Non-psychotic psychiatric disorder and subsequent risk of schizophrenia

Cohort study

GLYN LEWIS, ANTHONY S. DAVID, ASLÖG MALMBERG and PETER ALLEBECK

Background Those with schizophrenia often give a history of premorbid non-psychotic psychiatric disorder.

Aims To investigate the association between non-psychotic psychiatric disorders and the later development of schizophrenia.

Method Men aged 18 or 19 years, conscripted to the Swedish army in 1970 (n=50 054) were linked to the Swedish National Psychiatric Case Register.

Results There was an increased risk of schizophrenia in those with ICD–8 diagnoses of neurosis (OR=4.6, 95% CI 3.2–6.9), personality disorder (OR=8.2, 95% CI 5.4–12.3), alcohol abuse (OR=5.5, 95% CI 1.7–17.5) or substance abuse (OR=14.0, 95% CI 7.8–25.0) at age 18. Of those who developed schizophrenia, 38% (95% CI 32–45) received a diagnosis of non-psychotic psychiatric disorder at age 18. Only those with personality disorder had a significantly increased risk of schizophrenia (OR=2.4, 95% CI 1.1–5.2) with onset after age 23.

Conclusions Personality factors could represent an underlying vulnerability to schizophrenia. Other diagnoses occurring before schizophrenia may reflect a prodromal phase of the illness.

Declaration of interest Supported by the Swedish Medical Research Council and the Söderberg-Königska Foundation. No conflict of interest.

It has long been recognised by clinicians that non-psychotic disorders can often occur before the onset of schizophrenia. It is usually presumed that this is a manifestation of a prodromal phase of the illness. However, it is not clear what proportion of people with schizophrenia have other psychiatric conditions before onset. It is also possible that those with non-psychotic psychiatric disorder have an increased risk of developing schizophrenia and that non-psychotic psychiatric disorders could have a causal relationship with the onset of schizophrenia.

Background

Asking people with schizophrenia and their relatives retrospectively about psychopathology before the onset of the psychosis is likely to be prone to biased reporting. If these questions are to be addressed successfully it is important to establish the presence or absence of psychopathology before the onset of the psychotic illness. One methodology for approaching this question has been by using child guidance records. Robins' classic cohort study (Robins, 1966) found that somatic symptoms, depression and antisocial behaviour were all associated with the later development of schizophrenia. However, this design did not give any idea of the proportion of people with schizophrenia who had problems before onset. The large proportion of conduct problems in the sample was probably a result of patterns of referral to the clinic. Gardner (1967) reported an increased likelihood of anxiety, phobias and obsessive–compulsive disorder among children attending the Judge Baker Clinic. Both of these older US studies were probably using diagnoses of schizophrenia that do not correspond to our current use of the term (Cooper *et al*, 1972). Ambelas (1992) in a UK study estimated that child guidance clinic attenders were twice as likely to develop schizophrenia and also found associations between 'mixed emotional and conduct' disorders and schizophrenia. The study was, however, rather small and the design of the case–control study took no account of the potential for selection bias.

There have also been some cohort studies based upon general population samples. Hanson *et al* (1990) briefly report a cohort study in which Minnesota Multidimensional Personality Inventory sections covering depression, anxiety, internalised anger, social alienation and withdrawal were associated with admission for schizophrenia in the following 5 years. There were, however, few methodological details in their account. More recently, Tien & Eaton (1992) have carried out a cohort study utilising data from the Epidemiologic Catchment Area (ECA) programme. They found that phobias and panic were associated with schizophrenia 1 year later. This study is limited by the short follow-up period and concerns about the validity of diagnoses of schizophrenia in the ECA. Two UK cohort studies have also investigated childhood psychiatric disorders in relation to the later development of schizophrenia. Jones *et al* (1994) found that anxiety in childhood was associated with schizophrenia. Done *et al* (1994) also found that various measures of childhood emotional well-being were associated with later schizophrenia, although they reported differences in the patterns between men and women.

Personality abnormalities and disorders are also common before the onset of schizophrenia (Berenbaum & Fujita, 1994; Malmberg *et al*, 1998). There is evidence that personality dimensions, such as those suggested by Malmberg *et al* (1998), and clinical diagnosis of personality disorder are both increased before schizophrenia (Fenton & McGlashan, 1989). Some studies have supported the idea that schizotypal features such as magical thinking are associated with increased risk (Fenton & McGlashan, 1989; Chapman *et al*, 1994).

These studies all point towards an increased prevalence of non-psychotic symptomatology in those who later develop schizophrenia. However, a number of questions remain. The current study was able to use data from the Swedish Conscript Survey linked to the Swedish National Register of Psychiatric Admissions. Information about psychiatric state was obtained at age 18 years before the onset of psychosis, both in the form of self-reported symptoms and also by screening for psychiatric disorder followed by a

https://doi.org/10.1192/bjp.177.5.416 Published online by Cambridge University Press

psychiatric examination. Although the psychiatric examination was unstandardised, it was obtained before the onset of schizophrenia and therefore was unbiased by the presence of schizophrenia. We were also able to examine whether the association between psychiatric disorder and schizophrenia was still present when schizophrenia had a relatively late onset in relation to the original survey. This would test the idea that non-psychotic symptomatology was a manifestation of the prodrome of schizophrenia.

METHOD

Subjects

A total of 50 087 18-year-old males conscripted into the Swedish army during 1969–1970 formed the cohort for the current study. Other studies (David *et al*, 1997; Malmberg *et al*, 1998) have used the same population. Only 2–3% of the male population were excused conscription on account of severe mental or physical handicap. The conscription procedure took 36 h for each subject, and consisted of a series of tests of physical and mental capacity, health status, personality and intellectual capacity. A full medical examination was carried out, and if any disease or disability was reported or discovered, a more thorough examination was performed. Each subject answered self-administered questionnaires on family, social background and behaviour during adolescence. Permission to use the database for research was granted by the Karolinska Ethics Committee and the Swedish Data Inspection Board.

Assessment of psychiatric disorder

All were given a structured interview by a psychologist and those reporting any psychiatric symptoms or current problem under treatment were interviewed by a psychiatrist and given a diagnosis according to ICD–8 (World Health Organization, 1974) where applicable. The whole procedure was aimed at detecting disease as well as identifying persons suitable for higher military training, hence the threshold for referral to the psychiatrist was low. The following diagnostic categories were used in the analysis: neurosis (ICD code 300.00–300.99), personality disorder (code 301.00–301.99), alcohol abuse (code 303.00–303.99) and substance abuse (code 304.00–304.99).

Thirty-three cases of psychosis were diagnosed at the time of conscription and these were excluded, leaving 50 054 individuals in the cohort. The self-report questionnaires also included eight questions concerned with the current emotional well-being of the respondent. The questions were all scored on a four point Likert scale (Yes, frequently; Yes, sometimes; Yes, now and then; No, never) and the results for each question were dichotomised in order to simplify the presentation. The results were checked to ensure that dividing the data in this way did not alter our interpretation of them. The questions could be translated as follows: "Do you ever get headaches?", "Do you have difficulty sleeping?", "Do you frequently get stomach ache?", "Do you get nervous?", "Do you feel down?", "Do you get angry easily?", "Do you get troubled and restless?" and "Do you get upset when things go wrong?". These items were thought to reflect neurotic symptomatology.

Follow-up

The Swedish National Register of Psychiatric Care recorded about 70% of all admissions in 1970, rising to 83% in 1973. From 1974 to the end of 1983 the coverage was between 97 and 98%. For the linkage reported here the register was closed in 1983, although it has subsequently been re-opened. The register also provided a date for the first admission to a psychiatric hospital after 1973.

Psychiatric diagnosis

The patients were given clinical diagnoses according to the Nordic version of ICD–8. The two end-points analysed were admission for schizophrenia (codes 295.00–295.99) and other psychoses (codes 296.00–299.99), as well as year of entry onto the case register (year of first admission). Diagnoses have been found to have approximately 85% specificity and sensitivity when measured against DSM–III criteria (American Psychiatric Association, 1980). In addition, a random selection of cases from the National Register was recently retrieved and the diagnoses checked. An ongoing validity study has confirmed these results on 23 cases of schizophrenia with respect to DSM–III–R schizophrenia criteria (American Psychiatric Association, 1987). In addition, of twenty individuals with a non-schizophrenic psychosis, only two met the criteria for schizophrenia (10% false positive); the rest were correct.

Analysis

Logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals for schizophrenia and other psychoses before and after adjustment for other variables. The odds ratios can be interpreted as rate ratios because schizophrenia is a rare outcome. Previous research on this cohort (David *et al*, 1997; Malmberg *et al*, 1998) found that the IQ score and personality variables concerned with friendship and interpersonal relations were strongly associated with schizophrenia. The following four personality variables were therefore used in adjusting the results: having a steady girlfriend, fewer than three close friends, preferring to socialise in small groups, and feeling more sensitive than other people. There were relatively few missing data. Only 3% of the sample had missing data for one or more of the self-reported symptoms. There were 195 cases with schizophrenia and 193 cases with other psychoses.

RESULTS

The association between the eight self-reported symptoms and the onset of schizophrenia was examined. In the univariate analysis in which the variables were examined alone (Table 1, column 3), six of the variables were significantly associated with schizophrenia. As these variables are all associated with each other, we performed an analysis that took account of this association in order to determine which of the variables were independently associated with schizophrenia (Table 1, column 4, adjusted for other symptoms). Difficulty sleeping, feeling depressed ('down') and being upset when things go wrong all had independent associations. We then adjusted the results for a number of other confounders, including the diagnosis given at conscription by the psychiatrist (Table 1, column 5). After this procedure, difficulty sleeping and, possibly, feeling down were both associated with schizophrenia, whereas those reporting stomach ache appeared to have a reduced risk of developing schizophrenia.

The results of performing a similar analysis with other psychoses as the outcome are given in Table 2. The pattern of results was similar, although the findings showed a less strong association and were less likely to reach conventional levels of statistical significance.

https://doi.org/10.1192/bjp.177.5.416 Published online by Cambridge University Press

Table 1 Odds ratios (95% CI) for the association between somatic and psychological symptoms and schizophrenia

Symptom	Number (%) of subjects	Odds ratios (95% CI) unadjusted[1]	Odds ratios (95% CI) adjusted for symptoms[2]	Odds ratios (95% CI) adjusted for confounders[3]
Headache	14 719 (29.7)	1.63 (1.22–2.18)	1.16 (0.84–1.61)	1.01 (0.70–1.46)
Difficulty sleeping	13 393 (27.1)	2.43 (1.83–3.24)	1.73 (1.24–2.41)	1.55 (1.07–2.24)
Stomach ache	9786 (19.8)	1.29 (0.92–1.79)	0.73 (0.50–1.06)	0.55 (0.35–0.85)
Feeling nervous	16 265 (32.9)	2.18 (1.64–2.89)	1.28 (0.89–1.84)	0.84 (0.55–1.27)
Feeling 'down' (depressed)	10 565 (21.4)	2.69 (2.01–3.59)	1.86 (1.30–2.66)	1.53 (0.99–2.35)
Angry easily	19 012 (38.5)	0.95 (0.70–1.27)	0.66 (0.48–0.91)	0.89 (0.63–1.20)
Troubled and restless	9631 (19.5)	1.90 (1.39–2.58)	1.11 (0.77–1.60)	0.89 (0.63–1.24)
Upset when things go wrong	20 169 (40.8)	2.33 (1.74–3.11)	1.68 (1.22–2.32)	0.86 (0.61–1.22)

1. Baseline, those without headache, etc.
2. Adjusted for other symptoms in table.
3. Adjusted for other symptoms and diagnosis at conscription: personality variables, IQ, drug taking, family economy, place of upbringing.

Table 2 Odds ratios (95% CI) for the association between somatic and psychological symptoms and other psychoses

Symptom	Number (%) of subjects	Odds ratios (95% CI) unadjusted[1]	Odds ratios (95% CI) adjusted for symptoms[2]	Odds ratios (95% CI) adjusted for confounders[3]
Headache	14 719 (29.7)	1.35 (1.00–1.82)	1.08 (0.77–1.50)	0.97 (0.68–1.39)
Difficulty sleeping	13 393 (27.1)	1.69 (1.26–2.27)	1.38 (0.98–1.94)	1.21 (0.84–1.75)
Stomach ache	9786 (19.8)	1.25 (0.89–1.75)	0.91 (0.62–1.32)	0.82 (0.55–1.24)
Feeling nervous	16 265 (32.9)	1.74 (1.30–2.32)	1.35 (0.94–1.95)	1.20 (0.80–1.80)
Feeling 'down'	10 565 (21.4)	2.01 (1.49–2.73)	1.64 (1.13–2.39)	1.34 (0.88–2.05)
Angry easily	19 012 (38.5)	1.02 (0.76–1.37)	0.88 (0.65–1.21)	0.89 (0.63–1.24)
Troubled and restless	9631 (19.5)	1.56 (1.13–2.16)	1.08 (0.73–1.59)	0.89 (0.58–1.38)
Upset when things go wrong	20 169 (40.8)	1.25 (0.94–1.67)	0.97 (0.71–1.34)	0.86 (0.61–1.22)

1. Baseline, those without headache, etc.
2. Adjusted for other symptoms in table.
3. Adjusted for other symptoms and diagnosis at conscription: personality variables, IQ, drug taking, family economy, place of upbringing.

Table 3 Odds ratios (95% CI) for schizophrenia by diagnosis at conscription

Diagnosis at conscription	Number of non-cases	Number of cases	Odds ratios (95% CI) unadjusted	Odds ratios (95% CI) adjusted for symptoms[1]	Odds ratios (95% CI) adjusted for confounders[2]
No diagnosis	45 320	120	1.00[3]	1.00[3]	1.00[3]
Neurosis	2502	31	4.64 (3.18–6.9)	3.44 (2.14–5.5)	1.87 (1.08–3.22)
Personality disorder	1291	28	8.15 (5.38–12.3)	6.49 (4.03–10.4)	4.17 (2.47–7.03)
Alcohol misuse	206	3	5.52 (1.74–17.5)	5.06 (1.56–16.4)	4.33 (1.29–14.5)
Substance misuse	347	13	14.0 (7.82–25.0)	11.1 (5.81–21.1)	4.09 (1.75–9.56)

1. Adjusted for symptoms in Tables 1 and 2.
2. Adjusted for symptoms in Tables 1 and 2, personality variables, IQ, drug taking, family economy and place of upbringing.
3. Baseline.

A scale was also constructed by adding together scores on all the eight self-reported symptoms. There was a linear relationship between the scores on this scale and the later development of schizophrenia, with OR=1.24 (95% CI 1.16–1.32) for each unit increase in the scale. This relationship was considerably weakened after adjustment for the other psychiatric diagnoses (OR=1.07, 95% CI 0.96–1.15) and further weakened after adjustment for the other potential confounders (OR=0.98, 95% CI 0.89–1.06).

The diagnoses given by the psychiatrist at conscription were strongly associated with schizophrenia (Table 3). These associations persisted after adjusting for both the self-reported symptoms and the other confounding variables. The pattern of results for other psychoses (Table 4) was similar although less strong, and in the case of personality disorder was no longer statistically significant after adjustment for the other confounding variables.

Of the 195 individuals with schizophrenia in the sample, 38.5% (95% CI 3.17–45.3) had received a non-psychotic psychiatric diagnosis at age 18 years and 30.2% (95% CI 23.6–36.5) had a diagnosis of neurosis or personality disorder (Table 3). Therefore, a substantial proportion of people with schizophrenia had significant psychiatric symptomatology well before its onset. However, psychiatric disorders would not have been useful in attempting to predict schizophrenia. Of the 1319 subjects with personality disorder,

https://doi.org/10.1192/bjp.177.5.416 Published online by Cambridge University Press

Table 4 Odds ratios (95% CI) for other psychoses by diagnosis at conscription

Diagnosis at conscription	Number of non-cases	Number of cases	Odds ratios (95% CI) unadjusted	Odds ratios (95% CI) adjusted for symptoms[1]	Odds ratios (95% CI) adjusted for confounders[2]
No diagnosis	45 320	146	1.00[3]	1.00[3]	1.00[3]
Neurosis	2502	31	3.81 (2.58–5.62)	2.52 (1.56–4.08)	2.18 (1.31–3.63)
Personality disorder	1291	11	2.60 (1.40–4.80)	2.06 (1.56–408)	1.52 (0.72–3.23)
Alcohol misuse	206	0	–	–	–
Substance misuse	347	5	4.32 (1.76–10.6)	3.66 (1.45–9.24)	3.04 (1.10–8.39)

1. Adjusted for symptoms in Tables 1 and 2.
2. Adjusted for symptoms in Tables 1 and 2, personality variables, IQ, drug taking, family economy and place of upbringing.
3. Baseline.

Table 5 Odds ratios[1] (95% CI) for schizophrenia with early onset and late onset (first admission at least 5 years after the diagnosis at conscription)

Diagnosis at conscription	Early onset (within 5 years of conscription)	Late onset (5 years or more from conscription)
No diagnosis	1.00[2]	1.00[2]
Neurosis	3.81 (1.79–8.09)	0.98 (0.43–2.20)
Personality disorder	7.75 (3.76–16.0)	2.43 (1.13–5.22)
Alcohol misuse	4.05 (0.52–31.3)	4.39 (0.99–19.5)
Substance misuse	8.02 (2.83–22.7)	1.84 (0.39–8.68)

1. Adjusted for other symptoms: personality variables, IQ, drug taking, family economy, place of upbringing.
2. Baseline.

Table 6 Odds ratios[1] (95% CI) for other psychoses with early onset and late onset (first admission at least 5 years after the diagnosis at conscription)

Diagnosis at conscription	Early onset (within 5 years of conscription)	Late onset (5 years or more from conscription)
No diagnosis	1.00[2]	1.00[2]
Neurosis	3.70 (1.40–9.78)	1.82 (1.00–3.32)
Personality disorder	2.95 (0.81–10.7)	1.17 (0.46–2.99)
Substance misuse	5.16 (0.95–27.9)	2.45 (0.68–8.81)

1. Adjusted for other symptoms: personality variables, IQ, drug taking, family economy, place of upbringing.
2. Baseline.

only 28 developed schizophrenia in the following 13 years (2.1%, 95% CI 1.3–2.9).

The cases of schizophrenia were divided into those who were admitted to hospital within 5 years of the conscript survey (90 cases) and those who were admitted after that date (105 cases). Those given psychiatric diagnoses had an increased risk of schizophrenia within the first 5 years, but only those given a personality disorder diagnosis had an increased risk of schizophrenia after 5 years (Table 5). A somewhat different pattern was found for those admitted with other psychoses. Those given a diagnosis of neurosis were at increased risk of developing another psychosis after 5 years, although this association was less strong after adjustment (Table 6).

DISCUSSION

Psychiatric diagnoses for non-psychotic disorders made at age 18 years were strongly related to the later development of schizophrenia up to the age of 31 years. The association between psychiatric diagnosis at age 18 years and other psychoses was less strong. The diagnoses given by the psychiatrist at conscription appeared to be more strongly associated with later psychosis than the self-reported symptoms. Neuroses and substance misuse disorders were associated with schizophrenia only within the first 5 years of the survey. In contrast, personality disorders were associated with the later development of schizophrenia after an interval of more than 5 years. There was no independent association between personality disorder and other psychoses, and this suggests that the relationship between personality disorder and schizophrenia may be a specific one.

The most obvious interpretation of our findings is that the association between neurosis, substance misuse and schizophrenia is a reflection of a prodromal phase of schizophrenia. In contrast, the relationship between personality disorder at age 18 years and schizophrenia before the age of 31 years seems to be of more importance. This association was apparent even after taking account of the association with the personality variables concerned with friendship and interpersonal relationships that are connected with the development of schizophrenia in this cohort (Malmberg *et al*, 1998). One can therefore conclude that other aspects of personality were identified by the psychiatrists involved in this study and were independently associated with schizophrenia.

The results indicate that nearly 40% of men who develop schizophrenia would have received a psychiatric diagnosis for a non-psychotic disorder at the age of 18 years. This affirms the clinical impression that a large proportion of those with schizophrenia show other symptomatology before the psychosis develops. However, it is also important to note that non-psychotic psychiatric disorder was not of value in attempting to predict schizophrenia. Only 2% of those with a personality disorder diagnosed at 18 years went on to develop schizophrenia.

The strength of the present study is in having diagnostic information on the cohort before the onset of schizophrenia, and therefore collected in a manner that could not be biased by the presence of schizophrenia. However, the diagnoses that were available were made clinically according to ICD–8 and the assessment and diagnostic decisions were not standardised. For this reason we chose to use broad

https://doi.org/10.1192/bjp.177.5.416 Published online by Cambridge University Press

diagnostic groupings. There will undoubtedly be some misclassification in these clinical diagnoses compared with those provided by more structured means. However, because of the lack of bias, we can presume that any misclassification that did occur was random in relation to the outcome of interest. Such random misclassification tends to reduce the strength of associations and could not therefore have led to the positive findings demonstrated here – indeed, it suggests that our results have underestimated the strength of the relationships.

One possible bias is that psychiatrists were more likely to diagnose schizophrenia if there was evidence of personality disorder earlier in life. However, Swedish psychiatrists appear to use the diagnosis of schizophrenia in a very narrow way and show good agreement with DSM–III criteria (Kristjannson *et al*, 1986).

The diagnosis of personality disorder is notoriously unreliable and the concept of personality disorder has also been criticised on a number of grounds (Lewis, 1974; Lewis & Appleby, 1988). Despite these criticisms, psychiatrists will tend to diagnose personality disorder when the subject has experienced long-lasting abnormalities of behaviour or mood. These results therefore strengthen the notion that features of personality, defined in general terms, are associated with an increased risk of schizophrenia. We have previously discussed the possibility that psychological attributes that underlie personality could be of aetiological importance in schizophrenia (Malmberg *et al*, 1998). These results do not help to identify what these might be but point to this area as one that requires further study.

CLINICAL IMPLICATIONS

- Thirty-eight per cent of men who developed schizophrenia before the age of 31 years had a non-psychotic disorder diagnosed at age 18 years when screened for entry into the Swedish army.
- Those who received a diagnosis of personality disorder at age 18 years had more than twice the risk of developing schizophrenia before the age of 31 years.
- Neurosis, alcohol or substance misuse at age 18 years is more likely to be a prodromal phase of schizophrenia.

LIMITATIONS

- Diagnoses at age 18 years were made on the basis of unstandardised assessments.
- Only men were included in the study.
- Only cases of schizophrenia presenting before the age of 31 years were included.

ACKNOWLEDGEMENTS

We acknowledge the support of the Swedish Medical Research Council and the Söderberg-Königska foundation. We thank Lena Brandt for help with the data management.

REFERENCES

Ambelas, A. (1992) Preschizophrenics: adding to the evidence, sharpening the focus. *British Journal of Psychiatry*, **160**, 401–403.

American Psychiatric Association (1980) *Diagnostic and Statistical Manual of Mental Disorders* (3rd edn) (DSM–III). Washington, DC: APA.

__ (1987) *Diagnostic and Statistical Manual of Mental Disorders* (3rd edition, revised) (DSM–III–R). Washington, DC: APA.

Berenbaum, H. & Fujita, F. (1994) Schizophrenia and personality: exploring the boundaries and connections between vulnerability and outcome. *Journal of Abnormal Psychology*, **103**, 148–158.

Chapman, L. J., Chapman, J. P., Kwapil, T. R., *et al* (1994) Putatively psychosis-prone subjects 10 years later. *Journal of Abnormal Psychology*, **103**, 171–183.

Cooper, J. E., Kendell, R. E., Gurland, B. J., *et al* (1972) *Psychiatric Diagnosis in New York and London: A Comparative Study of Mental Hospital Admissions*. London: Oxford University Press.

David, A. S., Malmberg, A., Brandt, L., *et al* (1997) IQ and risk for schizophrenia: a population-based cohort study. *Psychological Medicine*, **27**, 1311–1323.

Done, J. D., Crow, T. J., Johnstone, E. C., *et al* (1994) Childhood antecedents of schizophrenia and affective illness: social adjustment at ages 7 and 11. *British Medical Journal*, **309**, 699–703.

Fenton, W. S. & McGlashan, T. H. (1989) Risk of schizophrenia in character disordered patients. *American Journal of Psychiatry*, **146**, 1280–1284.

Gardner, G. G. (1967) The relationship between childhood neurotic symptomatology and later schizophrenia in males and females. *Journal of Nervous and Mental Disease*, **2**, 97–100.

Hanson, D. R., Gottesman, I. I. & Heston, L. L. (1990) Long-range schizophrenia forecasting: many a slip twixt cup and lip. In *Risk and Protective Factors in the Development of Psychopathology* (ed. J. Rolf), pp. 424–444. New York: Cambridge University Press.

Jones, P., Rodgers, B., Murray, R., *et al* (1994) Child development risk factors for adult schizophrenia in the British 1946 birth cohort. *Lancet*, **344**, 1398–1402.

Kristjannson, E., Allebeck, P. & Wistedt, B. (1986) Validity of the diagnosis of schizophrenia in a psychiatric inpatient register. *Nordisk Psychiatrica Tiddskrift*, **43**, 229–234.

Lewis, A. (1974) Psychopathic personality: a most elusive category. *Psychological Medicine*, **4**, 133–140.

Lewis, G. & Appleby, L. (1988) Personality disorder: the patients psychiatrists dislike. *British Journal of Psychiatry*, **153**, 44–49.

Malmberg, A., Lewis, G., David, A., *et al* (1998) Premorbid adjustment and personality in people with schizophrenia. *British Journal of Psychiatry*, **172**, 308–313.

Robins, L. N. (1966) *Deviant Children Grown Up: A Sociological and Psychiatric Study of Sociopathic Personality*, Baltimore: Williams and Wilkins.

Tien, A. Y. & Eaton, W. W. E. (1992) Psychopathologic precursors and sociodemographic risk factors for the schizophrenia syndrome. *Archives of General Psychiatry*, **49**, 37–44.

World Health Organization (1974) *International Classification of Diseases* (8th edn) (ICD–8). Geneva: WHO.

GLYN LEWIS, FRCPsych, Division of Psychological Medicine, University of Wales College of Medicine, Cardiff; ANTHONY S. DAVID, FRCPsych, Institute of Psychiatry, London; ASLÖG MALMBERG, MRCPsych, Department of Psychiatry, University of Oxford, Warneford Hospital, Oxford; PETER ALLEBECK, MD, Department of Social Medicine, Göteborg University, Vasa Hospital, Göteborg, Sweden

Correspondence: Glyn Lewis, Division of Psychological Medicine, University of Wales College of Medicine, Monmouth House, Heath Park, Cardiff CF4 4XN, UK. E-mail: wpcghl@cardiff.ac.uk

(First received 21 February 2000, final revision 31 May 2000, accepted 9 June 2000)

https://doi.org/10.1192/bjp.177.5.416 Published online by Cambridge University Press