricians and pediatric neurologists? In countries where there are very severe financial constraints, this is a real issue.

The counter-argument to this apparently attractive argument rests on several pillars:

The child and adolescent psychiatrist is the only member of the child mental health team with a biological training as well as a psychological and social context training. This is important as often there are biological influences in the development

and presentation of child mental health disorders, and increasingly it is relevant in terms of integrating treatments. Sometimes there are biological consequences of child mental health disorders. Being able to integrate those into thinking in direct work and perhaps even more importantly in helping other team members learn to take these issues into account in their thinking is an important function of the child and adolescent psychiatrist. We are increasingly recognizing the importance in child mental health work of psychoeducation; it is not a one-off occasion but a recurrent theme in treatment. Again, the child psychiatrist can bring an informed biological facet to this work, integrate it with other skills, and help their colleagues to acquire it.

The integration of all aspects of a case in a biopsychosocial formulation and then, when appropriate, treatment including medication is best carried out by doctors working in child mental health. Sometimes, nurses can work as colleagues seeing the more routine cases once initially assessed, but often child mental health finds that children and young people have complex needs with multiple simultaneous difficulties. A child psychiatrist is well-placed to prioritize aspects of treatment, taking into account biological variables and to provide treatment or consultations to others who are the primary therapists in such situations.

Because of their medical background, the child psychiatrist is often offered respect by patients, colleagues, and those planning services. Their training in evidence-based medicine and epidemiology as well as their clinical knowledge offers important information to those planning services. Not least among these skills is that of working with others to provide the most appropriate skill-mix for the local population, conditions, and the resources available to meet the needs. How this can be achieved creatively will vary widely internationally.

Finally, the child psychiatrist has a role of advocacy at a political level. Politicians do want to hear the medical voice among those they consult about child and adolescent mental health needs. They are increasingly aware of the economic cost to their countries both in the short term but also for many decades of ignoring child mental health needs in their countries.

In Japan, two surveys of psychiatric education have called attention to some areas where development was required. They have suggested that a shortage of specialists in child and adolescent psychiatry would not be resolved unless flexible, innovative ideas for training and teaching are adopted (Yoshida et al. 2010; Nagao 2012) CAMHS staff. So far, these have focused on increasing the numbers of medically trained specialists.

In addition to collaboration between pediatrics and child psychiatry for the sake of sharing specialities for mental health problems and/or child psychiatry, there are more possible contributions; the first is from adult psychiatry and the second is infant/perinatal psychiatry.

Dilemmas

The models of teaching and learning in CAMHS have been and remain resource intensive. This may be helped in the future by technology, but it is unlikely to remove a substantial input from senior clinicians, whether CAPs or other child

mental health specialists. In many countries, this produces a tension between senior clinicians undertaking clinical work and spending time training the next generation of clinicians. This can be seen in the UK where it is not unknown for clinicians to decline having a trainee CAP in the team because of the time it will take away from a busy service, especially if the trainee needs special support as happens from time to time. Analogously, being responsible for organizing a training scheme is interesting but onerous; often the time it takes is not well recognized by employers. There are similar issues in many other countries.

Further, there are real challenges in some countries where there are very few child mental health specialists, whether medical or not. In those situations, should the few specialists try to provide a limited service or should they better be spending their time advocating politically for the development of children's mental health services?

Conclusions

There are many challenges facing education and training in CAMHS for the future based both on advances in the field, economic challenges, and woeful inadequacies of provision in some parts of the world. In terms of "Parity of Esteem" between services for the physical health and mental health of children and young people, there is still a long way to go.

It is likely that effective CAMHS teams will need CAP input in some form. How this is organized is very likely to vary according to a country's own opportunities and challenges. It is also likely to change over time and with advances in medical science.

Cross-References

► Education in Mental Health
► Epidemiology of Child Psychopathology

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Beginning Research

41

Eric Taylor

Contents

Abstract

This chapter identifies some of the challenges faced by clinicians who are seeking to develop their work into useful research. The opportunities for doing so are outlined, together with some difficulties to expect in the early stages and some ways of overcoming them. Consultation with the existing literature, supervisors, ethical committees, and service users is emphasized. Examples are provided for clinical records search, reviewing software, development of measures, and evaluations of practice.

Keywords

Research design · Service users · Ethics · Controlled trials · Case register · Quasi-experimental · Systematic review · Effect size · Supervisor · Qualitative research · Placebo

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Introduction: Why Should Clinicians Carry Out Research?

Clinicians need to be active in research for many reasons. Mental health professions are and should be scientifically based. New knowledge is essential for the subject to improve, and clinicians are well placed to know what is needed. Professionals need to be able to evaluate a growing body of research in their fields, to understand its value and its limitations and to translate it into practice.

In many countries, mental health issues and their context differ from the Western consensus in which most published research is carried out. The methods appropriate and the designs used may vary from culture to culture. Research projects may very well be necessary to understand how far the "textbook" findings can be applied. Clinical scientists are therefore particularly necessary in cultures diverging from those of North America and Europe.

Clinicians are likely to find themselves at the forefront of knowledge. Individuals have often made important observations in the course of their practice, which they have been able to translate into research-based advances. For example, Kanner's (1943) clinical observation enabled him to define the group of children who are now referred to as having autism spectrum disorder, and this led directly to systematic study of the features that autistic people have in common and which distinguishes them from other groups of atypically developing people.

There are also benefits to clinicians themselves from engaging in the progress of science. Research encourages a habit of critical, questioning, and original thought. The status of the child mental health professions, and therefore their ability to influence political decisions, is enhanced if they can show their contribution to the developing evidence base. The best way to learn about research is to engage in it. Unfortunately, however, some clinicians in mental health professions lack education in conducting their own research. This chapter acknowledges some of the obstacles that clinicians encounter in their engagement with research and in the early development of research projects and suggests methods to overcome them.

Originating and Developing Research

Several kinds of research are suitable ways of learning how to do it. An early project might be in the analysis of existing data, for instance from previous research; or from electronic case registers; or from case notes or officially collected data. Qualitative research might be needed to assess the impact of interventions on people. A topic may need a systematic analysis of existing papers, or a questionnaire method for analyzing clinical data for a particular purpose.

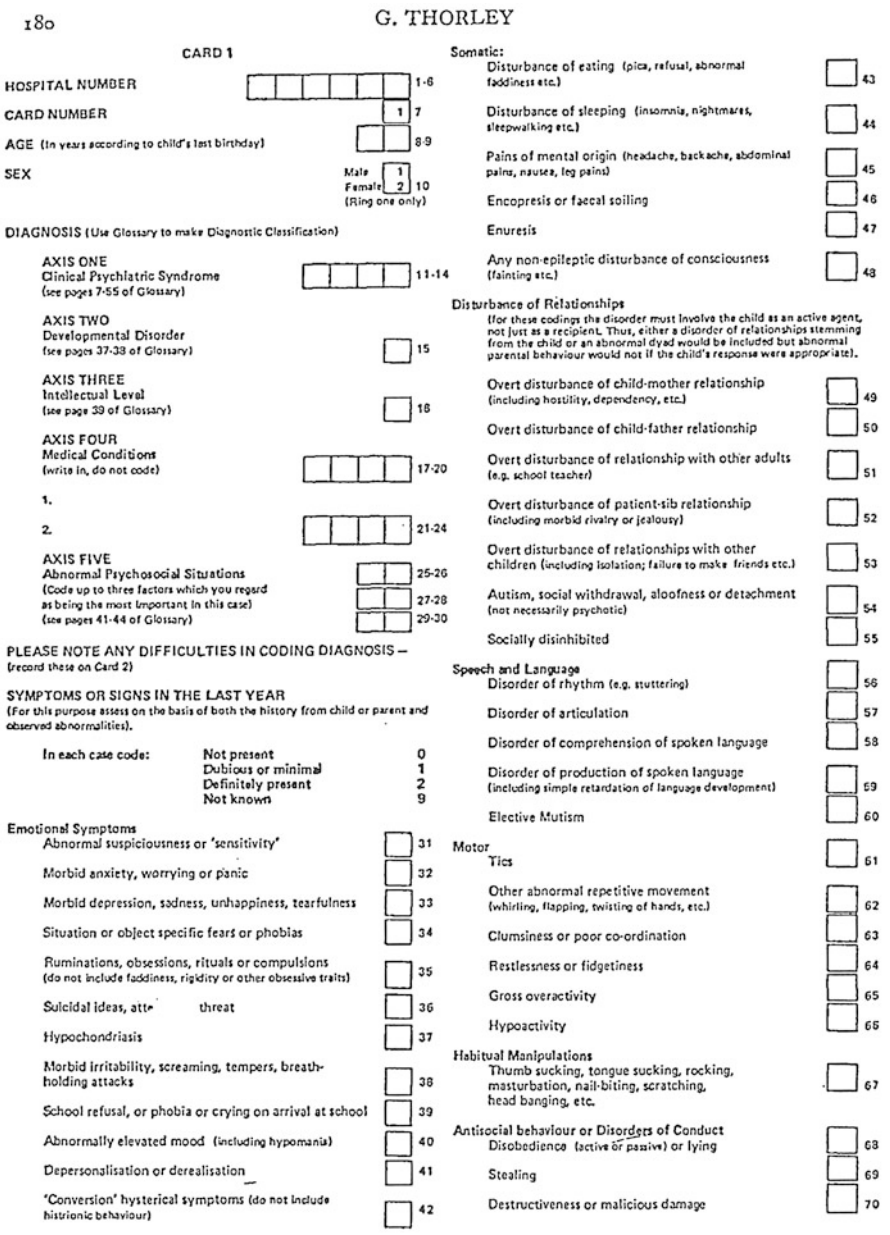
There can be several opportunities for getting started.

- *Using existing data*
  It is sometimes possible to obtain permission to analyze data that have been gathered already. There may have been previous surveys locally that have included information relevant to the current question. Clinical or educational

records may have useful data. In this case, one will need to be aware of likely problems of missing data in routine records. Increasingly, however, clinics are adopting systematic ways of recording. Electronic case records, if available, can allow searching large numbers for relevant information (e.g., CRIS 2017). National or regional statistics may already have been gathered and be in a form that allows for analysis.

- *Developing a case register*
  If a case register does not already exist, then it can be very useful to develop one. For instance, a clinic can set up a checklist with a limited range of problems or characteristics to be described simply as present or absent. (Recording the absence of a problem is much preferable to simply assuming that a problem is absent if it is not recorded as present.) Such a checklist has been invaluable in developing early stages of research (Thorley 1982). The "item sheet" developed for the Maudsley Hospital and associated clinics in South London is an example (Corrigall and Nikapota 1998). It allowed series to be developed for identifying which clinical features were specific to autism and which were not; for establishing groups of young children with depression for a longitudinal follow-up; and for identifying gender differences in several conditions. An extract from that is presented in Fig. 1.
- *Joining an existing Research team, if available*
  This allows ambitious questions to be addressed at an early stage. Joining an existing team has the advantages that there are probably several promising projects to take on, and experienced people around to advise and even to supervise. There can also be disadvantages: some highly successful and pressured research teams are not very successful in developing originality in junior workers.
- *Evaluating practice changes*
  Systematic evaluation (Audit) involves the standardized recording of outcomes in clinical practice. It is a descriptive practice and should probably be a routine part of note keeping, but it allows for repeated recording after a change has been made. This is often described as "closing the audit loop" and may well be of enough interest to other services to justify professional publication.

A key aspect of beginning research is to develop a good question. This stage is worth a good deal of time and thought. A good question is answerable. That is to say, it has enough clarity that it will be easy to tell whether it has been answered or not. It is therefore best if it is expressed in simple terms and is specific in detail. Whether or not the question is novel is usually less important. Many important studies are intended to test an idea in a different setting from that in which it was first formulated, or to use a methodology which was used elsewhere for a locally significant question. In all studies it is important to be precise in the details of the question. For example, "Is treatment A good for patients at my clinic?" may be a key aim but is not yet a good research question. Elaborating it will probably lead to something more like: "Is treatment A better than comparison B in reducing symptoms of X in children with Y"? The elaboration has specified important details.



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CARD 1

HOSPITAL NUMBER 1-6

CARD NUMBER 1 7

AGE (In years according to child's last birthday) 8-9

SEX Male 1 / Female 2 10 (Ring one only)

DIAGNOSIS (Use Glossary to make Diagnostic Classification)

AXIS ONE
Clinical Psychiatric Syndrome 11-14
(see pages 7-55 of Glossary)

AXIS TWO
Developmental Disorder 15
(see pages 37-38 of Glossary)

AXIS THREE
Intellectual Level 16
(see page 39 of Glossary)

AXIS FOUR
Medical Conditions 17-20
(write in, do not code)

1.

2. 21-24

AXIS FIVE
Abnormal Psychosocial Situations 25-26
(Code up to three factors which you regard as being the most important in this case) 27-28
(see pages 41-44 of Glossary) 29-30

PLEASE NOTE ANY DIFFICULTIES IN CODING DIAGNOSIS – (record these on Card 2)

SYMPTOMS OR SIGNS IN THE LAST YEAR
(For this purpose assess on the basis of both the history from child or parent and observed abnormalities).

In each case code: Not present 0; Dubious or minimal 1; Definitely present 2; Not known 9

Emotional Symptoms
- Abnormal suspiciousness or 'sensitivity' 31
- Morbid anxiety, worrying or panic 32
- Morbid depression, sadness, unhappiness, tearfulness 33
- Situation or object specific fears or phobias 34
- Ruminations, obsessions, rituals or compulsions (do not include faddiness, rigidity or other obsessive traits) 35
- Suicidal ideas, att[illegible] threat 36
- Hypochondriasis 37
- Morbid irritability, screaming, tempers, breath-holding attacks 38
- School refusal, or phobia or crying on arrival at school 39
- Abnormally elevated mood (including hypomania) 40
- Depersonalisation or derealisation 41
- 'Conversion' hysterical symptoms (do not include histrionic behaviour) 42

Somatic:
- Disturbance of eating (pica, refusal, abnormal faddiness etc.) 43
- Disturbance of sleeping (insomnia, nightmares, sleepwalking etc.) 44
- Pains of mental origin (headache, backache, abdominal pains, nausea, leg pains) 45
- Encopresis or faecal soiling 46
- Enuresis 47
- Any non-epileptic disturbance of consciousness (fainting etc.) 48

Disturbance of Relationships
(for these codings the disorder must involve the child as an active agent, not just as a recipient. Thus, either a disorder of relationships stemming from the child or an abnormal dyad would be included but abnormal parental behaviour would not if the child's response were appropriate).
- Overt disturbance of child-mother relationship (including hostility, dependency, etc.) 49
- Overt disturbance of child-father relationship 50
- Overt disturbance of relationship with other adults (e.g. school teacher) 51
- Overt disturbance of patient-sib relationship (including morbid rivalry or jealousy) 52
- Overt disturbance of relationships with other children (including isolation; failure to make friends etc.) 53
- Autism, social withdrawal, aloofness or detachment (not necessarily psychotic) 54
- Socially disinhibited 55

Speech and Language
- Disorder of rhythm (e.g. stuttering) 56
- Disorder of articulation 57
- Disorder of comprehension of spoken language 58
- Disorder of production of spoken language (including simple retardation of language development) 59
- Elective Mutism 60

Motor
- Tics 61
- Other abnormal repetitive movement (whirling, flapping, twisting of hands, etc.) 62
- Clumsiness or poor co-ordination 63
- Restlessness or fidgetiness 64
- Gross overactivity 65
- Hypoactivity 66

Habitual Manipulations
- Thumb sucking, tongue sucking, rocking, masturbation, nail-biting, scratching, head banging, etc. 67

Antisocial behaviour or Disorders of Conduct
- Disobedience (active or passive) or lying 68
- Stealing 69
- Destructiveness or malicious damage 70

Fig. 1 Part I item sheet – completed within 2 weeks of admission. (The figure reproduces the first page of a case register checklist used locally for administrative and research purposes in child mental health clinics)

Table 1 The table gives suggestions fot the types of clinical research that are likely to be feasible in many settings

Suitable approaches for early-stage clinical research
Using existing data
Developing a case register
Joining an existing research team
Evaluating practice changes
Types of design for clinical research
Descriptive series
Qualitative study
Case-control study
Cohort study
Quasi-experimental study
Experimental studies (including controlled trials)

The design of a study to answer a question might be *descriptive,* to report an observation, or *analytic,* to test a hypothesis. For all of these, key purposes are clarity and transparency, so that other workers can understand what is being done and can generalize the answers to their own situation. It is often helpful to think in terms of "what is to be compared with what?"

Considerations of how to answer the question will then lead to thinking about different designs (see Table 1). A *case series* is simply the description of patients, or families, or situations to clarify what is being done and what other people should learn. For instance, Bradley's (1937) clinical observation of the therapeutic effect of methylphenidate, in children to whom we would now refer as having ADHD, led other workers to systematic, scientific study of the effects. Observations carry the grave risk of being heavily biased, for instance by over-reliance on a few remarkable cases, or by the special interest of a clinic or practitioner that has created a major slant towards referrals of one kind of problem. An instance was a report in the very prestigious New England Journal of Medicine of marked improvements in a very few autistic children who had been given fenfluramine (Geller et al. 1982). Subsequent controlled studies, however, did not confirm the observation and the drug is no longer used.

A *case-control study* would take things further into the crucial step of comparison. Children with one kind of exposure or problem will be compared with another group who are similar in other respects. The similarity may not be perfect, but they can be matched for those factors likely to determine outcome. Age, gender, and social disadvantage often need to be taken into account. Some studies of abusive parents, for instance, have drawn conclusions about the qualities of the abusing parents, which subsequently proved to be only the results of poverty or social exclusion. Box 1 gives an example of how such a confusion can be reduced by matching, from a study by Harrington et al. (1990).

Box 1
Harrington and his colleagues worked at the Maudsley Hospital, London, at a time when children with persistent misery were not regarded as having a depressive disorder in the same way as adults. They set out to test whether this was in fact the case. They used the clinical data summaries ("item sheets") of children who had attended 15–20 years previously (see Fig. 1). Very few had been given a diagnosis at the time, but it was possible to use the recorded symptoms to provide an operational definition of depressive mood. They could then use the same database to identify a group of nondepressed psychiatric controls, individually matched on demographic variables and nondepressive childhood symptoms. They could then follow up the cases and controls and examine them in adult life. What they found was that the depressed children had much higher rates of adult depression, but not of other disorders (Harrington et al. 1990). This clinical work was made possible by systematic recording of clinical features and had a strong influence on reconceptualizing childhood depression.

A *cohort study* will take all the cases meeting explicit criteria – for instance, all those exposed to a toxin or all those with a specified problem – and follow them to record their outcomes. If the cohort is defined by being given a specific therapy, then many kinds of bias may appear, but at least the issue will not be prejudged by describing only those who have responded well. Ideally the cohort would be compared with nonexposed people. An example would be the work done to establish lead exposure as a cause of cognitive and behavioral problems in children. The studies are described by Wani et al. (2015), as mentioned in Box 2.

Box 2
Several epidemiological surveys have investigated the potential neurotoxicity of lead in children. A systematic review of the studies has described them (Wani et al. 2015). Some surveys have amassed a representative group of the child population, defined their exposure by measuring the level of lead in their blood, and related that to measures of behavior and cognitive performance later. There is indeed an association between high exposure and lower performance. The possibility does exist of confounding – for instance, economic disadvantage causes both reduced performance and exposure to lead in the environment. Accordingly, statistical tests have sought to control for several indices of adversity. The usual conclusion has been that the size of the relationship is reduced, but does not disappear altogether.

A *quasi-experimental study* will take advantage of a naturally occurring situation over which the subjects have not had any control (Thapar and Rutter 2015). If, for

instance, one wished to compare the outcome for vaccinated children against unvaccinated, then there will be clearly a whole set of reasons why some children have not received vaccination. These reasons could in themselves generate apparent differences between the groups. Self-selection can be a major problem in all observational studies. One might therefore proceed to a quasi-experimental study by taking advantage of situations where, for instance, the exposure to vaccination is determined quite independently of the families involved. National policy could, in this example, determine the giving or not giving of vaccine. One such study was reported by Uchiyama et al. (2007) and is summarized in Box 3.

Box 3
Uchiyama and colleagues (2007) were able to use national data in Japan to examine the controversial idea that measles/mumps/rubella triple vaccine (MMR) was a cause of regressive autism. MMR was used in Japan only between 1989 and 1993, so they could examine periods before, during, and after the time when it was used. There was no significant difference between these periods in the incidence of regression. This could not have been confounded by parental or clinical decisions about whether or not to vaccinate: the decision was a matter of public policy.

Experimental studies avoid the biases of self-selection by ensuring that the influence being considered is assigned by the experimenter, not by the choice of the individual exposed. Clinical trials are usually of this kind. Careful attention to design and replicability has meant that controlled trials are the key basis for guidelines about practice.

Qualitative research seeks to provide a richer picture of the complexities of patient experience. It can still be carried out rigorously even though not everything is controlled or measured from the start. It usually involves the verbatim recording of responses from interviews, focus groups, or elicited conversations. The information is recorded and coded and then the investigator will go through the transcripts to decide on a small group of common themes and patterns that characterize the population studied. Generalized conclusions are then presented with the carefully recorded responses as evidence for the generalization. The aim is to stay close to the informants' point of view.

Formulation and Consultation

The process of developing an interest into a specific question will be greatly helped if the questioner has the benefit of supervision or collaboration. A supervisor does not have to be a great expert in the specific topic, though of course it is a great advantage if they are. If no such person is available, then the clinician embarking on a research topic will find it very helpful to discuss in fair detail with somebody else who is

knowledgeable about research procedures in general. A group of colleagues can also serve in this way to help with oversight of a developing project. Explaining to other people helps to make one's ideas more exact and more transparent. Experienced colleagues may also be able to direct a beginning researcher toward other investigations that are relevant, and to how far the question will interest other clinicians/researchers and can therefore be potentially a publishable paper.

Ethical aspects should be considered from the start. In most countries the process is formalized into obtaining consent from a committee with that explicit purpose. In a trial there should be equipoise from existing knowledge about whether the intervention should be better than that currently given. The most important consideration is the safety of patients and many "human subjects" committees will confine themselves to the questions of possible harm. There are other things that need considering as well – societal values such as equity and the propriety of any sponsors of the research. Some ethics committees will also wish to take the quality of the science into consideration, on the principle that bad science is unethical in itself and may harm many people from false conclusions. The process of consideration can sometimes be frustratingly long but it remains important that there is a check on investigators' enthusiasm.

Consultation should also take place with the people likely to be affected by the research. Young people and/or their families can bring in excellent developments from their experience of the condition. They are also very well placed to advise on the feasibility of recruiting and the acceptability of procedures. Informed consent is also a key ethical issue and service users should be able to advise about how much information needs to be given for consent to be truly "informed."

Consulting the Literature

An early stage of developing a research topic is usually the understanding of the work that has been done already. Published reviews in refereed journals will usually be up-to-date and rigorous. They help the new investigator to scope the topic. Useful resources include the National Clearing House for Guidelines (USA), the National Institute for Care and Health Excellence (UK), the Cochrane Collaboration, and nationally developed "guidelines" and "practice parameters."

On this basis, it should be possible to decide whether to make a narrative account, a systematic search, or a meta-analysis. "Systematic" implies there has been an unbiased attempt to include all the literature that has addressed the question – so as to avoid all the bias that creeps in for contested or politicized areas. A "meta-analysis" implies that the studies can be quantitatively combined to produce a general conclusion about the size of any effect and about the reliability of the conclusion. There is also a decision to be made about whether to include unpublished studies as well as those that have appeared in refereed journals. The advantage of inclusion is to give the possibility of freedom from the biases of editors; the disadvantage is that there is no longer the quality control implicit in the work having met the critiques of referees.

If the decision has been to include unpublished studies, then there is more work to do in assessing the quality and the possibilities of other kinds of bias.

Developing a systematic strategy of the studies to include will mean decisions about the search terms to adopt. MeSh subject headings allow quite a wide choice. An exploratory application of the terms in the databases would allow for a check on whether they are successful in identifying key papers already noted. The terms are then applied to databases such as PubMed, Scopus, Google Scholar, Psych Info and Hinari (a free database maintained by WHO). Typically, this will produce a large and overinclusive number of published studies. It may well be possible to refine the list by including only epidemiological surveys or controlled trials, or reviews; and the titles alone may allow many to be excluded as irrelevant. The next step will be to read the abstracts and exclude those that are plainly not concerned with the intended topic. This decision about relevance will ideally be checked with a colleague so that the investigator's personal biases do not contaminate impartial selection.

Extracting the key data from the identified studies will also aim at being a systematic and unbiased process. Enlisting a colleague to check on judgments will make the resulting review more likely to persuade other people and to achieve publication. Each of the studies will need to be coded not only for its conclusions but also for its methods. Consider including aspects such as when and where it was done, the number and definition of subjects and a rating of quality.

Quantitative combination of studies will need measures of the size of the effect, its direction, and the heterogeneity between the results of different studies. Software, such as RevMan, is available for this purpose. The "p value" is not an ideal measure of how large the effect is. Rather, it indicates, in an experimental study testing a hypothesis, the probability that an effect as large as the one hypothesized could have arisen by chance (Armitage et al. 2008). Clinicians are more likely to want to know whether the size of the effect is large enough to be clinically meaningful. The p value will depend not only on the size of the effect but also on the sensitivity of the data and the number of cases involved. The *effect size* is better measured by statistics such as the difference between the means of the group been studied and the comparison group, divided by the standard deviation. It is, therefore, a measure that is independent of the exact rating scale that was used.

Some authorities advocate a method of analysis that takes account of the prior probabilities that a treatment is effective, and replaces the binary decision (works or doesn't work) implicit in p level with a set of probabilities relating to different possible effect sizes (Gelman et al. 2013). This kind of Bayesian analysis can complement the traditional hypothesis-testing approach but is not yet widely applied.

Deciding on Measures

The choice of measures is one of the hurdles that often deter investigators in the very early stages. They are, of course, aware that publication is likely to demand internationally recognized measures. On the other hand, available measures may be only

tangentially relevant to the exact question. Measures (see ▶ Chap. 2, "Screening Methods and When to Use Them") will need to be reviewed for their reliability, validity, and relevance.

Reliability refers to the hope that the measure used will be stable over time if it is repeated, and/or that it will be very similar if given by different people, and/or that all the parts of it (e.g., all the items in a scale) will be consistent (Krippendorff 2008).

Validity implies that the measure does, indeed, give an accurate description of what it is supposed to be indexing.

Cultural relevance is an important aspect of validity. Many observations and rating scales were developed in the context of North-American or European practice and may be limited by that. Investigators in another culture will need to consider how far they should be used and whether they need modification. At its simplest this involves accurate translation, checked by back-translation to be clear that the words used mean the same thing in different languages. They may well not. "Depression" is not the same construct everywhere. Effective translation may, therefore, need not only a linguistic approach but also an anthropological one. Are the ways that distress is manifest in different cultures similar enough to be mapped? Often the constructs are similar in outline but vary in detail. In questionnaire measures of children's problems, for instance, a construct of antisocial behavior does typically emerge in many different national surveys. The individual items, however, may load in different ways. "Cruelty to animals," for instance, may have a very different association with psychopathology in Nigeria to that in Scandinavia.

An example of good practice comes from studies of measuring post-traumatic stress disorder (PTSD) in several countries, such as Nepal, Sierra Leone, and Zambia. It has been found valuable and necessary to achieve a good qualitative understanding of the cultures before settling on measures to describe the nature of children's distress (e.g., Murray et al. 2013). The workers in Nepal after the earthquake there wanted to evaluate trauma-focused CBT (Acharya et al. 2018). They had to work out the ways in which trauma syndromes developed in that culture and language. They tackled it with an anthropological approach that had been developed over 10 years in the context of children's reactions to the wars there (Kohrt et al. 2011). This had gone beyond translation and back-translation to understand the cultural meaning of the symptoms of PTSD and produce a new version of a PTSD scale.

Developing Evaluations of Practice

Several designs are used to develop the evidence base of practice. All need to consider the consistency of results – either between subjects or over time – so as to understand the probability of getting good results.

Single case studies can include multiple measures to achieve this and are widely used in the study of the results of behavior therapy. They can work in a situation where the effects are assumed to be rapid and reversible. More usually, groups will be followed:

Pre-post observation: At their simplest, group designs compare the outcome of people before and after they are given a treatment. This pre-post design is widely adopted but can be misleading. "Improvement" can result from many things other than an effective intervention. Regression to the mean is a simple consequence of selecting subjects for an extreme score (e.g., a high level of hyperactivity to be reduced). At the follow-up, they will be less extreme, whether or not something helpful has happened in the interim. Furthermore, in a fluctuating disorder, it is likely that people will start treatment when problems are at their worst and stop treatments when they are effective. This can lead the unguarded to suppose that the treatment chosen has been effective. Further still, the impact of any intervention will carry suggestions that things will change and hopes for improvement. These "placebo" effects can be powerful. Some people may well have recovered spontaneously in the interval between starting treatment and evaluating it.

Controlled comparison: As with other research topics, a key consideration is: What is to be compared with what? What is the comparator for the treatment? Sometimes, it is TAU (treatment as usual). This may have the disadvantage that in a trial TAU will be given in a very unusual way. Sometimes, the comparator is a waiting list but this has the disadvantage of the potentially harmful effects of knowing one is not receiving a new treatment, or the beneficial effects of believing that you are about to. A *placebo* is a treatment that simulates as closely as possible the chosen intervention but without having therapeutic effects. This has been of great value in establishing drug treatments, but is harder to apply in psychotherapy trials. *Comparisons with an active therapy* answer a key clinical question, but often require very large numbers to demonstrate better results than a current standard.

The design of comparative studies is most commonly one of "*parallel arms,"* in which cases are allocated at random to the desired intervention or to the comparison procedure (Kao et al. 2008). The assumption that the two groups will be similar in other respects cannot always be relied upon completely. The groups may therefore be matched as part of the randomization; or any differences between them may be allowed for in the analysis after the results are in.

Typically, not all people assigned to one group or the other complete the study in the way that is intended. If the reasons for dropping out are different – if, for instance, those on an active drug drop out because they have recovered, or those on a placebo drop out because there has been no improvement, then the results will be skewed to favor one or other of the groups. *An intent-to-treat analysis* therefore includes everybody who was initially randomized and finds some way of evaluating the outcome for everyone. A *per-protocol analysis*, by contrast, compares only those who have completed the trial in the condition to which they were assigned. Some people prefer this in evaluating psychological interventions, on the basis that it is unfair to evaluate people who have not, in fact, received the intervention fully. Nevertheless, the whole theory of a trial is to guide a person deciding on therapy at the point of decision – and if the outcome is that the treatment is not accepted then the probability of that should inform the decision.

Many detailed statistical issues arise in designing trials. At the beginning stages considered here, as much advice as possible should be sought from a statistician.

A sound approach from the start will avoid delays and heartache later. Fuller consideration of the later stages of designing evaluations is provided by Kraemer (2015).

Conclusions

It is valuable for clinical professionals to understand research. The best way of doing so is to engage in it. There are many opportunities to do so. Many of the obstacles can be overcome by forethought and application of key principles of study design.

Cross-References

- ▶ Epidemiology of Child Psychopathology
- ▶ Pharmacological Approaches in Child and Adolescent Mental Health
- ▶ Screening Methods and When to Use Them

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