Temporal changes in the incidence of treated psychiatric and neurodevelopmental disorders during adolescence: an analysis of two national Finnish birth cohorts

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Summary

Background

Comprehensive overviews of the temporal changes in treated psychiatric and neurodevelopmental disorders during adolescence are scarce. We reviewed data from two national cohorts, 10 years apart, to establish the change in use of specialised services for psychiatric and neurodevelopmental diagnoses in Finland.

Methods

We compared the nationwide register-based incidence of psychiatric and neurodevelopmental diagnoses between the 12th birthday and 18th birthday of adolescents born in Finland in 1987 and 1997. Adolescents who emigrated or died before their 12th birthday and those with missing covariate data were excluded, as were those who, when aged 11 years, had lived in a municipality belonging to a hospital district with obviously incomplete data reports during any follow-up years in our study. Our primary outcomes were time to incident specialised service use for any psychiatric or neurodevelopmental disorder and for 17 specific diagnostic classes. We also investigated whether adolescents who died by suicide had accessed specialised services before their deaths.

Findings

The cumulative incidence of psychiatric or neurodevelopmental disorders increased from 9.8 in the 1987 cohort to 14.9 in the 1997 cohort (difference 5.2 percentage points [95% CI 4.8–5.5]) among girls, and from 6.2 in the 1987 cohort to 8.8 in the 1997 cohort (2.6 percentage points [2.4–2.9]) among boys. The hazard ratio for the overall relative increase in neurodevelopment and psychiatric disorders in the 1997 cohort compared with the 1987 cohort was 1.6 (95% CI 1.5–1.8) among girls and 1.5 (1.4–1.6) among boys. Of the studied diagnostic classes, we noted significant (ie, p<0.001) relative increases for ten of 17 diagnoses among girls and 11 among boys. Of the adolescents who died by suicide before age 18, only five of 16 in the 1987 cohort and two of 12 in the 1997 cohort had used specialised services in the 6 months before their death.

Interpretation

The large absolute rise in service use for psychiatric or neurodevelopmental disorders points to the need to deliver effective treatment to a rapidly increased patient population, whereas the relative increase in specific diagnoses should inform clinical practice. Despite increasing service use, identification of adolescents at risk of suicide remains a major public health priority.

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Introduction

Most emotional disorders and many psychotic disorders have their onset during adolescence.1 Neurodevelopmental disorders, including attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorders, begin in childhood,2 but are often diagnosed during adolescence.34 To reduce the burden associated with adolescent psychiatric and neurodevelopmental disorders, optimal allocation of services is of high importance. To improve the service system and diagnostics, knowledge about the temporal changes in diagnosed adolescent psychiatric and neurodevelopmental disorders in the service system is crucial.

According to a 2015 review,5 diagnosis and treatment of a wide range of psychiatric and neurodevelopmental disorders have been increasing among adolescents in several high-income countries. For example, service use for depression,6 autism spectrum disorders,7 ADHD,8 and bipolar disorder9 has increased among adolescents. To study the temporal changes in the number of psychiatric and neurodevelopmental disorders diagnosed in specialised services, national registers can provide comprehensive data for the whole spectrum of diagnoses in large populations. Previous register-based studies of adolescents treated for psychiatric and neurodevelopmental disorders have typically focused on one diagnostic group10 or a few outcomes.11 Furthermore, most studies report the relative change in prevalence or incidence estimates —ie, the ratio between two samples or cohorts. The relative change is important for understanding changes in diagnostic practices and the service system at large. However, from a service-planning perspective, the absolute change between two estimates is more informative for quantification of the estimated number of new cases that need treatment.

To obtain a comprehensive overview of the absolute and relative changes in the number of diagnosed psychiatric and neurodevelopmental disorders during adolescence, we compared two complete Finnish national birth cohorts, born in 1987 and 1997. Our primary aim was to test the
hypothesis that specialised service use for a wide range of psychiatric and neurodevelopmental disorders during adolescence has increased during the decade separating the cohorts. Given that approximately 90% of the people who die by suicide fulfil the criteria for psychiatric disorders in psychological autopsy studies,16 but most are not treated in psychiatric services before suicide,17 a secondary aim was to explore whether adolescents who took their own lives had used specialised services before death.

Methods

Study design and participants

We used data from two longitudinal studies: the 1987 Finnish Birth Cohort study, which has been described in detail,14 and its successor, the 1997 Finnish Birth Cohort study. Both are managed by the National Institute for Health and Welfare in Finland, and contain extensive data from Finnish nationwide registers for all children born in the country in the titular years. We followed up the cohort members for incident psychiatric and neurodevelopmental disorder diagnoses from their 12th birthday to their 18th birthday. Thus, the longitudinal base of our study covered the calendar years 1999–2005 and 2009–15. Both studies received approval from the ethical committee in the National Institute for Health and Welfare, and all data-providing register keepers gave permission for us to use the data in scientific research, as required by Finnish legislation. All data were anonymised before analyses, and handled according to Finnish data protection laws. By law, informed consent is not required in Finland for register-based studies if the registered people are not contacted.

Adolescents who emigrated or died before their 12th birthday and those with missing covariate data in the Medical Birth Register records were excluded from our analysis. To ensure that changes in service use were not biased by incomplete reporting of psychiatric outpatient visits in early study years,16 we inspected the yearly numbers of all visits to psychiatric specialty clinics reported by each hospital district to the Hospital Discharge Register. Subsequently, we also excluded children who, when aged 11 years, had lived in a municipality belonging to a hospital district with obviously incomplete data reports during any follow-up years in our study. Finally, to restrict analyses to incident cases, we inspected the data by yearly incidence and applied an outcome-specific washout period, in which cohort members who had a record of a visit with a relevant diagnosis when aged 11 years were excluded.

Research in context

Evidence before this study

We searched PubMed with the terms ("psychiatr* or neurodevelop* or mental or psychopathology) and (adolesc* or youth or young or juvenile) and (trend or secular or change) and (epidemiolog* or register* or interview or survey or questionnaire) for reviews about temporal changes in diagnosed psychiatric and neurodevelopmental disorders among adolescents published in English between Jan 1, 2007, and Nov 1, 2017. We initially identified 29 reviews, two of which proved relevant after scanning titles or abstracts. The more recent of the two systematic reviews included articles published until October, 2014. Thus, we used the same search terms to search for articles other than reviews published after October, 2014. We scanned the titles or abstracts of the 224 identified studies for relevance, and subsequently reviewed the full text of seven studies. The identified studies showed that the diagnosis and treatment of a wide range of psychiatric and neurodevelopmental disorders have been increasing among adolescents in several high-income countries. However, we did not find a comprehensive overview of both the absolute and relative changes in a wide range of diagnosed psychiatric and neurodevelopmental disorders during adolescence.

Added value of this study

To our knowledge, this study is the first nationwide register-based study of both absolute and relative temporal changes in use of specialised services for the whole spectrum of psychiatric and neurodevelopmental disorders in adolescence. The diagnostic system was consistent across the study period, and all outpatient and inpatient treatment was included. Our results suggest that there has been both an absolute and relative increase in use of specialised services for most diagnostic classes among adolescents born in 1997 compared with those born in 1987. The largest absolute increases were evident for unipolar depression and anxiety disorders in girls and in emotional and social interaction disorders and attention deficit hyperactivity disorder in boys. Although an increasing number of adolescents is using specialised services for psychiatric or neurodevelopmental disorders, only a small proportion of adolescents who died by suicide in our study cohorts used specialised services before their deaths.

Implications of all the available evidence

The large absolute increase in diagnosed disorders in specialised services suggests a rapidly enlarged patient population requiring treatment. Such treatment necessitates financial resources, easily available services, and a smoothly running system. In particular, the increased number of adolescents with diagnosed depression and anxiety disorders poses a challenge because psychotherapy is the first-line treatment for these disorders, and there is a shortage of available therapists. The relative temporal changes, which are more sensitive to diagnostic practices than absolute temporal changes, noted in our study are in line with previous studies suggesting improved diagnostics of neurodevelopmental and bipolar disorders. Identification of the service need for adolescents who go on to die by suicide remains a major public health priority.
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