



JUTTA NIEMI, TIMO HOLTTINEN, RIITTAKERTTU KALTIALA

ADOLESCENTS WITH SEVERE DEPRESSIVE AND ANXIETY DISORDERS – A NATIONWIDE REGISTER STUDY OF INPATIENT-TREATED ADOLESCENTS 1980- 2010

ABSTRACT

Objective: To explore trends in the inpatient treatment of adolescent internalizing disorders, namely depressive and anxiety disorders. To compare the prognosis of these disorders regarding readmissions, diagnostic stability, mortality, and symptom severity and functioning with similar indices among adolescents psychiatrically hospitalized due to other disorders.

Materials and methods: A register-based follow-up study of all adolescents with their first ever psychiatric admission at ages 13-17 in the period 1980-2010.

Results: The number and proportion of internalizing disorders as primary diagnoses in the psychiatric inpatient care of adolescents increased vastly across decades, particularly among girls. Readmissions, mortality and symptom severity and functioning did not essentially differ from those with other diagnoses and did not essentially improve over time.

Conclusions: Our findings do not lend support to the assumption that increased treated incidence of adolescent internalizing disorders is due to medicalization.

KEYWORDS: ADOLESCENT, DEPRESSION, ANXIETY DISORDERS, HOSPITALIZATION

INTRODUCTION

Depression and anxiety are among the most common internalizing disorders during adolescence [1]. Almost one third of adolescent boys and over half of girls self-report potentially clinically significant symptoms of depression or anxiety disorder at some point during adolescence [2]. In a meta-analysis of studies from 27 countries, the point prevalence of depressive disorder in a community sample under 18 years of age was 2.6% and that of anxiety disorder was 6.5% [3]. The systematic review also included children which lowers the point prevalence compared to studies including only adolescents. In a large US National Comorbidity Study, the lifetime incidence of depressive disorder in an adolescent community sample was 11.7%, and of anxiety disorders 31.9%; incidences of disorders with severe impairment were 8.7% for depressive and 8.3% for anxiety disorders [4].

Of adolescents with depressive disorders, up to 75% present with comorbid anxiety disorder and it is estimated that 10-15% of adolescents with primary anxiety disorders meet the criteria for depressive disorder [5,6]. Left untreated, a psychiatric disorder at a young age poses a serious threat to adolescent development [7]. A link to poorer school performance and quality of life has been found in a study based on Finnish data for both depression and anxiety disorder. Long-term and severe symptoms as well as comorbidities increase the risk of adverse consequences [8]. The number of mental disability pensions among Finnish young people has increased. Depression is the most common disorder underlying the disability pension for persons aged 16–34. During the period 2015-2019, pensions related to anxiety disorder also became more common in all age groups, especially in women [9].

Psychiatric hospital care for adolescents is targeted at patients with severe symptoms and significant dysfunction, or at the risk of harming themselves or others [10]. Between 1980 and 2010, health policies promoted adolescent psychiatric care, and the number of psychiatric inpatient beds for adolescents and the number of young people admitted to psychiatric hospital care increased vastly in Finland [11], also reported elsewhere. At the same time, the proportion of girls in hospital care increased, associated with an increase in proportion of diagnoses more common among girls than boys, such as depression and anxiety disorder. Among adolescent psychiatric inpatients in Finland, the proportion of those with a diagnosis of depression increased from 25%

to 38%, and that of patients with anxiety disorder from 8% to 19%, between 2000 and 2011 [12].

The mental health status of young people treated in psychiatric hospital care has been described as having become more severe over time [12,13]. Readmission is a commonly used indicator of prognosis in inpatient care. The number of young people readmitted for psychiatric inpatient treatment less than six months from discharge is approximately 12.1-28%. Risk factors for the new hospital stay among adolescents include psychiatric comorbidity, somatic chronic diseases and number of earlier admissions [14]. In adolescents with depression, faster rehospitalization has been associated with self-injury without suicidal intent [15]. In an earlier study based on our data, 40% of young people returned to hospital at least once between the ages of 13 and 17. Of patients treated for mood disorders (F30-39), 41% were readmitted, of patients with neurotic, stress-related and somatoform disorders (F40-49), 39% [11].

The incidence of many mental disorders, including depression and anxiety disorder, peaks in adolescence and young adulthood [1,16]. Psychiatric disorder at a young age increases the risk of adult psychiatric disorder at least threefold [17]. Further, a persistent or recurrent disorder in adolescence predicts more psychiatric problems in adulthood [18]. Homotypic continuity refers to the recurrence of the primary disorder as the same disorder in later life [1,17,19]. In turn, heterotypic continuity characterizes a situation where morbidity continues but subsequent manifestation differs from the primary diagnosis. Homotypic and heterotypic continuity can also be studied in the level of higher order dimensions (internalizing disorders, externalizing disorders) [19]. The recurrence of psychiatric disorders among young people is mainly homotypic, but diagnostic crossover occurs, particularly between depression and anxiety disorders. In other words, depression in adolescence predicts subsequent anxiety disorder and vice versa [1,17,19].

Adolescent psychiatric disorder increases the long-term risk of premature mortality [20,21,22]. Among adults, depression alone has been shown in several studies to increase the risk of death [23,24,25], and the connection appears to be stronger for men than for women [25,26,27,28]. The occurrence of anxiety disorder with depression appears to reduce mortality in depressed adult patients [25,29,30], and anxiety disorder alone does not appear to be related to increased risk of mortality [24,29,31]. However, to the best of our knowledge, research has not focused specifically on mortality in adolescent-onset depression and/or anxiety disorders.

In 2020, the proportion of suicides among total causes of death in Finnish adolescents was 26% [32]. On average, psychiatric hospitalization is associated with an eight-fold increased risk of suicide [33]. Of adolescent psychiatric hospital-treated patients, 17–55% have attempted suicide [34]. Comorbidity of depression and anxiety disorder increases the risk of suicide in adolescents [31].

AIMS OF THE STUDY

Depression and anxiety are the core internalizing disorders. Their prevalence is high among adolescents. These disorders are often comorbid and predict each other's incidence. Given that the number of adolescents hospitalized due to these disorders has vastly increased in recent decades [11], they have considerable economic implications.

Finnish registers afford the opportunity to scrutinize the psychiatric morbidity of Finnish adolescents over a long period of time. To increase the understanding of the increasing needs related to adolescent depression and anxiety disorders, we set out to study rehospitalizations, homotypic and heterotypic continuity of diagnoses and mortality among adolescents hospitalized for these disorders in the period 1980–2010. We intend to examine whether the incidence of depression and anxiety disorders requiring hospitalization has changed from the 1980s to the 21st century, and what the outcome is like for patients who have been hospitalized for depression and anxiety disorder in terms of symptom severity, rehospitalization, continuity and mortality.

METHODS

The study is a register-based follow-up study based on comprehensive nationwide data. Finland's comprehensive and reliable patient registers together with personal ID numbers enable the processing of large amounts of patient data and the compilation of data. As a basis for information on inpatient care we used the Hospital Discharge Register and the Care Register for Health Care, both kept by the Finnish Institute for Health and Welfare. The variables used are the dates of admission and discharge, the patient's sex, age, the initial and end dates of any new hospital treatment, and the diagnoses during the index treatment period and subsequent treatment periods. Symptom severity was described by GAS registered at admission. In addition, cause of death data was extracted from the

Mortality register (Statistics Finland) for subjects who died during the follow-up period. The original data included those 13 to 17-year-olds who received psychiatric hospital care for the first time in the period 1980–2010. The data were extracted by register keepers and pseudonymized by Statistics Finland. All in all, these criteria included 17,112 young people on the register. There were 40.2% (6,873) boys and 59.8% (10,239) girls in the data. During their first treatment, 270 of them did not receive a psychiatric or neurological diagnosis and were thus excluded, resulting in a final analysable sample of 16,842 patients. Patients were followed up in registers for up to ten years or until 2014 or death, whichever criterion came first.

The data contain diagnostic data from three different ICD (International Classification of Diseases) classifications used at different times. ICD-8 was used in Finland between 1968 and 1986, ICD-9 from 1987 to 1995, and ICD-10 has been in use since 1996. The WHO conversion patterns were used to modify the ICD-8 and ICD-9 diagnostics to follow the ICD-10 classification. The primary diagnosis in the registry was set to describe the main cause of hospitalization. Our research focuses on diagnostic codes F32–33 for depressive disorders and F40–48 for anxiety disorders. In this study we use the term internalizing disorders to refer to both these disorders together. In studying diagnostic stability, internalizing disorders were combined, mania and bipolar disorder (F30 and F31) were grouped together, and other diagnoses were used as categorized to main categories (F00–09, F10–19, F20–29...).

GAS (Global Assessment Scale) is a method of evaluation to monitor the change in the patient's ability to function and to define the objectives of rehabilitation for a specific period. The scale ranges from 1 to 100, with lower scores indicating greater symptom severity. GAS has been found to be reliable as an assessment method (35). It is now compulsory in Finland to register GAS at the beginning and at the end of psychiatric hospitalization. The values are determined by the treating physician according to the instructions of the Finnish Institute for Health and Welfare. A GAS assessment of the patient's mental status has been available from the registry at the beginning and end of the treatment period since 1996, and thus the arrival GAS assessments are used in the present study for a subsample admitted since 1996.

STATISTICAL ANALYSES

The data were analysed by statistical methods for quantitative data. Patients treated for internalizing disorders were compared with patients treated for other disorders. The groups were compared by cross-tabulation and the statistical significance was examined by Chi-square test (Fisher's exact test where appropriate). The number and proportion of patients hospitalized due to internalizing disorders were also compared according to the sex and phase of adolescent development and between the various decades (1980—1989, 1990—1999, 2000—2010). Readmissions and diagnostic stability were compared between internalizing and other disorders in different decades. Differences in mortality were likewise explored between internalizing and other disorders by sex, age at index admission (13-14-year-olds (early adolescence) vs. 15-17-year-olds (middle adolescence)) and decade. Causes of death were compared between the diagnostic groups (internalizing vs. others). From 1996, admission GAS estimates were compared between internalizing and other disorders. Within the group of internalizing disorders, we compared the incidence of depression and anxiety and likewise readmissions, diagnostic stability and mortality. Due to the large data size, the cut-off for statistical significance was set at $p < 0.001$.

RESULTS

INCIDENCE BETWEEN 1980 AND 2010

Internalizing disorder as a primary diagnosis during the first hospitalization period was across the decades more common among girls than boys. Internalizing disorder as a reason for the index admission was equally common in early and mid-adolescent patients (13–14-year-old boys 35.2% and 15–17-year-old boys 36.6%, $p=0.2$; 13–14-year-old girls 51.0% and 15–17-year-old girls 51.9%, $p=0.4$). The share of internalizing disorders as the main diagnosis increased significantly among both boys and girls from decade to decade. In absolute terms, the number of patients treated for these disorders more than tripled in boys and increased ninefold in girls (Table 1). Of the internalizing disorders at the index admission, 53.9% (4191/7773) were depressive disorders, 37.4% (2908) anxiety disorders and 8.7% (674) comorbid depression and anxiety.

In the internalizing disorders group, the preponderance of anxiety disorders in the 1980s changed to a preponderance of depressive disorders in the 2000s. This was seen in both sexes (Table 2).

Table 1. Proportions and numbers of internalizing disorders (F32-39, F40-49) as primary diagnoses among adolescents admitted for psychiatric inpatient treatment for the first time between the ages of 13 and 17 in 1980-2010 (%(n/N))

	Total	Boys	Girls	p (between sexes)
1980–2010	45.4% (7773/17112)	36.2% (2485/6873)	51.6% (5288/10239)	<0.001
1980–1989	33.7% (871/2588)	30.7% (430/1401)	37.2% (441/1187)	0.001
1990–1999	40.4% (1455/3604)	36.4% (580/1594)	43.6% (875/2008)	<0.001
2000–2010	49.9% (5447/10922)	38.0% (1475/3878)	56.4% (3972/8044)	<0.001
p (between decades)	<0.001	<0.001	<0.001	

Table 2. Distribution of main diagnoses among internalizing disorders in adolescents with first psychiatric hospitalization at ages 13-17 in 1980–2010 (n (%))

		Boys	Girls	p (between sexes)	Total
Boys	F32-39	19.1% (82)	37.8% (219)	61.2% (902)	48.4% (1203)
	F40-48	80.9% (348)	62.2% (361)	38.8% (573)	51.6% (1282)
Girls	F32-39	23.4% (103)	51.0% (446)	71.2% (2827)	63.8% (3376)
	F40-48	76.6% (338)	49.0% (429)	28.8% (1145)	36.2% (1912)
Total	F32-39	21.2% (185)	45.7% (665)	68.5% (3729)	58.9% (4579)
	F40-48	78.8% (686)	54.3% (790)	31.5% (1718)	41.1% (3194)

NEED FOR REHOSPITALIZATION AND DIAGNOSTIC STABILITY

More than half of those treated for internalizing disorders during the first hospitalization were later readmitted. However, in the case of other disorders, the probability of rehospitalization was statistically significantly higher than in the case of internalizing disorders, although the absolute difference in percentages was small (Table 3). In a decade stratified analysis, the proportions of rehospitalizations did not systematically differ between patients treated for internalizing disorders and for other disorders (1980–1989, p=0.3; 1990–1999, p=0.02; 2000–2010, p=0.08).

Diagnostic stability was explored by comparing the primary diagnosis of the initial internalizing disorder to the primary diagnosis in the most recent hospitalization period during the ten years of follow-up among those who had at least one rehospitalization. In total, 4,116 patients were rehospitalized, among whom the primary diagnosis of internalizing disorder remained unchanged (57.5%). In boys, the persistence of an internalizing diagnosis was statistically significantly lower than in girls (boys 52.6%; girls 59.8%; p<0.001). Between the decades, the diagnostic

stability of internalizing disorders increased (1980-1989 45.4%; 1990-1999 53.2%; 2000-2010 61.3%; p<0.001). Age at index admission had no impact on diagnostic stability. In boys the diagnostic change, if present, was more in the direction of schizophrenic group psychoses (F20-29) or intellectual disabilities/other developmental disorders of speech and language (F70-79/F80-89). In girls, if diagnostic changes occurred, the initial internalizing diagnoses most commonly changed to bipolar disorder.

Within the internalizing disorder group, rehospitalization was equally common among patients with primary diagnosis of depression and anxiety disorder, both in boys and girls, and in early and middle adolescents, but decreased across the decades. In the latest decade, the risk of rehospitalization was higher in patients with depression than in patients with anxiety disorder (Table 4).

Table 3. Proportion of patients rehospitalized during a follow-up of 10 years by main diagnostic group (%(n/N))

	Internalizing disorders (F32-39, F40-49)	Other psychiatric disorders	p
Boys	53.7% (1334/2485)	56.9% (2495/4388)	0.011
Girls	52.6% (2782/5288)	56.4% (2790/4951)	<0.001
Total	53.0% (4116/7773)	56.6% (5285/9339)	<0.001

Table 4. Proportion of patients rehospitalized during ten years of follow-up by primary diagnosis in the internalizing group (%(n/N))

	F32-39	Other psychiatric disorders	p
1980–89	63.2% (117/185)	62.8% (431/686)	0.92
1990–99	60.8% (404/665)	57.3% (453/790)	0.19
2000–2010	52.1% (1941/3729)	44.8% (770/1718)	<0.001

MORTALITY

During the ten-year follow-up period, 2.4% (N=290/7773) of those treated for an internalizing disorder at index admission had died, of patients treated for other disorders, 3.2% (N=295/9339) (p=0.005). Mortality in the internalizing disorder group did not differ from mortality in patients treated for other diagnoses when analyses were stratified by sex (in boys: 4.3% vs. 4.5%, p=0.7; in girls: 1.6% vs. 2.0%, p=0.1), but male mortality was higher than female mortality in both internalizing and comparison groups (p<0.001).

Among those admitted to their index admission period in early adolescence there was no difference in mortality comparing the primary diagnosis of internalizing disorder to other disorders. Whereas among those first admitted as middle adolescents, internalizing disorders were associated with lower mortality in follow-up than other primary diagnoses (2.7% vs. 3.9%, p=0.001). In the internalizing

disorder group, mortality was similar in the depressive and anxiety disorder groups.

Among the deceased, cause of death was suicide in 52%, accidents and violence in 31% and natural causes in 17%. There were no statistically significant differences in the distribution of causes of death by diagnostic group in the whole sample or in the sex and decade-specific analyses.

GAS SCORE

Mean GAS at index admission among patients treated for internalizing disorders was similar to that in patients treated for other disorders and did not improve over time, even if the number of patients admitted increased (Figure 1). In the anxiety disorder group, GAS mean levels were slightly higher in the 1990s than in the depression group, but the difference diminished towards the end of the period scrutinized (Figure 2).

Figure 1. Mean GAS at admission to index inpatient period: patients with internalizing disorders compared to all other patients

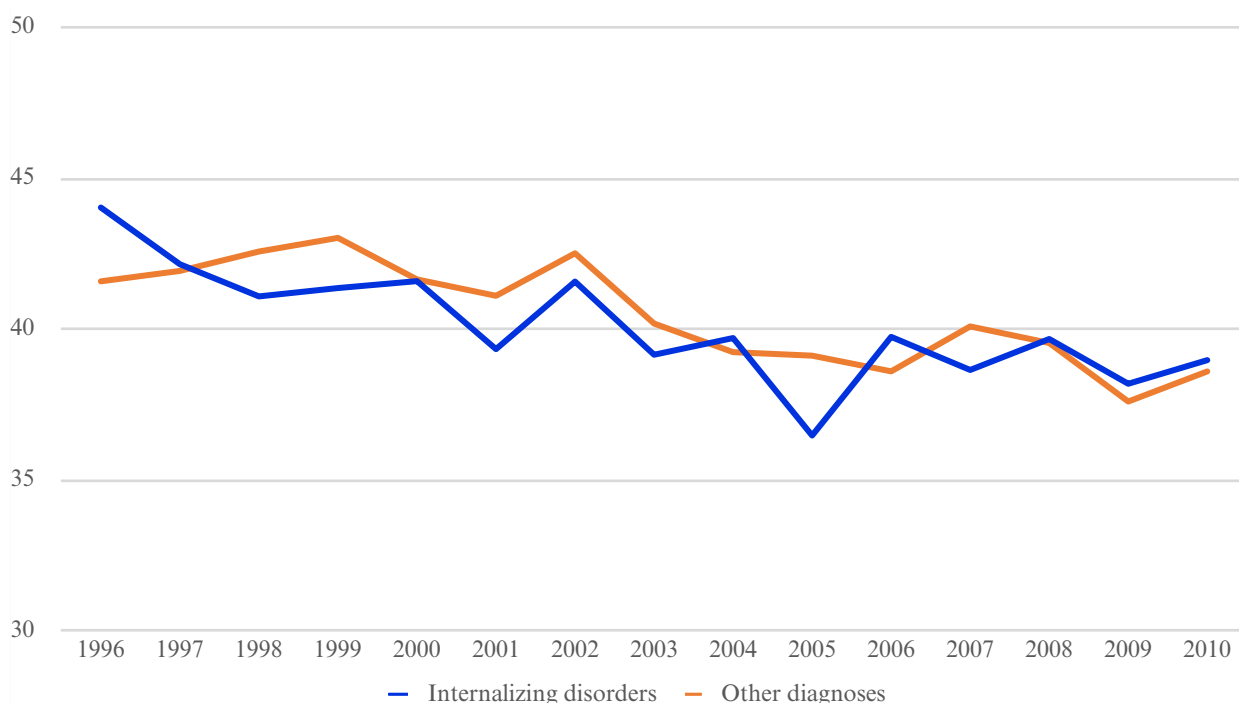
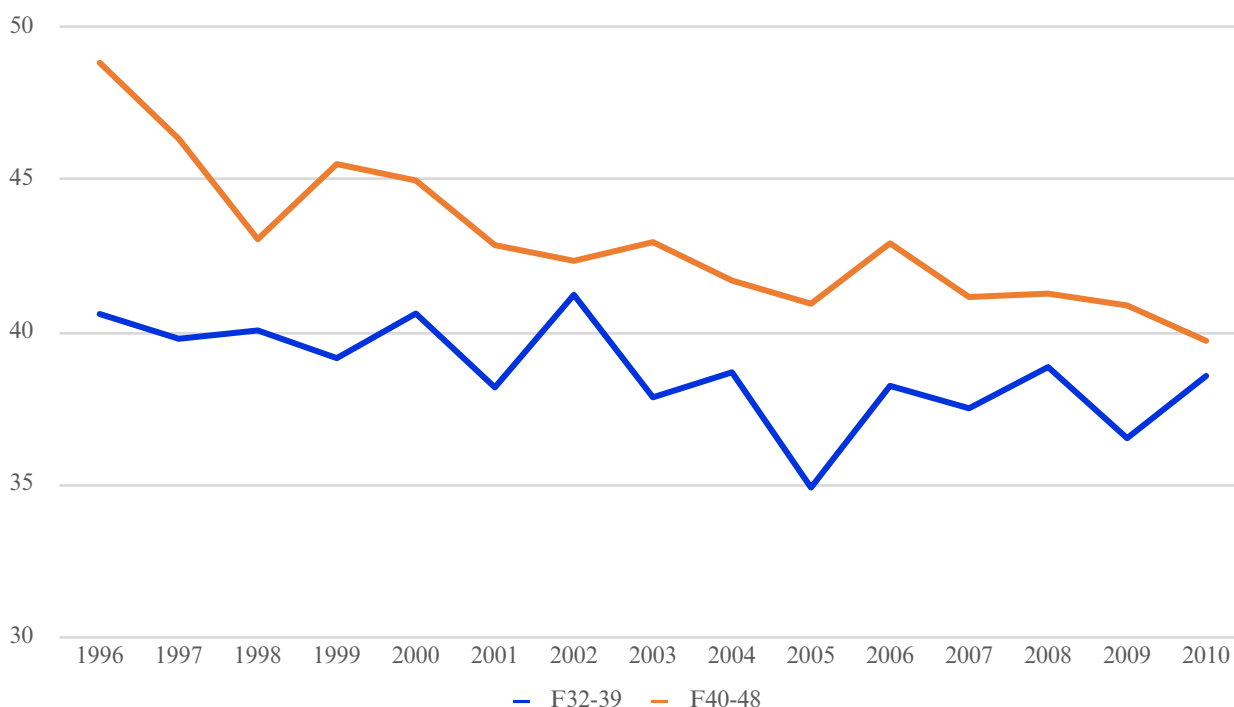


Figure 2. Mean GAS at admission to index inpatient period among the two internalizing groups



DISCUSSION

Among adolescents with their first ever psychiatric admission at ages 13-17 in the period 1980-2010, the absolute number and proportion of all admissions with a main diagnosis of internalizing disorders (F32-29, F40-49) increased vastly from the 1980s to the 2000s. The proportion and mortality of rehospitalized patients were slightly lower in the group of internalizing disorders than in those treated for other disorders. These indicators did not change over time. The primary diagnosis of internalizing disorder in the first hospitalization period persisted in more than half of the new inpatient treatment cycles, and diagnostic stability increased over time. Even if the number of adolescents admitted for internalizing disorders increased, GAS assessment suggested very little change in their symptom severity and functioning across the decades. If anything, GAS scores worsened, and did not differ from those of patients treated for other disorders.

In absolute terms, the incidence of internalizing disorders requiring hospitalization tripled in boys and increased ninefold in girls in the period scrutinized. However, there were no changes in the overall incidence of internalizing symptoms among adolescents based on either international

meta-analyses or on the Finnish population survey [36,37,38]. Internalizing disorder as a primary diagnosis in the first hospitalization period was more common in girls than in boys in all the decades considered, which concurs with known sex differences in these disorders [2]. The known sex differences in morbidity do not, however, explain why being hospitalized because of these disorders continued to increase in girls more than in boys. Nevertheless, the amount of treatment provided has earlier been insufficient in relation to morbidity. During the study period, the need may have been met better but still probably not well enough. According to more recent Finnish community sample studies, the incidence of adolescent internalizing symptoms may be increasing [39,40]. This may further increase the need for inpatient treatment.

Half of those treated for a primary diagnosis of depression or anxiety disorder during their first psychiatric hospitalization were rehospitalized during a ten-year follow-up period, slightly less than those treated for other disorders. This would suggest that internalizing disorders requiring hospitalization in adolescence are quite serious and require long-term specialized medical care. The proportion of rehospitalized patients in the internalizing disorder group decreased slightly over time. This may be due to a lowering

of the threshold to inpatient care, but also to improvements in the effectiveness of outpatient care.

Continuity of psychiatric morbidity among young people has previously been found to be mainly homotypic [1,17,19]. In these data, the diagnosis of internalizing disorder persisted in 57% of new treatment cycles and the diagnostic stability increased towards the present. The more marked persistence of diagnoses in later cohorts may be explained by changes in diagnostic classifications and evolving diagnostic practices. Interest in better diagnostics in depressive disorders was increased by the introduction to the market of SSRIs in the early 1990s [41] and may play a role here. The change in the proportions of depression and anxiety disorders within the group of internalizing disorders could also be related to the introduction of SSRIs and the increased precision in depression diagnostics. In 1980-1999, primary diagnosis of anxiety disorder was more common than depression in both girls and boys and young and older adolescents. In the 21st century, the proportions were reversed. Of course, it is also possible that there has been a change in the actual symptom picture in a more depressed direction.

Internalizing disorders were not only more common in girls than in boys; persistence of the diagnosis was also more stable in girls. This may indicate greater challenges in diagnostic work among adolescent boys. In boys, the change in diagnosis happened more frequently towards the group of schizophrenic psychoses, while in girls the change occurred more in the bipolar direction. Bipolar disorder is diagnostically closer to depression and anxiety disorders, which serves to confirm the potential diagnostic challenges for boys. In boys, a greater share of internalizing type of symptom presentation may actually represent the prodrome of psychosis.

The mortality rate among adolescents treated in hospital due to internalizing disorders did not differ from that of adolescents hospitalized due to other disorders. Nor were there any changes in mortality over time or any differences observed when comparing depression to anxiety disorders. These findings do not suggest a lowering of the threshold to inpatient care due to internalizing disorders over time. Adolescents hospitalized due to depressive and anxiety disorders represent a seriously ill proportion of the young. This is further underlined by noticing that their mortality did not decrease over time, even if suicide mortality in general has been in steady decrease over the study period and beyond in Finland [42]. On the other hand, based on our data, the mortality rate among young people with psychiatric disorders in need of hospital care does not appear to be

heavily dependent on the disorder itself, but it is more likely dependent on the severity of the disorder.

Mortality in boys was higher than in girls. This is consistent with results reported among adults [25,26,27] and sex differences in mortality in general population [43]. GAS scores for hospital patients were available from 1996. There was no discernible difference in GAS between internalizing disorders and other disorders, and no improvement between the 1990s and 2010s in either group. This does not indicate a lowering of the hospital admission threshold.

The number of adolescent depression and anxiety patients in psychiatric hospital care has increased sharply from one decade to the next, especially in the 21st century. No similar increase in the incidence of these disorders at population level has been demonstrated. The incidence of rehospitalizations among adolescent patients due to depression and anxiety disorders has been almost as high as among patients treated for other psychiatric disorders. In addition, their ability to function has been as low as those treated for other disorders and the proportion of people assigned to a new hospital cycle has decreased only slightly. These findings do not suggest that the increasing number of young people with depression and anxiety disorders in hospital care has to do with the growth pains of youth and psychiatric disorders, i.e., medicalization.

The need for treatment is influenced by several factors other than the incidence and severity of the disorder. These may include various social factors and increasing demands in the lives of young people, in the family, at school and at community level. The general acceleration of the pace of life and the increased use of social media have been proposed as risk factors for young people's internalizing disorders [44,45]. In addition, the role of social and cultural risk factors may be different for girls and boys, and even the role of biological and hormonal factors for differences in mental health epidemiology remains yet unresolved.

METHODOLOGICAL CONSIDERATIONS

The strength of our research is that it is based on a comprehensive, national register over three decades. National registry data allow reliable analysis and comparison of data on adolescent psychiatric hospital patients. However, the register does not take into consideration regional differences in the implementation and availability of psychiatric care. In addition, the diagnostics of the registry are based on clinical data, which could lead to diagnostic uncertainty. Psychiatric diagnostics in Finland,

however, have previously been found to be reliable in psychiatric hospital care [46]. A registry-based study only allows for the examination of more general phenomena. A more detailed analysis would require an examination of individual patient data. Therefore, several known risk factors such as genetics, socio-economic family background and the significance of adverse childhood experiences (ACEs) were not included in the study.

Unfortunately, the GAS scores were only available from 1996. The possibility of a GAS comparison before 1996 would also have been valuable because a change in the number of hospitalizations occurred specifically in the mid-1990s [11].

CONCLUSION

The number of adolescent patients hospitalized for depression and anxiety disorder increased markedly from the 1980s to the 2000s. The functional capacity of hospitalized depression and anxiety patients was as weak as that of inpatients treated for other psychiatric disorders and remained similar as the number of inpatients increased. The prognosis of internalizing disorders in light of rehospitalization periods and mortality was similar to that of other disorders requiring hospitalization. There appears to be no evidence that medicalization could explain the increasing need for adolescent psychiatric hospital care. Treatment of depression and anxiety disorders in adolescents should be intensified at all levels of treatment. The causes for greater increases in treated incidence of internalizing disorders in girls remain unclear.

Disclosure statement

The authors declare that they have no conflicts of interest.

Ethical approval

The study was duly approved by the ethics committee of Tampere University Hospital, and data extraction and use in research was approved by the Finnish Institute for Health and Welfare and Statistics Finland.

Author contributions

All authors contributed to the study conception and design. Data preparation and analysis were performed by Timo Holttinen. The first draft of the study was written by Jutta Niemi and all authors commented on previous versions. All authors read and accepted the final draft.

Data availability statement

Availability of datasets used and/or analysed in this study is subject to data permits from the Finnish register authorities. T.H. will provide further information at readers' requests.

Additional information

Funding

The study received financial support from Tampere University Hospital Support Fund (MK201), the Finnish Medical Foundation, and from the Finnish Foundation for Psychiatric Research.

Authors

Jutta Niemi, medical student at Tampere University Finland, Faculty of Medicine and Health Technology.

Riittakerttu Kaltiala, MD, PhD, Professor of Adolescent Psychiatry at Tampere University Finland and Chief Psychiatrist at Tampere University Hospital, Department of Adolescent Psychiatry, Finland.

Timo Holttinen, MD, PhD, Senior Lecturer in Adolescent Psychiatry at Tampere University, Finland and Senior Consultant in Adolescent Psychiatry at Tampere University Hospital, Department of Adolescent Psychiatry, Finland.

Correspondence

Jutta Niemi
jutta.niemi@tuni.fi

References

1. Costello EJ, Copeland W, Angold A. Trends in psychopathology across the adolescent years: what changes when children become adolescents, and when adolescents become adults? *J Child Psychol Psychiatry*. 2011 Oct;52(10):1015-25. doi: 10.1111/j.1469-7610.2011.02446.x
2. Patton GC, Coffey C, Romaniuk H, Mackinnon A, Carlin JB, Degenhardt L, Olsson CA, Moran P. The prognosis of common mental disorders in adolescents: a 14-year prospective cohort study. *Lancet*. 2014 Apr 19;383(9926):1404-11. doi: 10.1016/S0140-6736(13)62116-9
3. Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *J Child Psychol Psychiatry*. 2015 Mar;56(3):345-65. doi: 10.1111/jcpp.12381
4. Merikangas KR, He JP, Burstein M, Swanson SA, Avenevoli S, Cui L, Benjet C, Georgiades K, Swendsen J. Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication--Adolescent Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry*. 2010 Oct;49(10):980-9. doi: 10.1016/j.jaac.2010.05.017
5. Karlsson L, Pelkonen M, Ruutu T, Kiviruusu O, Heilä H, Holi M, Kettunen K, Tuisku V, Tuulio-Henriksson A, Törrönen J, Marttunen M. Current comorbidity among consecutive adolescent psychiatric outpatients with DSM-IV mood disorders. *Eur Child Adolesc Psychiatry*. 2006 Jun;15(4):220-31. doi: 10.1007/s00787-006-0526-7
6. Cummings CM, Caporino NE, Kendall PC. Comorbidity of anxiety and depression in children and adolescents: 20 years after. *Psychol Bull*. 2014 May;140(3):816-45. doi: 10.1037/a0034733
7. Aalto-Setälä T, Marttunen M. Nuoren psyykinen oireilu--häiriö vai normaalia kehitystä? *Duodecim*. [Internet]. 2007;123(2):207-13. Finnish. Available: <https://www.duodecimlehti.fi/duo96233>

8. Kasteenpohja T, Marttunen M, Aalto-Setälä T, Perälä J, Saarni SI, Suvisaari J. Outcome of depressive and anxiety disorders among young adults: Results from the Longitudinal Finnish Health 2011 Study. *Nord J Psychiatry*. 2018 Apr;72(3):205-213. doi: 10.1080/08039488.2017.1418429
9. Laaksonen M, Blomgren J, Perhoniemi R. Mielenterveyssyistä alkavat eläkkeet ovat yleistyneet nuorilla mutta vähentyneet vanhemmissa ikäryhmissä. *Lääkärilehti*. [Internet]. 36/2021 vsk 76s. 1889 – 1897. Available: <https://www.laakarilehti.fi/tieteessa/alkuperaistutkimukset/mielenterveyssyista-alkavat-elakkeet-ovat-yleistyneet-nuorilla-mutta-vahentyneet-vanhemmissa-ikaryhmissa/>
10. Evans N, Edwards D, Carrier J. Admission and discharge criteria for adolescents requiring inpatient or residential mental health care: a scoping review. *JBIS Synth*. 2020 Feb;18(2):275-308. doi: 10.11124/JBISRIR-2017-004020
11. Holttinen T, Pirkola S, Rimpelä M, Kaltiala R. Factors behind a remarkable increase in adolescent psychiatric inpatient treatment between 1980 and 2010 - a nationwide register study. *Nord J Psychiatry*. 2021 Jun 29;1-9. doi: 10.1080/08039488.2021.1939780
12. Kronström K, Ellilä H, Kuosmanen L, Kaljonen A, Sourander A. Changes in the clinical features of child and adolescent psychiatric inpatients: a nationwide time-trend study from Finland. *Nord J Psychiatry*. 2016 Aug;70(6):436-41. doi: 10.3109/08039488.2016.1149617
13. Case BG, Olfson M, Marcus SC, Siegel C. Trends in the inpatient mental health treatment of children and adolescents in US community hospitals between 1990 and 2000. *Arch Gen Psychiatry*. 2007 Jan;64(1):89-96. doi: 10.1001/archpsyc.64.1.89
14. Phillips MS, Steelesmith DL, Campo JV, Pradhan T, Fontanella CA. Factors Associated with Multiple Psychiatric Readmissions for Youth with Mood Disorders. *J Am Acad Child Adolesc Psychiatry*. 2020 May;59(5):619-631. doi: 10.1016/j.jaac.2019.05.024
15. van Alphen NR, Stewart JG, Esposito EC, Pridgen B, Gold J, Auerbach RP. Predictors of Rehospitalization for Depressed Adolescents Admitted to Acute Psychiatric Treatment. *J Clin Psychiatry*. 2017 May;78(5):592-598. doi: 10.4088/JCP.15m10326
16. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005 Jun;62(6):593-602. doi: 10.1001/archpsyc.62.6.593
17. Copeland WE, Adair CE, Smetanin P, Stiff D, Briante C, Colman I, Fergusson D, Horwood J, Poulton R, Costello EJ, Angold A. Diagnostic transitions from childhood to adolescence to early adulthood. *J Child Psychol Psychiatry*. 2013 Jul;54(7):791-9. doi: 10.1111/jcpp.12062
18. Colman I, Wadsworth ME, Croudace TJ, Jones PB. Forty-year psychiatric outcomes following assessment for internalizing disorder in adolescence. *Am J Psychiatry*. 2007 Jan;164(1):126-33. doi: 10.1176/ajp.2007.164.1.126
19. Shevlin M, McElroy E, Murphy J. Homotypic and heterotypic psychopathological continuity: a child cohort study. *Soc Psychiatry Psychiatr Epidemiol*. 2017 Sep;52(9):1135-1145. doi: 10.1007/s00127-017-1396-7
20. Archer G, Kuh D, Hotopf M, Stafford M, Richards M. Adolescent affective symptoms and mortality. *Br J Psychiatry*. 2018 Jul;213(1):419-424. doi: 10.1192/bjp.2018.90. Epub 2018 May 28
21. Jokela M, Ferrie J, Kivimäki M. Childhood problem behaviors and death by midlife: the British National Child Development Study. *J Am Acad Child Adolesc Psychiatry*. 2009 Jan;48(1):19-24. doi: 10.1097/CHI.0b013e31818b1c76

22. Maughan B, Stafford M, Shah I, Kuh D. Adolescent conduct problems and premature mortality: follow-up to age 65 years in a national birth cohort. *Psychol Med*. 2014 Apr;44(5):1077-86. doi: 10.1017/S0033291713001402
23. Cuijpers P, Vogelzangs N, Twisk J, Kleiboer A, Li J, Penninx BW. Comprehensive meta-analysis of excess mortality in depression in the general community versus patients with specific illnesses. *Am J Psychiatry*. 2014 Apr;171(4):453-62. doi: 10.1176/appi.ajp.2013.13030325
24. Colman I, Kingsbury M, Sucha E, Horton NJ, Murphy JM, Gilman SE. Depressive and anxious symptoms and 20-year mortality: Evidence from the Stirling County study. *Depress Anxiety*. 2018 Jul;35(7):638-647. doi: 10.1002/da.22750
25. Das-Munshi J, Chang CK, Schofield P, Stewart R, Prince MJ. Depression and cause-specific mortality in an ethnically diverse cohort from the UK: 8-year prospective study. *Psychol Med*. 2019;49(10):1639-1651. doi:10.1017/S0033291718002210, 10.1017/S0033291718002210
26. Cuijpers P, Vogelzangs N, Twisk J, Kleiboer A, Li J, Penninx BW. Is excess mortality higher in depressed men than in depressed women? A meta-analytic comparison. *J Affect Disord*. 2014 Jun;161:47-54. doi: 10.1016/j.jad.2014.03.003
27. Gilman SE, Sucha E, Kingsbury M, Horton NJ, Murphy JM, Colman I. Depression and mortality in a longitudinal study: 1952-2011. *CMAJ*. 2017 Oct 23;189(42):E1304-E1310. doi: 10.1503/cmaj.170125
28. Høye A, Nesvåg R, Reichborn-Kjennerud T, Jacobsen BK. Sex differences in mortality among patients admitted with affective disorders in North Norway: a 33-year prospective register study. *Bipolar Disord*. 2016 May;18(3):272-81. doi: 10.1111/bdi.12389
29. Mykletun A, Bjerkeset O, Overland S, Prince M, Dewey M, Stewart R. Levels of anxiety and depression as predictors of mortality: the HUNT study. *Br J Psychiatry*. 2009 Aug;195(2):118-25. doi: 10.1192/bjp.bp.108.054866
30. Zivin K, Yosef M, Miller EM, et al. Associations between depression and all-cause and cause-specific risk of death: a retrospective cohort study in the Veterans Health Administration. *J Psychosom Res*. 2015;78(4):324-31. doi:10.1016/j.jpsychores.2015.01.014, 10.1016/j.jpsychores.2015.01.014
31. Foley DL, Goldston DB, Costello EJ, Angold A. Proximal psychiatric risk factors for suicidality in youth: the Great Smoky Mountains Study. *Arch Gen Psychiatry*. 2006 Sep;63(9):1017-24. doi: 10.1001/archpsyc.63.9.1017
32. Statistics Finland. Suomen virallinen tilasto (SVT): Kuolemansyyt. [Internet]. 2021 [referenced at 3.2.2022]. Available: <http://www.stat.fi/til/ksyyt/index.html>
33. Harris EC, Barraclough B. Suicide as an outcome for mental disorders. A meta-analysis. *Br J Psychiatry*. 1997 Mar;170:205-28. doi: 10.1192/bjp.170.3.205
34. Hintikka U, Marttunen M, Pelkonen M, Laukkanen E, Viinamäki H, Lehtonen J. Improvement in cognitive and psychosocial functioning and self-image among adolescent inpatient suicide attempters. *BMC Psychiatry*. 2006 Dec 29;6:58. doi: 10.1186/1471-244X-6-58
35. Endicott J, Spitzer RL, Fleiss JL, Cohen J. The Global Assessment Scale. A procedure for measuring overall severity of psychiatric disturbance. *Arch Gen Psychiatry*. 1976 Jun;33(6):766-71. doi: 10.1001/archpsyc.1976.01770060086012
36. Richter D, Berger K, Reker T. Nehmen psychische Störungen zu? Eine systematische Literaturübersicht [Are mental disorders on the increase? A systematic review]. *Psychiatr Prax*. 2008 Oct;35(7):321-30. German. doi: 10.1055/s-2008-1067570

37. Costello EJ, Erkanli A, Angold A. Is there an epidemic of child or adolescent depression? *J Child Psychol Psychiatry*. 2006 Dec;47(12):1263-71. doi: 10.1111/j.1469-7610.2006.01682.x
38. Sourander A, Koskelainen M, Niemelä S, Rihko M, Ristkari T, Lindroos J. Changes in adolescents' mental health and use of alcohol and tobacco: a 10-year time-trend study of Finnish adolescents. *Eur Child Adolesc Psychiatry*. 2012 Dec;21(12):665-71. doi: 10.1007/s00787-012-0303-8
39. Mishina K, Tiiri E, Lempinen L, Sillanmäki L, Kronström K, Sourander A. Time trends of Finnish adolescents' mental health and use of alcohol and cigarettes from 1998 to 2014. *Eur Child Adolesc Psychiatry*. 2018 Dec;27(12):1633-1643. doi: 10.1007/s00787-018-1158-4
40. Gyllenberg D, Bastola K, Wan Mohd Yunus WMA, Mishina K, Liukko E, Kääriälä A, Sourander A. Comparison of new psychiatric diagnoses among Finnish children and adolescents before and during the COVID-19 pandemic: A nationwide register-based study. *PLoS Med*. 2023 Feb 27;20(2):e1004072. doi: 10.1371/journal.pmed.1004072
41. Horwitz AV. How an age of anxiety became an age of depression. *Milbank Q*. 2010 Mar;88(1):112-38. doi: 10.1111/j.1468-0009.2010.00591.x
42. Statistics Finland. 7. Itsemurhia aiempaa vähemmän. [Internet]. 2020 [referenced at 5.8.2023]. Available: http://www.stat.fi/til/ksyyt/2020/ksyyt_2020_2021-12-10_kat_007_fi.html
43. Statistics Finland. Terveys > Elinajanodote. [Internet]. 2021 [referenced at 18.2.2023]. Available: <https://www.tilastokeskus.fi/tup/tasaarvo/terveys>
44. Ohannessian CM, Fagle T, Salafia C. Social media use and internalizing symptoms during early adolescence: The role of co-rumination. *J Affect Disord*. 2021 Feb 1;280(Pt A):85-88. doi: 10.1016/j.jad.2020.10.079
45. Rosa H. Social acceleration: ethical and political consequences of a desynchronized high-speed society. *Constellations*. 2003 Mar;10(1):3-33. doi: 10-1111/1467-8675.00309
46. Sund R. Quality of the Finnish Hospital Discharge Register: a systematic review. *Scand J Public Health*. 2012 Aug;40(6):505-15. doi: 10.1177/1403494812456637