



Original article

Early-adult outcome of child and adolescent mental disorders as evidenced by a national-based case register survey



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ABSTRACT

Background: Mental disorders show varying degrees of continuity from childhood to adulthood. This study addresses the relationship of child and adolescent mental disorders to early adult psychiatric morbidity.

Methods: From a population at risk of 830,819 children and adolescents aged 6–16 years, we selected all those ($n = 6043$) who were enrolled for the first time in the Danish Psychiatric Register with an ICD-10 F00–99 diagnosis in 1995–1997, and identified any mental disorder for which they received treatment up to 2009.

Results: Neurodevelopmental and conduct disorders were the principal diagnostic groups at 6–16 years and exhibited a characteristic male preponderance; while affective, eating, neurotic, stress-related and adjustment disorders were more common in girls. Over a mean follow-up period of 10.1 years, 1666 (27.6%) cases, mean age 23.4 years, were referred for treatment to mental health services, and they had a markedly higher risk than the general population (RR 5.1; 95% CI 4.9–5.4). Affective, eating, neurodevelopmental, obsessive-compulsive and psychotic disorders had the strongest continuity. Heterotypic transitions were observed for affective, eating, neurodevelopmental, personality and substance use disorders.

Conclusions: These findings suggest that individuals with psychiatric antecedents in childhood and adolescence had a high risk of being referred for treatment in early adulthood, and many mental disorders for which they required treatment revealed both homotypic and heterotypic continuity.

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1. Introduction

Mental disorders with onset in childhood and adolescence show varying degrees of continuity over time [1,2], and individuals referred for treatment in early adulthood are most likely to have a previous diagnosis of mental disorder [3–6], pointing out that a large part of the disease burden from psychiatric disorders arises by adolescence [7].

In keeping with developmental psychopathology, there are two models of continuity: "homotypic continuity", that is the same disorder persists over time; and "heterotypic continuity", also called sequential comorbidity, when clinical features tend to

change with age, an effect which may result from the interaction of common genetic factors and environmental exposures [2].

Existing studies suggest that attention-deficit hyperactivity disorder (ADHD), anxiety, depression and antisocial personality disorders have higher continuity than other conditions [4,8,9], and nearly half of cases with emotional disorders are likely to recover by early adulthood [1]. Evidence also supports heterotypic patterns between conduct/oppositional disorders and later anxiety, depression, antisocial personality disorder and/or substance misuse [4,8]; between adolescent anxiety and depression in young adulthood [4,8,9]; and between earlier emotional and/or behavioral features and psychotic disorders [4,10]. Further studies revealed that vulnerability factors affecting the early stages of brain development are involved in causation of psychotic disorders [1,2], and that putative genetic alterations towards schizophrenia and affective disorders overlap with those for autism spectrum

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disorders and ADHD, challenging the basis of current psychiatric classifications [11]. However, only few population-based surveys examined continuity of a broad range of mental disorders from childhood to adult life [1,12]. It is the aim of this study to address the relationship of child and adolescent mental disorders to early-adult psychiatric morbidity in community-based mental health services in Denmark.

2. Methods

This study draws its data from the Danish Psychiatric Central Register (DPCR), which has stored information - with appropriate protection for anonymity - about all in-patients since 1969 and outpatient mental health services since 1995 [13]. Data are used for national statistics, mental health planning and research. DPCR records include details from case-notes and, since 1994, diagnosis coded according to the ICD-10 Classification of Mental and Behavioural Disorders, Diagnostic Criteria for Research (ICD-10) [14]. The quality of psychiatric assessment is enhanced by uniformity of training throughout the country, including supervisions and courses which provide tuition in ICD-10 and related diagnostic instruments. All those living in Denmark are entitled to free treatment under the National Health Service, and no private psychiatric facilities exist.

2.1. Case identification and relevant diagnostic categories

We selected all children and adolescents aged 6–16 years, whether admitted to hospital or treated as outpatients, who were listed for the first time in the DPCR with an ICD-10 F00–99 diagnosis between 1st January 1995 and 31st December 1997. Their admission/contact patterns were checked to identify any subsequent diagnosis they received when referred for treatment to mental health services up to the end of 2009. The age for transition from child-adolescent to adult psychiatric services is usually 18 years.

In selecting mental disorders to be included in our study, we relied on the following ICD-10 categories: F0–09 "organic mental disorders"; F10–19 "psychoactive substance use disorders" (SUD); F20–29 "schizophrenia and related disorders" (i.e. F20 "schizophrenia", F21 "schizotypal disorder", F22 "persistent delusional disorder", F23 "acute and transient psychotic disorders", F24 "induced delusional disorder", F25 "schizoaffective disorder", F28–29 "other and unspecified non-organic psychotic disorders"); F30–39 "affective disorders" (F30 "manic disorder", F31 "bipolar disorder", F32 "depressive disorder", F33 "recurrent depression", F34 "persistent affective disorders", F38–39 "other and unspecified affective disorders"); F40–48 "neurotic, stress-related and somatoform disorders" (F40 "phobic disorders", F41 "panic and generalized anxiety disorders", F42 "obsessive-compulsive disorder" [OCD], F43 "reaction to severe stress and adjustment disorders", F44 "dissociative disorders", F45 "somatoform disorders", F48 "other neurotic disorders"); F50–51 "eating and sleeping disorders"; F60 "personality disorders"; F70–79 "mental retardation"; F80–89 "psychological development disorders" (F80–82 "specific developmental disorders of speech and language, scholastic skills and motor function"; F84 "pervasive development disorders" [PDD]; F88–89 "other and unspecified psychological development disorders"); F90–99 "childhood and adolescent behavioral and emotional disorders (F90 "hyperkinetic disorders"; F91–92 "conduct disorders" [including oppositional defiant disorder, ODD]; F93 "emotional disorders"; F94 "attachment and social functioning disorders"; F95 "tic disorders"; and F98–99 "other and unspecified behavioral and emotional disorders of childhood and adolescence").

2.2. Data analysis

Incidence rates (IR), 95% confidence interval (CI), were expressed as the number of cases per 100,000 person-years using the Danish population at risk born between 1st January 1978 and 31st December 1991. Mantel-Haenszel combined sex-incidence rate ratio (IRR; 95% CI) were also calculated, and stratified by birth cohort.

The relative risk (RR; 95% CI) for children and adolescents with psychiatric antecedents at 6–16 years developing any mental disorder for which they required treatment in early adulthood was estimated as risk ratio by direct standardization, dividing the risk they had in their last admission/contact after the age of 18 years by that observed in the general population, stratified by birth cohort and gender. The sex risk ratio was calculated by indirect standardization, and stratified by birth cohort.

To address the relationship between child-adolescent and adult mental disorders, we compared the main ICD-10 diagnosis of children and adolescents in 1995–1997 to that they received when referred for treatment in their last admission/contact after the age of 18 years. Odd ratios (OR) with 99.5% CI were calculated using Bonferroni's method for 10 tests and adjusted for statistically significant diagnostic categories (P value = 0.05) by a forward inclusion/backward elimination procedure.

2.3. Ethical issues

Ethical approval for this study was not required because the DPCR data comply with appropriate protection standards for anonymity.

3. Results

From a population at risk of 830,819 children and adolescents (a total of 1,914,922 person-years), there were 6043 cases aged 6–16 years (58.7% males) who were first listed in the DPCR between 1995 and 1997. The mean age for boys was 11.0 years (SD 3.0), and that for girls 13.1 years (SD 3.1), respectively.

Nearly two-thirds were diagnosed as having "childhood and adolescent behavioral and emotional disorders" and "psychological developmental disorders". Neurodevelopmental disorders (i.e. specific developmental disorders, PDD and hyperkinetic disorders), conduct disorders and psychotic disorders were the principal diagnostic groups in boys; while affective disorders, eating disorders, emotional disorders, and neurotic, stress-related and adjustment disorders occurred more often in girls. Other diagnostic categories common at 6–16 years were social functioning and attachment disorders, and mixed conduct and emotion disorders. The residual categories "other" and "unspecified behavioral and emotional disorders" accounted for about 10% of the total (Table 1).

Three thousand five hundred and ninety (59.4%) children and adolescents attended inpatient and/or outpatient psychiatric services on at least one subsequent occasion over a mean follow-up period of 10.1 years (SD 3.2). Of these, 1666 (27.6%), mean age 23.4 years (SD 3.5), were referred for treatment in their last admission/contact. They had a risk 5.1 (95% CI 4.9–5.4) times higher than the general population, and the sex-specific risk was greater for males (6.2; 95% CI 5.7–6.7) than females (4.4; 95% CI 4.1–4.6). The principal conditions for which young people with psychiatric antecedents at 6–16 years required treatment had significantly raised RR (Table 2), and their frequency was as follows: personality disorders (17.0%), psychotic disorders (15.5%), stress-related and adjustment disorders (12.2%), affective disorders (10.9%), neurotic disorders (8.6%), hyperkinetic disorders (7.3%), eating disorders (6.1%) and PDD (5.5%).

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