Borderline Intellectual Functioning

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Learning Objectives

- To understand prevalence of borderline intellectual functioning (BIF) and associated factors.
- To learn about the ascertainment and diagnosis of BIF.
- To become aware of mental health comorbidities and BIF across the lifespan.
- To understand the issues relating to service delivery and treatment provision to this group.

4.1 Introduction

Intelligence encompasses many different cognitive components that contribute to the ability for abstract thinking, self-realisation, consciousness, moral judgement and a range of adaptive behaviours such as education, employment, forming of relationships and so on. Intelligence is measured by tests that derive IQ scores which are standardised for various population groups. All testing is imperfect and subject to standard error which may be due to cultural or other norms and the construct that each test strives to measure.

In 1961, the American Association on Intellectual and Developmental Disabilities (AAIDD) (formerly American Association on Mental Retardation) suggested a categorisation of mental retardation, as intellectual developmental disorders were then known, which included borderline intellectual functioning (BIF) as the first of five levels of severity. The IQ range was given as 70–85 including people who were on the second to 16th percentile. Subsequently, this categorisation was adopted by the classification manuals of the American Psychiatric Association in DSM-II [1], DSM-III [2] and DSM-IV [3]. This classification tended to overdiagnose people from minority ethnic groups or those in lower social strata as it omitted the additional condition needed for a diagnosis, that of impaired adaptive functioning.

It was then recognised that in order to avoid the likely increase in false positives, that is, people identified as having BIF, the latter became a descriptive V-code rather than a disorder incorrectly, and the IQ upper ceiling for mild intellectual disabilities (ID) was set to 70. An unintended consequence of this change was the de-classifying of people who had reduced cognitive ability but were not deemed to have ID and therefore, were unable to receive services. As this was clearly causing difficulties, clinicians, researchers and policymakers tried to rectify the situation by (1) interpreting needs based on IQ scores flexibly, which is establishing service exemptions so individuals with certain diagnoses may receive services; and (2) raising the ceiling for ID from 70 to 75 given that this is the accepted standard error of IQ measurement. For example, an IQ score of 70 can be as high as 75 or as low as 65. For a full discussion of that debate, see Greenspan [4].

Interest in BIF is international. Wieland [5] argues that BIF is an important element in the onset, treatment and prognosis of mental disorders and the relegation of the concept to a V code "for Conditions Not Attributable to a Mental Disorder that are the Focus of Attention or Treatment" is detrimental to the quality of life of those with BIF and mental or other health comorbidities. In the International Classification of Diseases tenth edition-Clinical Modification (ICD-10-CM) [6], BIF was assigned a "residual code R41.8, other and unspecified symptoms and signs involving cognitive functions and awareness".

Salvador-Carrulla et al. [7] presents the dilemmas that dominate the current understanding of BIF and its classification as veering from the World Psychiatric Association view of BIF being a disorder (or metal condition) that should be included in the international classification of diseases (ICD) to the American Association on Intellectual and Developmental Disorders (AAIDD) view that BIF is a disability and therefore should be included in the International Classification of Functioning (ICF), Health and Disability [8, 9].

Further, Bertelli, Cooper and Salvador-Carulla [10] argue that defining conditions by IQ level is problematical because intellectual developmental disorders are multifactorial and individual abilities and skills may differ between persons at the same IQ level. They propose that assessing specific cognitive

functions may be more fruitful for ascertaining ID but also for combating the associated stigma for the sufferers.

These debates about diagnosis of BIF clearly underscore its high heterogeneity as a condition which is underpinned by both biological and psychosocial factors that increase individual risk for developing it. Consequently, the absence of consensus on what the term BIF should encompass and how it should be classified raises concern that such uncertainties will affect the information on prevalence of the condition and the provision of services to those in need.

4.2 Prevalence

Information about the prevalence of BIF is garnered from a number of sources including clinic populations, country-wide epidemiological surveys or simply estimations based on the population intelligence distributions. Therefore, published literature suggests that prevalence ranges from 13.5% to 18% [7, 11, 12]. These proportions, which all are based on IQ rather than IQ and adaptive behaviour qualification, are close to 14% which is derived by subtracting those with IQ less than 70 (second percentile) from those with an IQ around 85 (16th percentile). Prevalence seems to be relatively higher in males, persons with individual and family problems, negative parent behaviours, low socioeconomic position, and prisoners [13–19]. In the latter, the rate ranges from almost 6–32% [19].

Recent exploratory studies have shown the prevalence of BIF to likely be higher also in mental healthcare populations [12, 20, 21]. Discrepancies in the prevalence rates reported in each study are due to methods of ascertainment, sampling frame and definition/criteria for BIF including whether the additional criterion of adaptive functioning was used.

It is possible that BIF overlaps with the upper end of mild ID but on occasion also with specific learning difficulties, that is, impairment of scholastic ability in one area in the context of normal development and adaptive functioning. Further, given the known impact of severe mental illness, for example, psychosis, bipolar affective disorder, on IQ, it is not surprising that ascertainment of BIF status in adulthood in people with severe mental illness may be contentious in the absence of collateral developmental history.

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4.3 BIF and Cognition

Impairment in educational and scholastic achievement has been linked with BIF in school-age children. Underlying processes that have been implicated include information processing [22] measured with event-related potential in the absence of sensory deficits. The findings suggested that the BIF group (mean IQ 81) had deficits in attentional and information processing pathways compared with children of average intelligence mean (IQ 99). Grey matter and brain volume changes may underlie executive or motor function difficulties; they appear to be increased in certain parts of the brain (e.g. right temporal cortex) but decreased in others (e.g. right parahippocampal gyrus) in BIF young persons without other pathology (IQ 80) compared to children of average intelligence (mean IQ 118) [23]. Other studies have replicated such deficits in motor function in up to about 60% of samples drawn from schools for children with special needs (mean IQ 77) [24]. Impulse control may also be affected by BIF as shown by van der Meere et al. [25] in young boys with conduct disorder. They showed that children with BIF and conduct disorder respond faster than the control group, and that their best performances are related to the presence of valid-cue information. This propensity may be perceived as an action-oriented response style that is consistent with the sensation or thrill-seeking characteristics.

There are several genetic conditions with variable effects on IQ which may lack distinguishable characteristics and thus, it may not

be obvious that the sufferers have a number of neurodevelopmental problems that may hinder their academic progress.

The most common conditions associated with variable IQ are autism spectrum disorder [26], attention-deficit/hyperactivity disorder (ADHD) [27], foetal alcohol spectrum disorder [28], Fragile X syndrome premutation carriers [29], velocardiofacial syndrome [30], Prader–Willi syndrome [31] and Williams syndrome [32].

Children with those conditions share specific cognitive profiles but those may not be recognised in classrooms especially where the original genetic abnormality is not known or distinctive facial and other bodily markers may not be prominent and therefore missed. Common problems in the classroom may comprise disturbances in executive function, working memory, remote recall of information, declarative learning and memory, speed of information processing, and temporal sequencing, as well as visuospatial functioning.

Many children and young people with BIF with or without known genetic conditions are also called "slow learners" and may come to the attention of services at the start of primary education. Karande et al. [33] raised the issue of lack of recognition or awareness of BIF in parents of children with BIF who had been referred for assessment due to poor educational attainment.

These children often receive a statement of educational needs which entitles them to support if their difficulties are deemed serious and impede their progress. However, they may leave education without qualifications and therefore, represent a hidden problem. More often than not, those early difficulties have not been subject to remediation or early support and may continue to impact adult life outcomes in a considerable minority. ◘ Table 4.1 presents the main cognitive deficits in comorbid conditions associated with BIF.

BIF has been associated with deficits in attentional and information processing, motor function and impulse control.

4.4 BIF and Health

Analysis of data from the Longitudinal Study of Australian Children [37] showed that 23% of children with BIF were obese by age 7 and were more likely to have been exposed to socioeconomic disadvantage. These children were also rated higher by their parents for total difficulties on the Strengths and Difficulties Questionnaire which implies possible psychiatric morbidity.

Common comorbidities in children include other neurodevelopmental conditions such as ADHD, autism spectrum disorder, conduct disorder and symptoms such as inattention and impulsivity. Other potential presentations of psychiatric disorders may be problem behaviours or somatic complaints.

Van der Meere and colleagues [38] investigated the characteristics of poor impulse control in children with conduct disorder and BIF, comparing them with a control group using the alertness test [39]. They suggested that these children lack an inhibitory response. In their study of disruptive behaviour disorders, Villalobos et al. [40] analysed data from more than 1000 children and found that the presence of BIF considerably increased the amount of disruptive behaviours. Further, the presence of BIF is a poor prognostic factor for the management of children with ADHD.

A narrative review of the literature examining reported psychopathology in people with BIF suggests that the commonest mental conditions found in this population group are personality disorders, posttraumatic stress disorder (PTSD), psychosis, ADHD, bipolar disorder and sleep disorders [41].

Findings from an Israeli study of 173,542 adolescents with BIF screened for military service [42] showed that as a group they were twice as likely to be diagnosed with a psychiatric disorder using the ICD-9 [43], specifically antisocial personality disorder and non-affective psychosis and were more likely to use drugs. The study by Wieland [11] which compared a clinical adult population with and without BIF but with mental disorders with a group of adults with mild ID and

Table 4.1 Cognitive profiles of comorbid conditions associated with BIF

Generalised developmental disorders	*Neurocognitive features*
Autism spectrum disorder	Relative strengths in tasks requiring non-timed abstract reasoning and relative weaknesses in processing speed and comprehension [26]
Attention-deficit/hyperactivity disorder	Deficits in executive function and response inhibition [27]
Specific developmental disorders	
Dyslexia	Phonological deficit [34]
Dyscalculia	Deficient number module [34]
Mathematics learning disorder	Difficulties in multiplication, learning to solve math word problems and automatized memory of basic facts [35]
Non-verbal learning disorder	Poor psychomotor coordination, arithmetic skills and drawing activities. Impaired social judgement and social problem-solving [36]
Other	
Foetal alcohol spectrum disorder	Deficits in executive functioning, particularly in tasks that involve holding and manipulating information in working memory [28]
Fragile X syndrome	Impaired mental status, intelligence, executive functioning, working memory, remote recall of information, declarative learning and memory, information processing speed, and temporal sequencing, visuospatial functioning [29]
Velocardiofacial syndrome	Weaknesses in the areas of visuospatial memory and arithmetic; morphological changes in the frontal cortex [30]
Prader–Willi syndrome	Impaired executive memory, and visuospatial tasks [31]
Williams syndrome	Variable cognitive profile with participants performing better on language and face recognition tasks, compared with visuospatial and number tasks [32]

Adapted from Salvador-Carrulla et al. [7]

mental disorders found lower rates of psychosis and other severe mental disorders in the BIF group, but that the BIF group had higher rates of PTSD. Just over half of the patients with BIF were diagnosed with a personality disorder, most commonly personality disorder not otherwise specified followed by borderline personality disorder [44].

Other studies suggest that limited communication or verbal ability may lead to longer inpatient admissions and more coercive care approaches for those patients [21]. The authors examined records of current psychiatric admissions and of admissions which had taken place in the preceding 5 years to check for evidence of seclusion, other restraint and enforced medication. They found that 44% of the inpatients screened positive for BIF or mild ID and that this group was almost 3 times as likely to have had involuntary admissions currently or in the past 5 years and almost 4 times more likely to have experienced any type of coercive treatment.

Another research found that BIF is likely to remain unidentified in mental health care and substance use services [45], which may hinder necessary treatment adjustments and worse the odds of positive outcome in both the short and long terms [21, 46–48]. Several papers deriving from the Adult Psychiatric Morbidity Surveys [49] in the UK indicate that adults with BIF and mental health issues

are younger, male and of lower socioeconomic status [12]. The BIF group was identified from those responding to the survey who had all completed the National Adult Reading Test (NART) which provides an estimation of current verbal IQ which is highly correlated with overall IQ. The BIF group had higher rates of common mental disorders, substance misuse and personality disorders. Further analyses [50] showed that the BIF group is also more likely to have made suicidal acts though not intending to take their own lives and are least likely to recover from them [51]. This is in accord with findings from epidemiological studies that indicate that low IQ is a risk factor for common mental disorders especially depression [52].

The BIF group is also found to have higher odds for problem gambling [53] and are less happy than their peers without BIF [54]. A recent report on symptoms of psychotic disorders in the BIF group showed that while community-dwelling respondents have twice the rates of psychosis compared to peers without BIF, they are also more likely to report auditory hallucinations but not delusions and that depression is a contributor in the pathway to developing and expressing those symptoms [55].

The most recent Adult Psychiatric Morbidity Survey [56] confirms previous findings and shows that all disorders are increased in the BIF groups compared to their peers of average intelligence. Details are shown in Table 4.2.

One potential reason as to why rates of emotional disorders are higher in this population is the possibility of being chronically frustrated of not meeting expectations set by family, education or the wider society [57]. In adolescents with either BIF or ID, emotional–behavioural difficulties are reported to be worse than for those with neither disability nor BIF [58]. Feelings of unworthiness may be compounded by not being eligible for supports due to arbitrary service cut-offs.

Recently, the relationship between BIF and adult psychiatric morbidity has been found to be partially mediated by exposure to Adverse Childhood Experiences (ACEs) [59].

Persons with BIF show higher rates of all mental disorders, especially depressive disorders, than their peers of average intelligence.

4.5 Social and Legal Aspects of BIF

Most individuals with BIF lead fulfilling lives. However, many face a number of difficulties in lack of prospects or close relationships and may feel that they have not reached their potential. Greenspan [4] argues that BIF is seen "as the poverty disorder" given that many of the individuals labelled as having BIF may also belong to lower socioeconomic and minority ethnic groups which are already vulnerable and discriminated against.

As many individuals will not be detected as suffering from BIF even during their school years, they may end up leaving the education system without skills that will lead to unemployment and possibly being unable to live independently. Many will have supportive families and may be employed in menial jobs without reasonable adjustments in the workplace and may not even know of their rights given that there is no specific statement to mandate input by social or healthcare professionals. This is a significant gap that does not afford people with BIF the same rights as those with disabilities and therefore, may be unable to access services.

Offenders with cognitive limitations should be supported by "appropriate adults". An appropriate adult in English law is a parent, guardian or social worker; or if no person matching this is available, any responsible person over 18. The term was introduced as part of the policing reforms in the Police and Criminal Evidence Act 1984 and applies in England and Wales [60].

People with cognitive limitations are often impulsive and lack social judgement which may also contribute to their criminal behaviour. Rather worryingly, in the USA, given the outlawed application of the death penalty to individuals with intellectual disability, inmates who have committed capital offences may be diagnosed as having BIF so the death penalty could be imposed upon them.

Table 4.2 Psychiatric morbidity by IQ range in a sample of community living adults in England

Predicted verbal IQ [a]						
Mental health conditions [b]	**70**	**71–79**	**80–89**	**90–109**	**110+**	**All**
Men	%	%	%	%	%	%
Any common mental disorder (CMD)	23.5	17.4	16.9	12.7	10.5	13.2
PTSD screen positive	4.9	7.2	5.3	3.4	2.7	3.7
Probable psychotic disorder	4.5	2.4	1.3	0.8	0.5	1.0
Autism	–	5.2	0.7	0.6	1.4	1.1
Personality disorder (SAPAS)	16.0	26.5	11.8	12.2	11.2	13.2
ADHD screen positive	10.9	17.8	14.3	10.1	7.7	10.0
Bipolar disorder screen	4.3	4.9	1.1	2.1	1.8	2.1
Alcohol: AUDIT score 16+	7.1	7.5	5.5	3.3	5.0	4.4
Alcohol AUDIT score 8+	17.8	21.4	26.9	29.2	29.8	26.3
Drug dependence signs	3.0	9.4	7.0	4.3	2.2	4.3
Suicide attempt (lifetime)	10.6	6.9	8.0	5.2	4.2	5.4
Women						
Any CMD	27.9	31.4	26.2	21.1	16.2	20.7
PTSD screen positive	12.4	15.2	8.8	5.0	2.4	5.1
Probable psychotic disorder	2.1	4.0	1.3	1.1	0.5	1.1
Autism	[–]	[–]	[–]	[0.1]	[0.6]	[0.2]
Personality disorder (SAPAS)	27.9	22.0	18.6	15.6	8.6	14.0
ADHD screen positive	20.2	14.6	7.6	10.4	7.5	9.5
Bipolar disorder screen	4.7	3.3	1.7	2.2	1.4	1.8
Alcohol AUDIT score 16+	5.0	1.1	2.2	2.5	1.3	1.8
Alcohol: AUDIT score 8+	15.2	15.6	16.4	14.8	13.1	13.4
Drug dependence signs	4.3	1.8	5.6	1.8	1.0	1.9
Suicide attempt (lifetime)	8.4	15.3	12.5	8.3	5.9	8.0

Reproduced from the report, 2016 [56]
[a]Based on the National Adult Reading Test
[b]Compared with peers without cognitive impairment

4.6 Organisational Issues and Service Delivery

Research has shown that people with BIF have a range of difficulties in adaptive functioning and undoubtedly suffer from mental ill-health including a number of mental disorders.

Findings from epidemiological and clinical studies indicate that they receive more medication, have less access to psychological therapies and self-report poorer health [12]. These issues seem to stem from inadequacy of mental health services, which lack the expertise to handle these patients, fail to meet their mental health needs and consequent development of more complex psycho-physical health problems [46].

Study of BIF can support the adaptation or development of treatments to address some of those conditions, for example,

trained staff in mental health services or primary care will ensure that at least BIF status is ascertained and appropriate pathways for assessment, treatment and management are formulated. Public Health initiatives can be inclusive of this population group and ensure that reasonable adjustments are adopted by generic services to improve healthcare and help-seeking behaviour. Researchers in the Netherlands have focused on interventions for substance misuse in this population; Van Duijvenbode and collaborators [61] investigated the standardisation of pictorial materials to address cognitive biases in adults with BIF and alcohol misuse. Van Duijvenbode and colleagues [62] have also examined tests that can be used in clinical practice to aid the detection of cognitive biases in young people and adults with BIF who misuse substances; they suggest that word association tasks are better at identifying high-risk conditions under which alcohol/other substances maybe used.

Education authorities also have a role to play in ensuring that children who are poor academic performers are referred for further assessment and are given the tools to manage their limitations with additional supports. Teachers can also work with families of BIF children to equip parents to support them effectively and seek the right support for the child.

A BIF consensus group from Catalonia, Spain, has posed a number of objectives in improving the lives of people with BIF [7]. This initiative was followed by the creation of an international group of experts (The Borderline Intellectual Functioning Consensus Group) including members of the World Psychiatric Association Section on Intellectual Disability and the Fogarty/NIMH NCD-LIFESPAN Programme, which produced a declaration, named "Girona declaration", with calls for action to promote policies and practices for improving health and quality of life of people with this condition [63].

Those include improvements in early detection based on awareness of warning signs and using appropriate psychometric instruments as well as measures of adaptive functioning in assessment. This process should be instigated as early as possible and no later than the 6 years of life to ensure that early intervention is implemented. Confirming that the individual has a diagnosis of BIF will enable him/her to seek help and be made aware of any rights under disability legislation. Good practice dictates that individualised intervention plans are developed early on with the input from the individual and his/her family carers. The plan should detail any health monitoring required and other provisions to be made regarding periods of transition, reaching adulthood and finding suitable employment.

Box 4.1 Types of Instruments Used in Assessments of Individuals Suspected as Having BIF

Screening assessment with KBIT-2 (Kaufman Brief Intelligence Test-second edition [65]; quick to carry out in routine care; children).

Full psychometric assessment (any established measure of cognitive functioning standardised for the population, e.g. WAIS - Wechsler Adult Intelligence Scale [66]; WISH - Wechsler Intelligence Scale for Children) [67].

Functional assessment and adaptive behaviour (any measure that can provide standardised assessment of abilities and needs, e.g. the Camberwell Assessment of Need for Adults with Developmental and Intellectual Disabilities; CANDID) [68].

Mental ill-health (any validated scales of psychopathology, e.g. Developmental Behaviour Checklist (DBC) [69]-children; Psychiatric Assessment Schedule for Adults with Developmental Disabilities (PAS-ADD)-checklist or mini versions) [70].

Adapted from Recommendations for caring for people with borderline intellectual functioning, Generalitat de Catalunya [64].

As has been mentioned already in the chapter, many of the individuals with BIF face service gaps as well as being turned down by services as they are often found to not be eligible for specialist ID community services but also find generic services difficult to navigate.

Patients with BIF are reported to be underserved by mental health programmes, which are unable to fulfil their mental health needs, leading to the emergence of more complex psycho-physical health issues.

4.7 Concluding Considerations

BIF as a diagnostic entity is highly contested, and current classification approaches are unsatisfactory as they tend to be too narrow in being based on IQ in the main without taking into consideration adaptive functioning. Individuals with BIF across the lifespan have a number of neurocognitive deficits [71] and are likely to also suffer from significant physical and mental health comorbidities for which they receive little targeted support. The mediating risks for further mental ill-health span the environmental and genetic spectrum, which could be the focus of novel research to better understand the biological substrate of intelligence and adaptive functioning but also how education and public (mental) health policies can support disadvantaged communities and children born within those households. BIF also raises important ethical dilemmas in the practice of – dare we say – medicine where forensic aspects are evident, and therefore it merits an overhaul of current conceptual frameworks given that individual lives are at stake.

Tip

The definition of BIF as well as its position within classification systems should be given further thought. A well-defined classification will help patients with BIF be identified more easily and gain access to mental health services, bridging the current gap between high prevalence and low recognition.

Future research and practice should focus more on the mediating risk of BIF for mental ill-health, especially in terms of environmental and genetic factors.

Special attention should also be given to the way through which education, social and mental health policies can adequately support persons with BIF.

Key Points

- There are significant issues in the definition of borderline intellectual functioning which may add to the difficulty of patients accessing support.
- There is little awareness of the complex needs of people with BIF across the lifespan.
- People with BIF have several mental health comorbidities.
- Individuals often fall through services due to artificial constructs about upper IQ limits denoting eligibility for services.

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