

SHORT REPORT

Borderline Intellectual Functioning and Psychosis: evidence from the Adult Psychiatric Morbidity Surveys

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Abstract

Borderline intellectual functioning (BIF) is associated with several neuropsychological deficits. In this paper, we used national data to establish the prevalence of psychosis, psychotic symptoms and the role of potential mediators. The BIF group were more than twice as likely to have probable psychosis (OR 2.3, 95% CI 1.4-4.0) and to report hallucinations (OR 2.9 95% CI 1.9-4.4) but not persecutory ideation. Salient mediators were depressive symptoms and the cumulative total of life events. Our findings suggest mechanisms other than drug use which are contributing to the strong relationship between BIF and severe mental illness and which maybe amenable to treatment.

Declaration of interest

None

Psychosis is conceptualised as a neurodevelopmental disorder¹, an argument supported by studies which have established that cognitive deficits in childhood are associated with the emergence of psychotic disorder in late adolescence or adulthood.

Freeman et al² argue that lower intellectual functioning may directly impact the development of psychosis by altering the way in which stimuli and events are interpreted. This suggests that low IQ may be associated with specific psychotic symptoms or syndromes as in the case of persecutory ideation. Pre-existing cognitive deficits may increase vulnerability to other processes involved in the emergence of psychotic states which would meet the statistical criteria for mediation. Psychotic disorders are associated with life events (including sexual, physical and emotional abuse³ and with drug use and dependence⁴, while affective disturbance may increase the severity of auditory hallucinations and persecutory and grandiose delusions⁵.

We were interested in exploring the relationship between psychotic symptoms and the diagnostic group of borderline intellectual functioning (BIF) defined as Intelligence Quotient (IQ) between one and two standard deviations below the mean (70-85), towards the lower end of the normal IQ spectrum⁶. BIF is associated with several neuropsychological difficulties distinct from those of other cognitively impaired groups, e.g. people with mild intellectual disabilities⁷. The 5th edition of the Diagnostic and Statistical Manual has recast BIF to a V code (axis II), denoting a condition warranting particular clinical attention⁸.

We undertook a secondary analysis of the 2000 and 2007 British national surveys of psychiatric morbidity, reported fully elsewhere^{9,10}, to investigate the particular association between BIF and psychosis. We predicted that individuals with BIF would:

- i. have a higher prevalence of psychotic disorder than their counterparts with average intelligence.
- ii. be more likely than their counterparts with average intelligence to report persecutory ideation and auditory hallucinations.

If the mechanism involved in the emergence of psychotic phenomena is related to cognitive function, we expect less mediation by affective changes and by the experience of stressful antecedents.

Method

Identification of BIF

Verbal IQ was assessed by the National Adult Reading Test (NART)¹¹ and we also excluded all those who had reported A-levels or higher qualifications.

Assessment of psychosis and psychotic symptoms

In phase 1 of each survey, participants were screened with the Psychosis Screening Questionnaire (PSQ)¹² for possible psychosis. We used PSQ items 3a and 5a for persecutory ideation and auditory hallucinations respectively.

Participants were invited to a phase 2 assessment if they were on anti-psychotic medication, were admitted to hospital, reported auditory hallucinations or a diagnosis of psychotic disorder.

A definitive diagnosis of psychosis was made based on the Schedules for Clinical Assessment in Neuropsychiatry (SCAN)¹³. A composite measure of “probable psychosis” was devised comprising SCAN-identified cases, together with some participants from phase 1 who met at least two of the screening criteria listed above.

Mediating variables

Possible mediators were reported sexual abuse and bullying, a cumulative total of victimisation events, and the use of cannabis, as these are repeatedly associated with psychosis¹⁴. We also examined the role of depressive and anxiety symptoms, measured by the Revised Clinical Interview Schedule (CIS-R)¹⁵ which appear to mediate the relationship of traumatic causes with psychosis, in particular, sexual abuse and bullying.

Statistics

Analyses were performed using Stata software Release 14. Data was weighted for survey design non-response. We used binary logistic regression to determine associations between BIF and psychosis, and the two individual psychotic symptoms. To test for our putative mediators, we used the KHB (Karlson Holm Breen)¹⁶ commands in Stata which decomposes the total effect of a variable into quantified direct and indirect effects.

Results

1701 out of 15,983 were identified with BIF, giving a weighted prevalence of 10.9%. The weighted prevalence of probable psychosis was 0.98%, compared with 0.42% for the non BIF group (adjusted OR 2.3 95% CI 1.4-4.0). The prevalence of auditory hallucinations in the BIF group was 2.06% compared with 0.81% in the non-BIF group (OR 2.9 95% CI 1.9-4.4).

There was no difference in the prevalence of persecutory ideation in those with and without BIF (8.9% and 8.6% respectively; OR 1.0 95% CI 0.8-1.3).

[table 1 near here]

We estimated that 13.7% of the overall link between BIF and psychosis could be accounted for by the effect of BIF on hallucinations.

The link between BIF and psychosis was significantly mediated by depressive but not by anxiety symptoms (20.6% vs. 3.9%). Of our three measures of stress only the cumulative measure met significance criteria for mediation, accounting for 11.2% of the BIF-psychosis link. The link was not mediated by a history of cannabis use. Overall, one quarter of the association between BIF and psychosis was accounted for by the effects of depression (17.9%) and the cumulative total of life events (6%).

Similarly, depressive symptoms but not anxiety mediated 11.8% of the link between BIF and hallucinations. The cumulative life event score accounted for 6.7% of the link between BIF and hallucinations.

Discussion

To our knowledge, this is the first study to examine associations between a specific patient profile and psychotic symptoms. Using amalgamated data from two national psychiatric morbidity surveys, we demonstrated that BIF is significantly associated with probable psychosis and with auditory hallucinations which remained significant after controlling for age, sex, current social class and ethnicity. Counter to prediction, persecutory ideation was no more frequent in people with BIF. Given the statistical power provided by this large dataset, this must be taken as a robust result. It is the most intriguing finding in our analysis, particularly as it might be expected that limitations on social interpretation would encourage mistaken perceptions of the intentions of others. There maybe further scope for effects of BIF on other aspects of the psychotic syndrome including specific cognitive impairments, for which there were no measures in the national surveys.

The largest individual contribution to psychosis in the BIF group is from the increase in depressive symptoms, less so anxiety symptoms. This parallels findings from other studies of mediation effects in psychosis¹⁷ and of low verbal IQ associations with depression and mixed anxiety/depression¹⁸. Reduced IQ maybe a greater risk factor for depression compared to anxiety or it may operate by altering the symptoms of mental disorder, bringing forward depressive symptoms at the expense of anxiety. Symptoms of depression may be misdiagnosed as negative symptoms.

Our results provide no evidence that people with BIF are more prone to psychosis due to exposure to sexual abuse and bullying but suggest a general excess and impact of such experiences in this group.

The national surveys provide samples large enough to allow analysis of subgroups free of the referral bias that may exist in clinical settings and use consistent methods and measures. However the cross-sectional design restricts inferences about causality. The NART may lead to an overestimation of BIF or inclusion of people with mild intellectual disabilities. Finally, the PSQ has not been validated in the BIF population therefore it could be a source of measure bias.

Although BIF is a contentious concept, it is clearly associated with significant psychopathology, to which contributing factors maybe amenable to prompt diagnosis and treatment. Accurate characterisation of mental disorders in people with BIF is the first step towards improved care and reduction in chronic disability.

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Table 1. Borderline Intellectual Functioning, Psychosis and Hallucinations

<i>Psychosis</i>			
Confounder	Odds Ratio	<i>P</i>	95% Conf. Interval (CI)
Unadjusted	2.3	0.002	1.4-3.9
Adjusted For Separate Confounders			
<i>Age</i>	2.2	0.005	1.3-3.9
<i>Sex</i>	2.3	0.004	1.3-3.9
<i>Social Class</i>	1.9	0.038	1.0-3.4
<i>Ethnicity</i>	2.2	0.004	1.3-3.8
<i>Hallucinations</i>			
Confounder	Odds Ratio	<i>P</i>	95% Conf. Interval (CI)
Unadjusted	2.9	<0.001	1.9-4.4
Adjusted for separate confounders			
<i>Age</i>	2.8	<0.001	1.8-4.4
<i>Sex</i>	3.0	<0.001	1.9-4.7
<i>Social Class</i>	2.6	<0.001	1.7-4.2
<i>Ethnicity</i>	2.9	<0.001	1.9-4.4