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DOES MORE PSYCHIATRIC INPATIENT TREATMENT DURING ADOLESCENCE PREDICT MORE OR LESS INPATIENT TREATMENT IN ADULTHOOD? A REGISTER BASED 10-YEAR FOLLOW-UP STUDY

ABSTRACT

Previous research has produced inconsistent findings regarding whether the amount of inpatient care during adolescence predicts later treatment needs in adulthood. The aim of this study was to examine whether the extent of adolescent psychiatric inpatient care is associated with recurrent hospitalization and the accumulation of inpatient days in adulthood, and whether these associations are independent of age, sex, diagnosis and decade of first admission. This nationwide register-based cohort study included all adolescents aged 13–17 who were admitted to psychiatric inpatient care for the first time between 1980 and 2010 (n=16 842). Adolescent inpatient days were calculated from all hospitalizations occurring before age 18, and adult inpatient days from hospitalizations during a ten-year follow-up period (ages 18–27). Associations were first analysed using cross-tabulations, and multivariable logistic regression models were used to account for potential confounders. A greater number of adolescent inpatient days was associated with a higher likelihood of readmission and a larger number of inpatient days in adulthood. Older age at first admission, diagnostic group and earlier decade of admission also predicted the occurrence and amount of inpatient care during follow-up. Among individuals with schizophrenia spectrum disorders, the association between adolescent inpatient days and adult inpatient care was not as pronounced as in other diagnostic groups; instead, the need for care remained relatively stable regardless of the amount of adolescent hospitalization, likely reflecting the nature of the disorder. These findings highlight the importance of strengthening outpatient services and supporting symptom management and functional capacity in adolescents within their natural developmental environments.

KEYWORDS: ADOLESCENT PSYCHIATRY, INPATIENT CARE, READMISSIONS, REGISTER STUDY

INTRODUCTION

Adolescence is a critical period for the onset of mental health disorders – most mental health disorders begin during adolescence or young adulthood, and many disorders that begin in adolescence continue into adulthood or reappear later in life (1–3). About one adolescent in five has a psychiatric disorder (4). Rapid changes in physical, cognitive, emotional and social development can contribute to the onset of mental health disorders during this sensitive period (5). There is an increase in rates of depression, panic disorder and substance use disorder (SUD) when moving from childhood to adolescence, as well as a decrease in ADHD and SAD (separation anxiety disorder)(4). Comorbidity, that is the simultaneous occurrence of multiple mental health disorders, is common in young people, as well as in adults.

Inpatient care could be considered most beneficial for those who have not received sufficiently effective treatment from lighter forms of psychiatric care, such as outpatient or day patient services, but there is only limited research evidence on which specific behavioural or symptom-related factors or criteria that would indicate the need for psychiatric inpatient treatment (6). In Finland, adolescent mental health treatment is more accessible compared to the European average (7). Adolescent psychiatric services in Finland are mainly provided by publicly funded specialist-level healthcare units, which commonly offer both inpatient and outpatient services in central hospitals. Additionally, student healthcare plays an important role in the

early detection of mental health disorders, treatment of mild and moderate disorders and referral to specialized treatment. Most adolescent psychiatric treatment and mental health services are provided on an outpatient basis.

In Finland, the first adolescent psychiatric ward was founded in Pitkäniemi, Nokia, in 1959, and shortly thereafter in Hesperia, Helsinki, in 1961 (8). In the Mental Health Act of 1991, it was emphasized that adolescent psychiatric inpatient care should take place in its own units, separate from adult psychiatric wards. At first, this led to a significant increase in the number of beds in adolescent psychiatric wards during the 1990s—up to 130% compared to previous levels—at the same time as the number of adult psychiatric ward beds decreased as a result of deinstitutionalization (9). In 1999, adolescent psychiatry became its own medical specialty, separated from both child and adult psychiatry. During the 2000s, adolescent psychiatric treatment increasingly shifted from ward-based to outpatient-based, and the length of inpatient stays shortened (10).

Inpatient care provides advantages over outpatient care by offering a safe, round-the-clock environment to manage serious symptoms such as suicidal behaviours, productive psychotic symptoms or severe eating disorder symptoms. It also enables close monitoring of medication response and provides structured support for reducing health-compromising behaviours such as substance use or passivity. Educational needs may be managed effectively in hospital school, and the ward community may provide peer support that is of utmost importance during adolescent years. Mental health challenges have been found to be associated with other health and developmental difficulties among young people, such as poorer academic performance, sexual health issues and increased substance use (2). Comorbid diseases such as diabetes and obesity, among other risk factors, reduce life expectancy of these patients by up to 10–20 years (12,13). Inpatient units can provide additional support to look after these habits and offer alternative activities and groups instead.

Inpatient care may in certain situations also take place on an involuntary basis. In Finland, criteria for adolescent psychiatric inpatient care are that the young person presents with a serious mental health disorder and is in need of treatment in a way that failure to submit to treatment would significantly endanger their health or safety or the health or safety of other people, and other mental health services are not suitable (Mental Health Act 1116/1990).

Inpatient treatment is not without downsides. Symptom contagion is a known risk in, for example, eating disorders and suicidal behaviours (14–16). Stigma related to mental disorders may be pronounced in inpatient care (17). During inpatient treatment, adolescents also miss out on the social interaction that young people generally engage in at school and in their hobbies. The patient's own leisure activities are put on hold during the treatment, which can affect coping, especially when the activity has previously been an important asset in their everyday life. Furthermore, the increase in autonomy that comes with adolescence is reduced while being an inpatient, as the inpatient care limits the young person's control over their actions and activities (11). After treatment, the transition back to normal life can be stressful if sufficient support is not available at that stage (18,19).

In conclusion, inpatient care can provide an opportunity for intensive treatment and individual support, but it can also cause unwanted changes in the patient's life and restrict their freedom in ways that outpatient or day care does not. Acute inpatient admissions mainly take place in situations where they are unavoidable. Long-term inpatient care can be more subject to debate. However, in subsequent crises, the threshold for inpatient admission may lower (20,21), and repeated inpatient admissions finally constitute considerable total time spent in inpatient care. The benefits and disadvantages of more inpatient treatment, as opposed to minimizing inpatient care, have not been studied widely enough to determine which provides better functioning in the long term. Some studies have yielded support for long hospital stays, suggesting they improve the patient's functional capacity more than a short stay, while other results support that the length of the hospital stay has no significance in functional capacity (11). Instead, recent research evidence indicates that a first psychiatric inpatient admission occurring in early adulthood predicts a continued need for long-term clinical psychiatric care (22).

In this study, we aim to survey the connections between time spent in inpatient psychiatric care during adolescence and rehospitalization during the 10-year follow-up among those who were admitted to hospital between ages 13 and 17 for the first time. Providing intensive care during developmental years in the form of inpatient treatment could result in improvements that permanently decrease the need for inpatient treatment in subsequent developmental stages. On the other hand, there may be a risk that both repeated admissions and lengthy stays become a helplessness-reinforcing solution to a multitude of challenges for the young person and their environment, as suggested in the labelling theory of mental illness (20). Therefore, we set out to answer the following questions:

1. Does the total time spent in hospital care during adolescence predict rehospitalization in adulthood?

2. Does the total time spent in psychiatric inpatient care during adolescence have predictive significance for time spent in inpatient care in ten-year follow-up after coming of age?
3. Are the possible longitudinal associations of time spent in inpatient care during adolescence with rehospitalization and time spent in inpatient care in 10-year follow-up independent of sex, age, diagnosis at first admission and decade of the first admission?

MATERIALS AND METHODS

The present study comprises a register-based naturalistic follow-up study of adolescent psychiatric inpatients. All the patients admitted to adolescent psychiatric inpatient care for the first time between 1980 and 2010 at ages 13-17 in Finland, diagnosed with psychiatric disorders (F diagnoses), Z codes or neurological disorders (G diagnoses) as per ICD-10, were identified from the National Care Register in Health Care (CRHC) database (n=16 842). The Finnish Care Register for Health Care (HILMO) has systematically recorded all episodes of specialized medical care in Finland since 1994. Its predecessor, the national hospital discharge register, encompassed all patients released from inpatient hospital care within Finnish health services between 1969 and 1993. The fundamental data elements and overall structure of these registers have remained largely stable throughout the entire study period. From these nationwide registers, data were extracted on patients' age, sex, psychiatric diagnoses, the dates marking the initiation and termination of inpatient treatment for each patient's first inpatient stay (=index admission) and dates of initiation and termination of all their subsequent psychiatric inpatient admissions.

For each patient, a sum score of psychiatric inpatient days during adolescence was calculated using all admissions that took place at ages 13-17. The patients were then followed up for 10 years (ages 18-27) after the index admission, or until the end of 2014, whichever came earlier. A sum score of accumulated inpatient dates during the ten-year follow-up in (early) adulthood was calculated for each patient.

Primary diagnoses were classified to externalizing disorders (F10-19, F60-69, F90-92), organic, intellectual disability, pervasive developmental disorders (F00-09, F70-79, F80-89) and G-diagnoses, schizophrenia group disorders (F20-29), severe mood disorders (F30-39), neurotic and stress-related disorders (F40-48), behavioral syndromes associated with physiological disturbances and physical factors (F50-59), internalizing disorders with onset in childhood (F93-99) and Z codes.

STATISTICAL ANALYSES

The distributions of total inpatient days during adolescence and during young adulthood were each classified to quartiles. Total inpatient days (in quartiles) during adolescence was used as the main explanatory variable. The outcome variable was inpatient treatment during follow-up that was used in the analyses as: a) dichotomized to no rehospitalization vs. any rehospitalization, and among those ever rehospitalized, b) inpatient days falling into the highest quartile vs. less than that.

Bivariate associations of length of total inpatient treatment during adolescence (classified to quartiles) as well as sex, age at index admission (13-14 years vs. 15-17 years), decade of the index admission (80's, 90's, 00's) and primary diagnosis at index admission with inpatient treatment during follow-up were explored using cross-tabulations with chi-square statistics (Fisher's exact test where appropriate).

Multivariable models were carried out using logistic regression. As the dependent variable : a) rehospitalization in 10-year follow-up (yes/no), and among those ever rehospitalized, b) high number (=highest quartile) of inpatient days in the follow-up. Independent variables used were inpatient days during adolescence (in quartiles), sex, age group at index admission, primary diagnosis and decade of index admission.

The associations between time spent in inpatient care during adolescence and inpatient treatment during 10-year follow-up were further analysed separately among those who had been diagnosed with a schizophrenia group disorder (F20-29) and those treated for other conditions at index admission.

Due to the large data size and multiple comparisons the cut-off for statistical significance was set at $p<0.01$.

RESULTS

The quartiles for the total number of days spent in inpatient psychiatric care during adolescence were as follows: 1st quartile: 0–9 days (23.9% (4032/16,842)), 2nd quartile: 10–35 days (24.1% (4051/16,842)), 3rd quartile: 36–49 days (25.3% (4268/16,842)), and the highest, 4th quartile: more than 95 days (24.8% (4181/16,842)).

During the ten-year follow-up, the upper quartile for inpatient days in adulthood was 180 days.

PATIENTS

Of the study population (n=16,842), 40.0% (n=6749) were male and 59.9% (n=10,093) female. At the index admission, 31.5% (n=5313) were aged 13–14 years and 68.5% (n=11,529) were aged 15–17 years. The distribution of primary diagnoses at the index admission is presented in *Table 1*.

A total of 14.4% (n=2427) of patients had their index admission in the 1980s, 21.0% (n=3543) in the 1990s and 64.6% (n=10,842) in the 2000s.

Table 1. Distribution of primary diagnoses at the index admission

Diagnostic group	% (n)
F00-09, F70-79, F80-89, G-diagnoses	3.0% (511)
F10-19, F60-69, F90-92	21.4% (3611)
F20-29	11.5% (1932)
F30-39	28.7% (4842)
F40-48	19.0% (3194)
F50-59	5.2% (874)
F93-99	7.3% (1233)
Z codes	2.8% (645)

INPATIENT CARE IN ADULTHOOD

Table 2 presents the occurrence of readmissions (yes/no) during the ten-year follow-up and the proportion of patients exceeding the upper quartile of inpatient days in adulthood (180 days), stratified by quartiles of inpatient days during adolescence. Readmissions were most common among those who had spent the longest time in inpatient care during adolescence (95+ days), at 30.5%. This group also most frequently exceeded the upper quartile of inpatient days in adulthood.

Inpatient care during the ten-year follow-up by index period diagnoses is shown in *Table 3*. Among those admitted with schizophrenia spectrum disorders (F20–29), 36.9% had a readmission, whereas in all other diagnostic groups the proportion was below 30% (p<0.01). This group also had the highest proportion of patients exceeding the upper quartile of inpatient days (48.6%, p<0.01), while in other diagnostic groups the proportions ranged between 15–20%.

Additionally, 27.5% (1856/6749) of males and 24.5% (2472/10,093) of females had at least one readmission during the ten-year follow-up after reaching adulthood (p<0.001). Those admitted at ages 15–17 had more readmissions (29.7%, 3425/11,529) than those admitted at ages 13–14 (17.0%, 903/5313), p<0.001. Readmissions were more common among those admitted in the 1980s (36.0%, 873/2427) compared with the 1990s (31.9%, 1129/3543) and 2000s (21.4%, 2326/10,872), p<0.01.

During the ten-year follow-up, 27.5% (511/1856) of males and 23.1% (571/2472) of females belonged to the group exceeding the upper quartile of inpatient days (>180 days), p<0.001. Among those admitted at ages 13–14, 15.0% (135/903) exceeded the upper quartile, compared with 27.6% (947/3425) of those admitted at ages 15–17 (p<0.001). By decade of index admission, 41.8% (365/873) of those admitted in the 1980s, 26.6% (300/1129) in the 1990s and 17.9% (417/2326) in the 2000s exceeded the upper quartile (p<0.001).

MULTIVARIABLE ANALYSIS

Compared with those in the lowest quartile of inpatient days during adolescence, the likelihood (Odds Ratios (OR) with 95% confidence intervals (CI)) of readmission in adulthood was higher among those with longer adolescent inpatient stays, although no linear trend was observed across quartiles: 10–35 days OR 1.2 (1.1–1.3), 36–94 days OR 1.2 (1.1–1.3), 95+ days OR 1.4 (1.3–1.6). Readmissions were also more likely among those admitted at ages 15–17 (OR 2.0 (1.9–2.2)), those with an F20–29 diagnosis at the index admission (OR 1.6 (1.4–1.7)), and those admitted in the 1980s (OR 1.7 (1.6–1.9)) or 1990s (OR 1.7 (1.5–1.8)). All ORs were statistically significant at p<0.01.

Exceeding the upper quartile of inpatient days in adulthood (>180 days) did not differ between the lowest (0–9 days) and second lowest (10–35 days) adolescent quartiles, but was more likely among those with 36–94 days (OR 1.5 (1.2–1.9)) and most likely among those with 95+ days (OR 2.3 (1.9–2.9)). Exceeding the upper quartile was also more common among those admitted at ages 15–17 (OR 2.2 (1.8–2.8)), those with an F20–29 diagnosis (OR 2.8 (2.3–3.3)), and those admitted in the 1980s (OR 2.6 (2.2–3.1)) or 1990s (OR 1.6 (1.4–1.9)). All ORs were statistically significant at p<0.01.

Table 2. Inpatient care during the 10-year follow-up by quartiles of inpatient days in adolescence

	Days in inpatient care during adolescence				
	0-9 days	10-35 days	36-94 days	95 days →	p
Readmissions during 10-year follow-up	22.4% (974/4342)	25.1% (1016/4051)	24.9% (1062/4268)	30.5% (1276/4181)	<0.01
More than 180 inpatient days during the 10-year follow-up	16.9% (165/974)	20.7% (210/1016)	24.3% (258/1062)	35.2% (449/1276)	<0.01

Table 3. Readmissions and inpatient days exceeding the upper quartile (>180 days) during the 10-year follow-up by diagnostic group

Diagnostic group	Readmission during 10-year follow-up, % (n/N)	More than 180 inpatient days during follow-up, % (n/N)
F00-09, F70-79, F80-89, G-diagnoses	24.9% (127/511)	22.0% (28/127)
F10-19, F60-69, F90-92	26.8% (969/3611)	15.1% (146/969)
F20-29	39.6% (766/1932)	48.6% (372/766)
F30-39	22.6% (1093/4842)	19.8% (216/1093)
F40-48	24.4% (780/3194)	22.3% (174/780)
F50-59	24.1% (211/874)	28.4% (60/211)
F93-99	20.6% (254/1233)	21.7% (55/254)
Z codes	19.8% (128/645)	24.2% (31/128)
p	<0.001	<0.001

INPATIENT CARE IN ADULTHOOD AMONG THOSE WITH AND WITHOUT SCHIZOPHRENIA SPECTRUM DIAGNOSES

Because patients with schizophrenia spectrum diagnoses differed clearly from all other diagnostic groups in terms of readmissions and inpatient days, predictors of adult inpatient care were examined separately for those with and without an F20–29 diagnosis at the index admission. Both primary and secondary diagnoses were included. A total of 2032 adolescents had an F20–29 diagnosis at the index admission.

Readmissions occurred in 39.3% (799/2032) of those with schizophrenia spectrum diagnoses and 23.8% (3529/11,281) of those with other diagnoses (p<0.01). More than 180 inpatient days during follow-up were recorded for 47.7% (381/2032) of the schizophrenia spectrum group and 19.9% (701/11,281) of others (p<0.01).

Table 4 shows inpatient care during follow-up by quartiles of adolescent inpatient days for those with and without schizophrenia spectrum diagnoses. Among those with schizophrenia spectrum disorders, neither the proportion of readmissions nor the proportion exceeding the upper quartile of inpatient days increased significantly as a function of adolescent inpatient days. Among those with other diagnoses, both outcomes increased with longer inpatient stays during adolescence.

Table 4. Schizophrenia spectrum diagnosis (F20–29) vs. other disorders – number of readmissions and long inpatient stays during the 10-year follow-up. % (n/N)

	Days in inpatient care during adolescence				
	0-9 days	10-35 days	36-94 days	95 → days	p
Readmissions during the 10-year follow-up • Schizophrenia spectrum (F20-29) • Other disorders	40.4% (120/297) 21.1% (854/4045)	42.0% (155/369) 23.4% (861/3682)	39.3% (201/512) 22.9% (861/3756)	37.8% (323/854) 28.6% (953/3327)	0.559 <0.01
More than 180 inpatient days during the 10-year follow-up • Schizophrenia spectrum (F20-29) • Other disorders	43.3% (52/120) 13.2% (113/854)	42.6% (66/155) 16.7% (144/861)	44.3% (89/201) 19.6% (169/861)	53.9% (174/323) 28.9% (275/953)	0.038 <0.001

DISCUSSION

The aim of our study was to examine whether the amount of psychiatric inpatient care during adolescence predicts the need for psychiatric hospitalization in adulthood, and if so, whether this is independent of age, gender, diagnosis or decade of first admission. The need for psychiatric inpatient care in adulthood was assessed over a ten-year follow-up period in terms of the occurrence of inpatient episodes and the total number of inpatient days. If an adolescent had accumulated a high number of inpatient days, readmission in adulthood was more likely and the number of inpatient days in adulthood was also higher. In addition to adolescent inpatient days, predictors of inpatient care during the ten-year follow-up included older age at entry into adolescent psychiatric care, diagnosis and earlier decade of first admission. To our knowledge, a similar analysis has not previously been conducted within the Finnish service system.

A high amount of psychiatric inpatient care during adolescence predicting extensive inpatient care in adulthood may indicate that the disorders requiring hospitalization and their symptoms were severe in adolescence and continued to be severe in adulthood. Alternatively, extensive inpatient care during adolescence may provide a pattern of emotion regulation and coping in which the young person turns to hospitalization, and this pattern may continue into adulthood. Long or repeated inpatient treatment during adolescence may also lead to stigmatization. Previous studies in both European and U.S. samples have shown that earlier adolescent psychiatric hospitalization and the accumulation of inpatient days predict future hospitalization (23,24). Repeated referrals to inpatient care may create a cycle in which the young person's sense of competence in their natural environment does not strengthen, as autonomy and self-efficacy tend to diminish in hospital settings. The phenomenon can also be considered through the dynamics of the welfare system: when a young person is frequently treated in hospital, they may learn to seek inpatient care again when a crisis escalates, and healthcare professionals may also be more inclined to refer them to hospital because of their prior admissions. This hypothesis aligns partly with labelling theory (20).

Because patients with schizophrenia spectrum diagnoses differed from all other diagnostic groups in terms of the amount of inpatient care, we also examined the predictive value of adolescent inpatient days for adult inpatient care separately for those with and without schizophrenia spectrum diagnoses at the index admission. In this analysis, schizophrenia spectrum diagnoses (F20–29) were considered both as primary and secondary diagnoses. Among those with schizophrenia spectrum disorders, the amount of inpatient care during adolescence did not significantly predict the amount of inpatient care in adulthood, whereas among those with other diagnoses, longer adolescent inpatient stays predicted more extensive inpatient care in adulthood. In schizophrenia spectrum disorders, the need for treatment is likely determined largely by the natural course of the illness rather than by external factors: these disorders are relatively chronic and persistent despite treatment, continuing into adulthood with relapses and more stable phases (25,26).

Based on the findings of this study, it is important to consider whether the need for inpatient care in adulthood could be reduced in non-schizophrenia disorders by more strongly modifying the young person's environment and strengthening their sense of competence through outpatient interventions.

Those admitted at ages 15–17 had a clearly higher risk of readmission during the ten-year follow-up than those admitted at ages 13–14. Younger adolescents may have greater potential for recovery and more remaining developmental years that support

neuroplasticity, whereas those admitted in mid-adolescence may have experienced a more severe onset of illness. For younger adolescents, symptoms may have been more strongly influenced by psychosocial factors. Additionally, the 15–17 age range coincides with the transition from compulsory education to upper secondary studies and increasing social and independence-related demands, whereas younger adolescents remain in a more structured developmental environment with less autonomy. Substance use experimentation is also more common in the older age group (27). Consistent with our findings, earlier research has shown that psychiatric disorders leading to inpatient care in young adulthood are associated with long-term and severe functional impairment regardless of the initial diagnosis (22).

Among those admitted in earlier decades, inpatient episodes during follow-up were more common than in the 2000s cohort, and particularly in the 1980s cohort, the proportion exceeding the upper quartile of inpatient days was elevated. Although those admitted in the late 2000s have had a shorter follow-up period, differences between decades likely reflect structural changes in the psychiatric care system, which has shifted toward shorter inpatient stays and a stronger emphasis on outpatient care (10). In the 1980s, the system was more hospital-centred and outpatient services were less developed.

These findings are significant for the future of adolescent psychiatric care. Extensive inpatient treatment during adolescence predicts extensive inpatient treatment in adulthood. It is important to avoid institutionalization that weakens autonomy and a sense of mastery. On the other hand, schizophrenia spectrum disorders, which require substantial inpatient care, are process disorders whose course may be less influenced by environmental factors than other disorders, which are more dependent on individual and professional interpretations and environmental influences. For this reason, future work should focus on understanding the mechanisms that explain differences in service use between diagnostic groups, and on developing diagnosis-specific risk assessment and care pathway models that account for the distinct developmental trajectories of different disorders.

STRENGTHS AND LIMITATIONS

A key strength of our study is the unselected, nationally representative register-based dataset, which is not affected by attrition. Service providers are required to report data in a standardized manner to the national HILMO register, which served as the data source for this study. On the other hand, register data do not allow examination of patients' subjective experiences regarding their need for care. The generalizability of the findings is likely limited to countries with healthcare systems similar to those in the Nordic region.

Meaningful analyses required categorizing the cumulative number of inpatients days both during adolescence and during adulthood, because in both periods the number of inpatient days was very skewed. We chose to categorize by quartiles in order to ensure sufficient number of observations in all cells. Patterns of inpatient care use have also changed over decades, so categorizations truly meaningful in content would be difficult to motivate for data over such a long inclusion period.

CONCLUSION

Extensive psychiatric inpatient care during adolescence predicts extensive inpatient care in adulthood, with the exception of schizophrenia spectrum disorders, in which the need for hospitalization is likely determined by the nature of the disorders themselves. Adolescent psychiatric inpatient care has increased in Finland over recent decades. It is essential to further strengthen support for symptom management and functional capacity in the natural developmental environments of young people with psychiatric disorders.

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