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Schizophrenia in Children Under 16 Years[1]

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Schizophrenic children admitted as inpatients to a child psychiatric unit over a 10-year period were reviewed in terms of demographic characteristics, clinical features, and social adaptation using the DSM-III as a frame of reference. Ten children who were first seen at least 1 year previously were followed up and reassessed as regards clinical status and level of adaptive functioning. As in other studies, outcome was related to age at onset, premorbid level of adaptation, rapidly of onset, clinical subtype, and presence of affective symptoms. However, deterioration following the active phase of the illness occurred in only four cases. The outcome in childhood schizophrenia may be more favorable than generally assumed, but there is a need for longer and larger studies of carefully diagnosed groups.

INTRODUCTION

The history of the study of the childhood psychoses has been reviewed by Eisenberg (1957), Rutter (1972), and Werry (1979). Early work on schizophrenia in children saw it as identical with the adult disorder, though presenting developmentally determined variations in symptomatology (Bradley & Bowen, 1941; Potter, 1933). In 1943 Kanner described early infantile autism as a disorder distinct from schizophrenia, and later he identified a third type of psychotic disorder, that due to disintegrative brain disease of which Hellers disease was one example (Kanner, 1943, 1957). Unfortunately, three forces operating in the 1950s and 1960s served to blur this tripartite classification of the childhood psychoses (see Werry, 1979).

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The first was the influential Bellevue group (Bender, 1947, 1956; Fish, 1957; Fish & Shapiro, 1965), who held that autism and schizophrenia were the same disease, differing only in age of onset. The second was the psychoanalytic view (Mahler, 1952; Szurek, 1956; Bettelheim, 1967) that psychosis was simply a matter of severity of regression, or failure in ego development. The third, seen in the British Working Party's Nine Points (Creak, Cameron, Cowie, Ini, Mackeith, Mitchell, O'Gorman, Orford, Rogers, Shapiro, Stone, Stroh, & Yudkin, 1961), was the phenotypic view that differing pathologies could result in similar clinical pictures, all called childhood schizophrenia. The primacy of this unitary thinking was reflected in the ICD8 (International Classification of Diseases, 1969), in which all childhood psychoses were subsumed under the single rubric of childhood schizophrenia.

However, Kanner's tripartite division was never completely lost; in fact, the Group for the Advancement of Psychiatry Classification of Childhood Disorders in 1966 retained and refined this largely on an age-of-onset basis (Group for the Advancement of Psychiatry, 1966). Studies by Rutter, Greenfeld, and Lockyer (1967) and Kolvin (1971a) provided support for Kanner's classification, and now both the ICD9 (ICD, 1979) and the American Psychiatric Association's *Diagnostic and Statistical Manual* (American Psychiatric Association, 1980) show a clear differentiation among schizophrenia, autism, the early dementias, and the rather ill-defined "other" psychoses.

The confusion over the classification of the childhood psychoses is nowhere more seriously evident than in outcome studies, where there are few data clearly relatable to the childhood schizophrenia group. A recent review of 21 such studies (Werry, 1979) found that two were themselves reviews, eight were devoted exclusively to autism, and in eight the diagnostic criteria were unclear, with no distinction made between groups. However, Annell (1963) did subdivide groups according to age of onset. Of the over-5-years group, 40% were schizophrenic, 34% "schizoid," and 26% healthy when followed up 5 to 15 years later. Subsequently, Eggers (1978) published a long-term follow-up of 57 clearly diagnosed schizophrenic children aged 7 to 13 years. At an average of 15 years after presentation, 20% were said to be in complete remission, while another 30% had made a very good or good-to-satisfying social adaptation. Eggers found that onset before the age of 10 was associated with a poor prognosis in all cases, while favorable prognostic features were a good premorbid personality, higher intelligence, and clear precipitating events.

There are other studies that have concentrated more particularly on adolescents (ages 12-19). They also emphasize poorer prognosis in younger age groups (less than 14 years), and in older adolescents the presence of

affective symptoms has been found to influence prognosis favorably (Carter, 1942; Masterson, 1956; Warren, 1965; King & Pitman, 1971).

The effect of antipsychotic medication on outcome has received little attention. Fish, Shapiro, and Campbell (1966) suggest that different forms of childhood psychosis may respond differently to drugs, and Winsberg and Yepes (1978) hold that when used in children, antipsychotics are useful for behavioral management but are not truly antipsychotic in the sense of controlling the disease. Eggers (1978) made no reference to the impact of medication, and May and Goldberg (1978), in their extensive review of factors influencing the effect of pharmacotherapy in schizophrenia, did not mention age. Thus, the effect of antipsychotic drugs on the childhood psychoses has not been clearly defined.

Because of the dearth of studies of children with schizophrenia, especially in English-language countries, it was decided to review and follow up all the cases seen in a child psychiatric inpatient unit over a 10-year period.

METHOD

Case Finding

Cases were identified by examining the records of children admitted to the child psychiatric inpatient unit at Auckland Hospital over the years 1971-1981 and selecting those given a diagnosis of schizophrenia. This diagnosis had been made, using Bleulerian/Schneiderian criteria, by consensus between the unit's two staff psychiatrists, both of whom had been with the unit since its inception. Information from the records and obtained by discussion with the two psychiatrists was then used to reclassify the diagnosis on presentation according to DSM-III, i.e., as schizophrenia (a greater than 6-months history) or schizophreniform (less than 6-month history).

Follow-Up Procedure

Follow-up was by means of an interview of the patient and at least one parent. This was performed by a senior psychiatric resident (R.R.K.) either at the child psychiatric unit or in the patient's home. The interview was unstructured but followed a similar format for each case, examining the child's mental health and current level of adaptive functioning, using DSM-III-derived criteria (see below).

Independent Variables

The review was based largely on clinical impressions recorded in case notes; therefore, the DSM-III, which has clinically oriented operational definitions, was used to define areas for assessment. Factors were examined that might, despite small numbers, help both to define the characteristics of the disorder in children and to give some indications of prognosis.

Family Background. Three factors relating to the child's family of origin were examined. Socioeconomic class (estimated using the occupation of the head of the household; Elley & Erving, 1972), family intactness (i.e., whether the child's parents were together or separated), and history in first-degree relatives of severe psychiatric disorder, requiring hospitalization.

Level of Intelligence. Psychometric assessment of intelligence had been performed on only three patients. School performance was therefore used as an estimate of intelligence level. Reports from the child's school had been routinely requested at the time of admission. These were used to rate the child, on scales derived from DSM-III (see Table IB), as above average, average, or below average. At follow-up a further estimation, again based on school or occupational performance, was made.

Clinical Features of Initial Presentation. Presenting episodes were examined as to the presence of prodromal symptoms (DSM-III P189), outpost syndromes (Eggers, 1978), clinical subtype (i.e., disorganized, catatonic, paranoid, or undifferentiated, DSM-III P190), duration (estimated using the time absent from school or its equivalent), and speed of onset. Speed of onset was classified, according to how long prodromal and/or active symptoms of the illness had been present, as acute (less than 2 weeks), subacute (greater than 2 weeks but less than 6 months), or insidious (greater than 6 months).

Psychosocial Stressors. Psychosocial stressors for the year prior to presentation were rated using the examples set forth in the DSM-III (p. 27).

Highest Level of Adaptive Functioning for Year Prior to Presentation. Three scales relating to peer relationships, school or vocational performance, and the use of leisure time were devised using the examples in DSM-III (p. 29). These are presented in Table I. The scales were applied to information available in the case notes, which included medical, parental, social work, and school reports. Individuals were rated separately in each area, then the results combined to give an overall level, the most important determination of this level being the quality of peer relationships (DSM-III, p. 28).

Medication. Two measures of the medication prescribed were used—the maximum daily quantity given during admission, and the amount prescribed on discharge. To enable comparability of dosage between different drugs, amounts were converted into milligram equivalents of

Table I. Scales Used to Estimate Level of Adaptive Functioning

A. Peer relationship	
Level 1 : Superior	– Extremely popular among peers
Level 2 : Very good	– Child has a large circle of friends with one or more close friends
Level 3 : Good	– Child has a small number of friends but these remain relatively stable over time
Level 4 : Fair	– Child befriends only one similarly disabled child but the friendship is sustained
Level 5 : Poor	– Child is constantly changing his group of friends
Level 6 : Very poor	– Child seems to have no real friends
Level 7 : Grossly impaired	– There is an absence of language development or the most primitive social skills
B. School/occupational performance[a]	
Level 1 : Superior	– Good school or work recommendations, good behavior, and better-than-average performance.
Level 2 : Very good	– *A*s and *B*s on school reports; in the superior child this is achieved with ease and comfort; *very good* implies some distress in "keeping up"
Level 3 : Good	– Absence of complaints and satisfactory school or work performance (C average on school report)
Level 4 : Fair	– Unprotected situation/unsatisfactory performance; absence of complaints but poor school or work performance when compared with others of a similar age (*D*s and *E*s on school reports)
Level 5 : Poor	– Unprotected situation/unsatisfactory behavior; child is attending school or work but behavior, and usually performance, is a cause of constant complaint from employer or teacher; in a vocational situation this may be manifested by constant changes in employment
Level 6: Very poor	– Protected situation; child is attending school or work but in a protected situation, e.g., special class or sheltered workshop situation
Level 7 : Grossly impaired	– No attendance
C. Leisure activities	
Level 1 : Superior	– Well-developed interests and activities in which participates more than once a week and excels
Level 2 : Very good	– As for (1) but does not excel
Level 3 : Good	– Definite interest or activities; devotes regular time but less than once per week
Level 4 : Fair	– Some specific interests but activity is irregular
Level 5 : Poor	– Some superficial interest, favorite TV program or magazine, follows a team or comic, etc.
Level 6 : Very poor	– Absence of any specific interest or activities, e.g., nondiscriminating TV watching
Level 7 : Grossly impaired	– Gross impairment in virtually all levels of functioning

[a] Level of intelligence was estimated on school performance as follows: Level 1 and 2 = above-average intelligence, Level 3 = average, Level 4 to 7 = below-average.

chlorpromazine, using the dose relationships suggested by Hollister (1978); i.e., 100 mg chlorpromazine is equivalent to 5 mg trifluoperazine or 2.3 mg fluphenazine. It had been intended to convert this to mg/kg units. However, the child's weight was not regularly recorded.

The nature of any recorded side effects to the prescribed medication was noted.

Dependent Variables

Mental Health Since Discharge. Three main areas were looked at to determine the child's mental health since the initial presentation: (1) the presence or absence of acute or residual psychotic symptoms, (2) the level of psychiatric contact and amount of medication being taken, and (3) the history, if any, of rehospitalization for acute exacerbation of the psychosis. The child's disorder was then classified as subchronic—duration more than 6 months but less than 2 years; chronic—duration more than 2 years; or in remission—no current active or residual signs of the illness irrespective of amount of medication or psychiatric contact (DSM-III, p. 193).

Current Level of Adaptive Functioning. The current level of adaptive functioning was rated on the scales used to assess premorbid adaptive function, so that some comparison could be made. School reports, where available, were examined but no separate report from school or place of work was specifically requested.

RESULTS

Background Data

Eight males and seven females were identified, together representing 1.5% of all new admissions over the 10-year period. The ages of the children are set out in Table II.

Five of the 15 children were first admitted within 12 months of the study and were therefore not regarded suitable for follow-up. One of the remaining 10 had recently emigrated. However, she had been under continuing day-patient care and her clinical condition had remained unchanged for some years. An estimate by a staff member who knew her well was therefore adjudged a suitable report on her current level of functioning.

The follow-up interval ranged from 1 to 9 years, with a mean of 4.6 and a median of 5.

Table II. Sex, Age, and Follow-Up Period

Total admissions 1971-1981	approx. 1,000
Number of schizophrenics	15
Sex ration (M : F)	8 : 7
Age (years) 10	3
10-12	3
13-15	9
Median	13
Range	6-15
Number suitable for follow-up	10
Interval	
Median	5 years
Range	1-9

Diagnosis

Eleven children could be unequivocally diagnosed as having schizophrenia, while four had schizophreniform psychoses. Of this latter group three were recent presentations (within 1 year) and must therefore be regarded as potentially schizophrenic. The other child diagnosed as schizophreniform was the youngest in the series. He was initially thought to have Sydenham's chorea but then developed florid psychotic symptoms. However, he had a short course and relatively good outcome, which, together with his presentation, suggests a contribution from organic factors. Therefore, some doubt should remain about his diagnosis.

Two of the children were mildly mentally retarded but displayed unequivocal schizophrenic symptoms (see DSM-III, p. 188).

Independent Variables

Family Background. Ten children were from families at the lower end of the socioeconomic spectrum (levels 4 and 5), four were from middle levels (2 and 3), and only one had professional (level 1) parents. The numbers are too small for statistical analysis but the proportions are roughly those of the population of New Zealand as a whole.

Five children came from broken families. This was due to death of the mother in two cases and separation of the parents in three. At follow-up one further family was broken, this by separation.

There was a family history of psychiatric disorder in four cases, schizophrenia in one (a male parent) and affective disorder in three (all female parents). One parent with affective disorder had committed suicide some years prior to the child's presentation.

Intelligence Level. One presentation 8 children were rated average, 5 below average, and 2 above average in intelligence. Of the 10 children followed up, 3 of the 5 initially rated average showed a deterioration in their estimated level. Three who were below average, and the 1 above average, showed no change.

Clinical Features of First Presentation. Unequivocal prodromal symptoms were present in six cases, taking the form of impairment of functioning at school, social withdrawal, and magical thinking. The duration of the prodrome ranged between 8 weeks and 6 months or more. In addition, three children had outpost syndromes of a depressive nature, which antedated the onset of the active disorder by periods ranging from 1 month to 2 years.

The onset of the disorder was acute in five cases, subacute in six, and insidious in four.

The duration of the presenting episode ranged from 10 to 150 days, with a median of 60 days. These figures exclude one case who was so severely impaired as to be unable to return to school and two recent cases who were still hospitalized.

Six cases were classed as paranoid, five as disorganized (hebephrenic), and four as undifferentiated. Those classed as paranoid were generally older (over 11 years) and had systematized delusional systems, either grandiose or persecutory. Three of the disorganized types displayed inappropriate affect and thought disorder, while two were characterized by rather vague symptoms of withdrawal, flattening of affect, and slowing of thought processes. The undifferentiated group were younger (all three children under 10 years were of this type) and showed a mixture of symptoms. Two of these young children showed a disturbance of identity (see Eggers, 1978): One believed that he was a man and insisted he be called "mister"; the other thought he was a girl.

Only two children displayed affective features. They were both older (15 years) and were otherwise classified as paranoid. One had a depressed mood and delusions of poverty, the other delusions of personal inadequacy and guilt.

Psychosocial Stressors. Stressors were minimal or mild in 4 cases, moderate in 10 and severe in 1.

Moderate stressors included events such as change to a new school (4 cases), brief hospitalization (2), death of a close relative (2), and a disturbed parental relationship (2). The one stressor rated severe was the death of the child's mother 9 months before presentation.

Adaptive Functioning Prior to Presentation. Prior to the onset of their disorder six children had been functioning in the good to very good range, four were fair, and four poor to very poor. Of those in the poor to very

poor range, two were mildly mentally retarded (IQ 54-64), one had a deprived background and was described as intellectually and socially backward, and the other had prodromal symptoms that commenced more than 1 year prior to presentation, causing a deterioration in performance.

Medication. Antipsychotic medication was prescribed in all cases, thioridazine being the drug of choice in 12, fluphenazine decanoate in 2, and trifluoperazine in 1. In chlorpromazine equivalents, the maximum daily dosage ranged from 75 mg to 900 mg, with an average around 400 mg. On discharge average was approximately 200 mg (range 75-500 mg).

All the cases of piperazine phenothiazines had extrapyramidal reactions, most commonly an acute dystonic reaction.

Dependent Variables

Mental Health Since Discharge. In six children the course of the disorder was chronic. A follow-up one of these children had active and five had residual psychotic symptoms. Four of the six had required rehospitalization for acute exacerbations of their psychoses. All remained on antipsychotic medication and had regular outpatient psychiatric contact.

The other four cases were classified as "in remission." However, all but one (the youngest child in the series) were still receiving psychiatric treatment including antipsychotic medication.

Current Adaptive Function. A comparison of the premorbid and follow-up levels of adaptive functioning is presented in Table III. Six cases remained essentially unchanged, and of the four who deteriorated, the shift involved only on DSM-III level in three instances. One child went down two levels (fair to very poor).

A table summarizing the results for individual cases is available from the authors.

Factors Affecting Outcome

Age under 14 at presentation appeared related to outcome (Fisher exact test, $p = .03$), with six of the seven younger patients showing poor adaptive functioning (fair to very poor) at follow-up. In contrast, all three children aged 15 returned to their previous level of functioning, which was very good in two instances.

A family history of psychiatric disorder did not appear to influence prognosis and the family socioeconomic status and intactness seemed unrelated to outcome.

Table III. Comparison of Premorbid and Follow-Up Levels of Adaptive Functioning[a]

		Peer relationships		School performance		Leisure pursuits		DSM-III		
Sex	Age	Pre[b]	F/up[c]	Pre	F/up	Pre	F/up	Pre	F/up	Difference
M	6	3	3	4	4	3	2	3	3	0
M	9	4	6	3	6	4	5	4	6	2
M	12	4	5	4	6	4	5	4	5	1
F	13	5	5	5	5	5	5	5	5	0
F	13	3	4	3	4	2	3	3	4	1
M	13	6	6	6	6	5	5	6	6	0
F	13	3	4	3	5	4	3	3	4	1
M	15	2	2	2	2	2	3	2	2	0
M	15	3	3	3	3	3	2	3	3	0
F	15	2	2	3	3	3	3	2	2	0

[a] 2 = very good, 3 = good, 4 = fair, 5 = poor, 6 = very poor.
[b] Premorbid.
[c] Follow-up.

Of the clinical features, an insidious onset, disorganized subtype, and a poor level of premorbid adaptive functioning was associated with a poor outcome. A more favorable result was associated with affective symptoms and a paranoid subtype. The severity of the psychosocial stressors and the duration of the active phase of the disorder did not appear to be related to outcome.

Estimated level of intelligence was not significantly associated with outcome (Fisher exact test, $p = .15$).

DISCUSSION AND CONCLUSIONS

Because of the small numbers of the children involved, it is not possible to do other than identify trends suggested by the data. There were, however, some features of interest, especially in view of the paucity of information relating to schizophrenia under 16.

Incidence of Schizophrenia in Childhood

That only 15 cases of childhood schizophrenia were collected over a period of 10 years reflects the low incidence of the disorder. The expected incidence for the at-risk population served by the unit (approximately 130,000) is 2 or 3 new cases per year (New Zealand Health Statistics Report, 1971-1976). The smaller than expected sample size may be attributed largely to the availability of other psychiatric facilities in the same area (private psychiatrists, two psychiatric hospitals, and a general hospital psychiatric unit), which in the pre-1975 era would have taken most of the older children (over 13 years), who form the bulk of the sample. However, the group reported cannot be regarded as fully representative of the region studied.

Diagnosis

In this study the diagnosis was established retrospectively, and it is possible that subjects belonging to categories other than schizophrenia have been included. Two children presented with a mixture of schizophrenic and affective symptoms and had good outcomes. The exact diagnostic status of such mixed psychoses is somewhat contentious (Pope & Lipinski, 1978; Procci, 1976; DSM-III, p. 199), but as the clinical picture in these cases was dominated by mood-incongruent psychotic features they were retained in the sample (DSM-III, p. 214).

Organic factors seemed of importance in the presentation of the youngest child in the series and therefore his unexpectedly good outcome should be interpreted with caution.

Sex Ratio

The nearly equal sex ratio is as found in adult schizophrenia (DSM-III, p. 186). However, Eggers (1978) found a slight female preponderance in children. As far as children under 10 are concerned, this study, like others (Eggers, 1978; Kolvin, 1971), showed a preponderance of males.

Prognosis of Childhood Schizophrenia

The 40% of cases found to be in remission at follow-up is a somewhat better result than those of Eggers (1978), who found only 20% in complete remission, though a total of 50% were rated by him as improved. The better results in this small sample possibly reflect the briefer follow-up interval but may also reflect the small sample size, a more liberal definition of remission (the DSM-III concept including cases on medication), and the somewhat older median age groups where outcome is said to be more favorable (Annell, 1963; Eggers, 1978).

On the basis of this sample it would seem, as found by Eggers, that the prognosis of childhood schizophrenia may be better than is usually assumed. However, it should be noted that removal of the three cases where the diagnosis could be questioned (the youngest and the two with affective delusions) gives a less optimistic picture, with only one child, the one with the shortest follow-up interval, having a good outcome.

The interpretation and comparison of outcome studies is often difficult for two other reasons. First, different outcome measures are used in each study. The DSM-III was used here because of the clinical nature of much of the information reviewed, but the need for standardized measures is evident (Werry, 1979). Second, there seem to be few studies that compare premorbid with follow-up levels of functioning. Unless this comparison is performed, a return to what was a poor premorbid level may be considered a deterioration attributable to the illness itself (Strauss, Klorman, Kokes, & Sacksteder, 1977). Of the 10 cases followed up in this study, 6 were estimated to have returned to their premorbid level.

Variables Affecting Outcome

The association found between poor outcome and early age of onset is consistent with other studies (Annell, 1963; Eggers, 1978; Warren, 1965).

Numbers were too small to reveal any real trends in terms of family history, family socioeconomic status, or family intactness.

An insidious onset, disorganized or undifferentiated subtype, and a poor level of premorbid adaptive function, all of which are established clinical prognostic indicators for poor outcome, seemed to have predictive value in this series. The association of a good outcome with paranoid subtype and affective symptoms has been reported in studies of adults (Stephens, 1978; Strauss & Carpenter, 1974; Strauss et al., 1977) but Eggers found no correlation between these psychopathological symptoms and outcome. A confounding variable with respect to type may be age, with younger children presenting as disorganized or undifferentiated and older ones, with more advanced cognitive development and ability to systematize their delusions, being classified as paranoid.

It is impossible to evaluate the effect of estimated intelligence in this small series.

The Effect of Medication

As all patients were medicated it was difficult to isolate the effect on outcome. Acute positive (delusions, hallucinations, thought disorder) symptoms of the disorder fared better, negative symptoms (withdrawal, blunting of affect) less so, but this cannot necessarily be attributed to medication. However, a more marked effect on positive symptoms has been reported in adult schizophrenics (Johnstone, Crow, Frith, Carnery, & Price, 1978), and it may be that the effect of the drugs in well-defined schizophrenic children is the same as in adults.

One other feature in this study was that all children treated with piperazine side chain antipsychotics had extrapyramidal side effects. This usually took the form of a severe dystonic reaction and would argue for the short-term prophylactic use of antiparkinsonian agents when commencing medication or raising the dosage. Alternatively, thioridazine, which had no such complications, could be used.

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