Adolescent psychiatric inpatients with first hospitalization due to anorexia nervosa: can rehospitalization be predicted by clinical features?

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Abstract

Anorexia nervosa (AN) is a severe mental disorder with increased risk for early death, chronic morbidity and long-term psychosocial adversities. In order to improve treatment approaches, it is important to study the most severely ill patients. Our objectives were to describe the adolescents hospitalized for the first time from a well-defined catchment area due to AN, as well as to identify factors that predict comorbidity and future need for inpatient care. Psychiatric symptoms and eating disorder (ED) symptoms were analysed as predictors of comorbidity and subsequent referral to inpatient treatment. The adolescents hospitalized during a defined study period (N = 59) had considerable previous and concurrent general psychopathology. Suicidal ideation and psychotic symptoms predicted comorbidity and readmission was predicted by prolonged fasting. Comorbid disorders and psychopathology other than ED symptoms are common in adolescent AN. However, they are little help in predicting who will need rehospitalization.

Introduction

Eating disorders (EDs), particularly anorexia nervosa (AN), are severe mental disorders (1, 2). A high 2.8% mortality rate has recently been reported for AN (3). Adequate and appropriate treatment is necessary to avert serious health consequences and the increased risk of death (1, 2, 4). In adolescence, EDs are common, chronic and increasing in frequency (1, 5-7). It has been estimated that approximately 0.5%-1% of adolescents and young adult women, and 0.2%-0.3 % of boys/men have a diagnosis of AN (6, 8-10). In a Finnish study of young females, the lifetime prevalence rate for DSM-IV AN was 2.2% and the incidence rate 270 per 100,000 person-years (11).

The superiority of any specific approach in the treatment of AN has not been confirmed by research. Nutritional rehabilitation, however, is a crucial aspect of treating AN for the short and intermediate course of the disorder (8). Management of psychological issues is ultimately crucial for the long-term outcome of the illness.

Early diagnosis and prompt intervention may enable less radical treatment and yield a better prognosis for AN (8). Research has shown that the duration of AN prior to hospitalization and the presence of a comorbid disorder influence the length of hospital stay among young AN patients (12). The type of treatment required for ED patients is determined by the level of severity of the condition, likewise that of weight loss, and treatment motivation. Inpatient treatment is typically restricted to the most severe cases (8).

Comorbidity, the presence of two or more diseases, is particularly common in adolescent EDs (13, 14). Studies have demonstrated that several psychiatric conditions, particularly mood, anxiety and substance abuse disorders as well as personality disorders and schizophrenia spectrum psychosis, have features that overlap with those of EDs and that these features are more common in individuals with EDs (8, 13, 15). Mood and anxiety disorders may be both a possible cause of the ED and a result of malnutrition (8). Psychiatric comorbidity may increase ED severity, chronicity and treatment resistance (15-17). It also predicts poorer ED recovery (15, 16, 18).

AN patients with younger onset age have poorer outcomes on average (19, 20). Several factors related to illness duration and severity have also been considered prognostic factors for AN (8). Hospital treatment is offered when the patient presents with severe medical conditions or a severe comorbid psychiatric illness (21), and it is unclear which type of young patient benefits from hospitalization (22). Certain studies report that inpatient treatment predicts poor prognosis (3), and comorbidity affects the duration of the treatment (12, 16). The natural course of the illness remains poorly understood.

The rehospitalization rate is higher in adolescent AN patients than in adults. Rehospitalization seems to reflect the chronic course in a sizable proportion of young AN patients and to carry the risk for subsequent poor psychosocial and psychiatric outcomes (23). By recognizing predictors of rehospitalization, preferably of such a nature that they can be influenced by treatment, might offer opportunities for preventing chronic course of the disorder after first inpatient admission. General

psychopathology and comorbid disorders are treatable factors that could be useful in indicating an increased risk of a chronic course of AN, and in tailoring effective interventions for those at greatest risk.

Most research on inpatient treatment of AN has been carried out in adult samples. Inpatient treatment for AN is generally accepted for adults, but there is uncertainty about its effectiveness for adolescents (24, 25). The number of adolescents receiving inpatient psychiatric services due to AN is significant (26, 27). Hospitalized patients are likely those with the most severe medical and psychiatric condition who need most help and resources from the health care system. There is a need to investigate the factors determining treatment outcome in inpatient care of adolescent AN patients (18).

The aims of this study were: 1) to describe the adolescent AN patients attending psychiatric inpatient care for the first time, as regards sociodemographics, pathways to care, concurrent psychiatric symptoms, diagnoses, family adversities and treatment received, 2) to compare adolescent AN inpatients with or without psychiatric comorbidity, and 3) to identify factors that predict rehospitalization among the adolescents with AN hospitalized for the first time.

Materials and methods

Data collection

All admissions to the adolescent psychiatric wards of Tampere University Hospital in 2005-2010 were identified in hospital databases. The study clinic provides for all adolescent psychiatric inpatient care for 13-17-year-old population from a well-defined catchment area of 22 municipalities including both urban and rural areas. The 13-17-year-old population numbers about 28,000 (http://tilastokeskus.fi/til/vaerak/index.html). All adolescents referred to inpatient care for the first time due to AN (F50.0) or atypical AN (F50.1) were included in the study group. This hospitalization period will be referred to as the patients' index treatment period.

A retrospective chart review with a structured data collection form was used. We followed up the patients in case files until the conclusion of their treatment in the adolescent psychiatry services. The study received approval from the ethics committee of Pirkanmaa Hospital District and a permission from Division of Psychiatry in Tampere University Hospital.

The study group

In the period 2005-2010, 59 patients aged 13 to 17 were hospitalized for the first time with AN (F50.0) or atypical AN (F50.1) as primary or additional diagnosis. Each adolescent was included in the study only once.

Measures

Sociodemographic characteristics collected were age, sex and family situation (living with at least one parent/with foster parent(s)/in child welfare institution/ independently). Previous treatment history was recorded whether or not the adolescent had been treated in specialist child or adolescent psychiatric community care (yes/no) or inpatient care (yes/no). If the adolescent had had previous psychiatric care, the reason for the treatment was noted.

The information collected relating to the present admission included the referring agent (primary care/GP/child or adolescent psychiatrist/other medical specialist), mode of referral (voluntary/involuntary), dates of admission and discharge, and involuntary detainment decision (yes/no).

The adolescents' symptoms were collected from the referral and from the case histories written during their hospitalization. In total, 21 general adolescent psychiatric symptoms were recorded (yes/no) in a checklist developed for clinical and research purposes in the study clinic (28). With the help of a structured 9-item checklist (28) adverse family life events were likewise recorded from the referral and from the case histories. These two checklists are presented in Appendices 1 and 2. ED symptoms were similarly recorded on a checklist of 10 items (feeling fat, fasting, sorting food into forbidden and permitted types, excessive exercise, hiding food, use of laxatives, induced vomiting, binging excessive amounts of food, perceived binging where the "binged" amount might be even smaller than a normal meal, anxiety at meals, and "other" as an eleventh option), each coded yes/no. Most of these were symptom behaviours that were readily observable to the staff. Feeling fat was recorded if there were notes that the patient had complained of feeling fat, and perceived bingeing similarly if the patient had talked about this feeling despite eating a normal amount or little.

The evaluations and interventions arranged for the adolescents during hospitalization were recorded on a 12-item checklist (comprising family meetings, network meetings, family therapy, psychological examination, laboratory tests, EEG, CT, MRI, music therapy, art therapy, physiotherapy and occupational therapy). If there were family meetings, the participants were observed. Length of treatment was calculated from admission to discharge.

Psychiatric primary diagnoses were collected as given at discharge by the treating psychiatrist according to the ICD-10. Diagnoses used in the analyses are classified as follows: substance use disorders (F10-F19), schizophrenia spectrum disorders (F20-F29), mood disorders (F30-F39), anxiety disorders (F40-F48), behavioural syndromes associated with physiological disturbances and physical factors (F50-F59), personality disorders (F60-F69), mental retardation (F70-F79), developmental disorders (F80-F89), behavioural and emotional disorders with onset usually occurring in childhood and adolescence (F90-F99), non-psychiatric primary diagnosis.

Medications initiated for continuous use and PRN (*pro re nata*, administered if needed) medications were recorded as prescribed during the hospital stay and at discharge. Medications were classified by therapeutic category level as follows: antipsychotics, antidepressants, antiepileptics/mood stabilizers, anxiolytics, hypnotics and ADHD medicines.

At discharge it was recorded whether the adolescent went to live with at least one parent/with foster parent(s)/in child welfare institution/independently or whether the treatment was to be continued in another inpatient psychiatric or somatic unit. With the help of a 10-item checklist, we recorded where the adolescents had their planned follow-up treatment after the index treatment period. The treatment options elicited were specialist adolescent psychiatric outpatient care, planned rehospitalization, adolescent psychiatric day treatment unit, follow-up visits in the inpatient ward, transfer to adult psychiatric ward or tertiary-level ward, treatment in private psychiatric practice, specialist psychiatric outpatient care in services for adults, primary care services and other arrangement. If the psychiatric treatment was to continue in other units within the scope of adolescent psychiatry, the evaluations and interventions made during follow-up treatment were also recorded with the same kind of checklist as the index treatment period. If the adolescent had hospitalizations after the index treatment period, the dates of admission and discharge were recorded, as were the diagnoses given during these treatment periods. The adolescents were followed up in case files until aged 18, or until specialist psychiatric treatment was terminated, whichever occurred earlier.

Statistical analyses

Frequencies of the features studied were computed. Symptoms and adverse family life events were compared between those suffering from comorbid AN and those with non-comorbid AN using cross-tabulations Pearson's chi-square (χ^2) test. The five most common psychiatric symptoms recorded during the index treatment were used as predictors for comorbid AN at discharge in a logistic regression analysis. The same analysis to predict comorbid AN was also conducted using the five most common ED symptoms and the most commonly prescribed medications.

The five most common psychiatric and ED symptoms were also used in a logistic regression analysis as predictors for subsequent referral to inpatient treatment. Statistical analyses were carried out using the SPSS for Windows program.

Results

The hospitalized adolescents

Of the study group, 57 (96.6%) were girls and 2 (3.4%) were boys. Their ages ranged from 13.11-17.94 years, mean 15.68 years (SD = 1.2). Of the adolescents, 3.4% had been referred by doctors in primary care, 25.4% by child or adolescent psychiatrists and 71.2% by other specialists. Thirteen (22%) of the adolescents had been referred involuntarily.

Prior to hospitalization, almost all (96.6%) of the adolescents had been living with their parent(s) and the remaining 3.4% in child welfare institutions or independently (in boarding schools, communes, with a partner). Of the adolescents, 10.2% had previously been treated in the child psychiatric outpatient clinic and 83.1% in the adolescent psychiatric outpatient clinic of the study hospital, and 37.3% had received counselling at a child guidance/family counselling centre. 3.4% had prior child psychiatric and 6.8% prior adolescent psychiatric hospitalizations due to reasons other than AN.

The most common psychiatric symptoms recorded other than ED symptoms were depression (54.2%) and suicidal talk, ideation or intentions (45.8%). Psychotic symptoms were present in 33.9% and self-destructive behaviour,

e.g. self-cutting, in 28.8% of the patients. The most common ED symptoms were fasting and anxiety at meals, both of which were present in 54.2% of the patients. The most common adverse family life events or conditions were verbal altercations at home (10.2%) and severe sibling-related problems (8.5%).

AN (F50.0) or atypical AN (F50.1) was the primary (first) diagnosis in 79.7% and 3.4% of the sample respectively. Other primary diagnoses, with (atypical) AN as additional diagnosis, were psychotic depression (3.4%), depression (3.4%), psychosis NOS (not otherwise specified) (3.4%), depression NOS (1.7%), temporary dissociation syndrome of childhood and adolescence (1.7%), other symptom related to emotional state (1.7%) and Asperger's syndrome (1.7%). AN was the sole diagnosis for 64.4% of the adolescents and the remainder (35.6%) had a diagnosis of AN comorbid with some other psychiatric diagnosis.

Interventions and treatment

Most of the patients (66.1%) were taking antipsychotic medication during the index treatment period, 27.1% took antidepressants, 23.7% anxiolytics and 3.4% hypnotics. None were prescribed antiepileptics or mood stabilizers, or stimulants or atomoxetine.

An individual treatment relationship with an assigned nurse was always a part of the treatment protocol in the study unit. During hospitalization, 91.5% of the patients had family meetings. 55.9% of the adolescents had physiotherapy during the index treatment period. Various other forms of therapy (e.g. music therapy and psychotherapy) were also available but these were only used on one patient (1.7%).

In the hospital, physical exercise was restricted for 84.7% of the patients. Weighing was a regular practice in the hospital, but the data regarding patients' weights and weigh-ins was incomplete so it was difficult to obtain systematic information about their weight fluctuations. At the beginning of the hospitalization the body mass index (BMI) of the patients ranged from 13.7 to 20.5 kg/m^2 (mean value 16.3 kg/m^2, SD = 1.35) and at discharge from 14.9 to 21.5 kg/m^2 (mean value 17.1 kg/m^2, SD = 1.35). Mean length of stay was 67.4 days (SD = 81.1) and median 25 days.

Treatment after hospitalization

After the index treatment period, most of the patients (78%) had their follow-up treatment in an adolescent psychiatric outpatient clinic. Family meetings were often arranged (96.6%) and physiotherapy was also taken by most of the patients (54.2%). A

planned readmission was scheduled for 18.6% of these patients. However, more than half (54.2%) of the adolescents had at least one further psychiatric hospital treatment period.

Factors predicting comorbidity

At the diagnostic level, the most common diagnoses occurring with AN were depression (20.3%) and schizophrenia spectrum psychosis (6.8%). No significant differences were found in duration of treatment between those with comorbid AN (mean duration 72 days) and non-comorbid AN (mean duration 65 days, $p = 0.77$).

Comorbid (35.6%) and non-comorbid (64.4%) patients were similar in regard to ED symptoms. The only significant difference was that comorbid patients presented with more fasting than non-comorbid patients (71.4% vs. 44.7%, $p = 0.05$). When ED symptoms were analysed together using logistic regression (Table 1), fasting showed a tendency to predict comorbidity (OR = 3.21, $p = 0.06$).

Comorbid patients presented with more depressive symptoms (71.4% vs. 44.7%, $p = 0.05$), suicidal talk, ideation or intentions (71.4% vs. 31.6%, $p < 0.01$), and psychotic symptoms (57.1% vs. 21.1%, $p < 0.01$). When analysed with logistic regression (Table 2), suicidal ideation (OR = 5.99, $p = 0.02$) and psychotic symptoms (OR = 3.98, $p = 0.05$) predicted comorbidity at discharge, whereas anxiety (OR = 0.40, $p = 0.05$) predicted non-comorbidity. The use of antipsychotics (OR = 4.36, $p = 0.05$) and also of antidepressants (OR = 4.54, $p = 0.03$) predicted comorbidity at discharge (Table 3). Adverse family life events did not differentiate between comorbid and non-comorbid AN patients.

Factors predicting rehospitalization

Being discharged with a comorbid diagnosis did not predict rehospitalization among AN patients (OR = 1.22, 95% CI of 0.42-3.55, $p = 0.71$). Of the five most common ED symptoms (Table 4), only fasting significantly predicted a repeat referral to inpatient treatment (OR = 3.31, $p = 0.04$) in the logistic regression analysis. Of the five most common general adolescent psychiatric symptoms (Table 5), depressive symptoms seemed to suggest that rehospitalization was more unlikely (OR = 0.34, $p=0.08$) but the result did not reach statistical significance.

Table 1. Logistic regression analysis of the five most common eating disorder symptoms as predictors for comorbidity at discharge (N=59).

	Wald (df)	p	OR	95% CI
Feeling fat	0.23 (1)	.63	0.73	0.20 - 2.63
Fasting	**3.46 (1)**	**.06**	**3.21**	**0.94 - 10.97**
Excessive exercise	0.85 (1)	.36	0.56	0.16 - 1.93
Vomiting	0.02 (1)	.89	1.09	0.31 - 3.91
Anxiety at meals	0.07 (1)	.80	0.86	0.27 - 2.71

Nagelkerke R^2 = .13, percent predicted correct 69.5

Table 2. Logistic regression analysis of the five most common psychiatric symptoms as predictors for comorbidity at discharge (N=59).

	Wald (df)	p	OR	95% CI
Depressive symptoms	1.26 (1)	.26	2.29	0.54 - 9.68
Suicidal ideation	**5.45 (1)**	**.02**	**5.99**	**1.33 - 26.94**
Psychotic symptoms	**3.71 (1)**	**.05**	**3.98**	**0.98 - 16.22**
Deliberate self-harm	0.00 (1)	.97	0.97	0.21 - 4.57
Anxiety	**3.79 (1)**	**.05**	**0.40**	**0.02 - 1.01**

Nagelkerke R^2 = .37, percent predicted correct 74.6

Table 3. Logistic regression analysis of the most commonly used medications as predictors for comorbidity at discharge (N=59).

	Wald (df)	p	OR	95% CI
Antipsychotic	**3.96 (1)**	**.05**	**4.36**	**1.02 - 18.61**
Depression	**4.93 (1)**	**.03**	**4.54**	**1.20 - 17.25**
Anxiolytic	0.23 (1)	.63	0.70	0.17 - 2.93

Nagelkerke R^2 = .24, percent predicted correct 76.3

Table 4. Logistic regression analysis of the five most common eating disorder symptoms as predictors for rehospitalization (N=59).

	Wald (df)	p	OR	95% CI
Feeling fat	0.68 (1)	.41	1.66	0.49 - 5.60
Fasting	**4.05 (1)**	**.04**	**3.31**	**1.03 - 10.64**
Excessive exercise	0.12 (1)	.74	1.23	0.37 - 4.04
Vomiting	0.42 (1)	.52	1.50	0.44 - 5.16
Anxiety at meals	0.73 (1)	.39	0.61	0.20 - 1.90

Nagelkerke R^2 = .15, percent predicted correct 59.3

Table 5. Logistic regression analysis of the five most common psychiatric symptoms as predictors for rehospitalization (N=59).

	Wald (df)	p	OR	95% CI
Depressive symptoms	**3.16 (1)**	**.08**	**0.34**	**0.10 - 1.12**
Suicidal ideation	0.05 (1)	.83	1.15	0.33 - 3.94
Psychotic symptoms	0.62 (1)	.43	1.68	0.46 - 6.12
Deliberate selfharm	0.51 (1)	.47	0.61	0.15 - 2.39
Anxiety	0.27 (1)	.60	0.65	0.12 - 3.36

Nagelkerke R^2 = .11, percent predicted correct 66.1

Discussion

The first aim of our study was to describe hospitalized adolescent AN patients with regard to symptom profiles, family situation, pathways to care, previous treatments, interventions during inpatient treatment and aftercare. We next aimed at searching among these characteristics for predictors of comorbidity and for rehospitalization.

Most of the patients with first admission due to AN had had psychiatric outpatient treatment before hospitalization. However, they had mostly been referred to inpatient care by physicians not specialized in child and/or adolescent psychiatry. This suggests that hospitalization was not planned as part of the adolescent psychiatric treatment process but had been initiated unexpectedly. A noticeable share of the patients had had psychiatric treatment contact already in childhood, and previous inpatient treatments due to disorders other than AN were not uncommon. These observations suggest that general psychopathology is common in adolescent AN patients prior to onset of AN.

About half of the inpatients with a diagnosis of AN presented with symptoms of depression and suicidal talk, ideation or intentions, about a third with psychotic symptoms and with self-destructive behaviour. Two-thirds were on antipsychotic medications and about a fourth on antidepressants and anxiolytics. These observations further underline that adolescents with AN also present with extensive psychopathology other than ED symptoms. Of ED symptoms, the most common were fasting, anxiety at meals and excessive exercise to lose weight. AN patients at large, especially those with the restricting type of AN, persist in fasting and restricting their food intake (29). Excessive exercise is also typical (30, 31), displayed by 40%-80% of AN patients (31). Anxiety symptoms and food intake restriction contribute to increased levels of exercise (31).

Almost all the patients in the sample were living with at least one of their parents. Compared to other clinical inpatient samples (28), adverse family life events were not particularly common in their families, with about a tenth of the families only displaying the most frequent events. This does not suggest an important role for family difficulties in the pathogenesis of AN. During and after hospitalization family meetings were, however, arranged for almost every patient. Anorexia is in itself likely to be very stressful for the parents of a young person, and family interventions ranging from family assessment, support and psychoeducation to actual

family therapy are indicated. Family-based treatment has been reported to be beneficial for adolescents with EDs at least in 6 to 12 months follow-up (32, 33). This kind of treatment has also been suggested to be effective in improving psychological symptoms and weight gain (34).

Physiotherapy was commonly used in our sample. AN patients tend to exhibit compulsive physical activity, notable muscular tension and to perceive defects in their body. Physiotherapy intended to improve body awareness may help patients to experience their own body and stabilize the mind, thereby possibly being beneficial to overall treatment (35). Psychotropic medications were commonly used, given that medication has a limited effect on AN. The use of antipsychotics in particular also exceeded the expectable, given the share of psychotic symptoms. This suggests extensive off-label use of antipsychotic medications among adolescent inpatients with AN.

In the treatment of AN, inpatient care is offered if outpatient treatment is not sufficient (8). Close cooperation between specialists and doctors in primary care is important (36). In our sample almost all patients had prior outpatient treatment. Both psychiatric and somatic treatment was arranged, but unfortunately our data does not allow for conclusions about the quality of cooperation between psychiatric and somatic health care in the treatment of AN.

About a third of the patients had a comorbid psychiatric diagnosis. At symptom level, AN patients with comorbid disorders presented with more suicidal ideation and attempts, and also more psychotic and depressive symptoms than non-comorbid AN patients, and in multivariate analysis, suicidal ideation and psychotic symptoms significantly predicted comorbid diagnoses at discharge, whereas high levels of anxiety predicted non-comorbid AN. Predictors for comorbidity were not found among ED symptoms. Adverse family life events did not differentiate between comorbid and non-comorbid patients. Taking antidepressants and antipsychotics during index treatment period significantly predicted comorbidity at discharge.

The treatment of EDs focuses heavily on the ED behaviour and less on comorbid symptoms (37). If the ED symptoms do not differ between non-comorbid and comorbid patients, it would be sensible to invest resources in clinical work on detecting depression, suicidal behaviour and other possible comorbid symptoms to take account of these in treatment. Treating comorbid depression is important, as suicidal ideation is often related to depression (37). Adequate competencies in adolescent psychiatry at large are needed in specialized treatment of adolescent AN.

Depression as a symptom was by far the most common general psychiatric symptom in our sample of adolescent inpatients with AN. Depressive symptoms and anxiety may, on the other hand, in part be sequelae of malnutrition (38) rather than suggest a separate mood or anxiety disorder. It is unclear which components of comorbidity are linked to malnutrition in AN, but it has been shown that with the improvement of BMI, depressive, anxiety, social phobia and ED symptoms decrease during hospitalization (38).

After discharge from the index treatment, adolescent psychiatric outpatient care was usually scheduled. More than half of the patients, however, were rehospitalized. This is somewhat more than has previously been reported in a corresponding sample in Central Europe (23). Fasting recorded during index admission significantly predicted a further referral to hospital, whereas depressive symptoms seemed to suggest that rehospitalization was unlikely. Previously it has been estimated that comorbidity increases the severity of the illness and causes prolongation of treatment (15-17) and that depression may later exacerbate ED symptoms, but this was not confirmed in our data. Symptom level depression was rather protective against future hospitalizations. Depression may increase motivation to change.

The outcome of AN has been shown to be favourable in approximately half of all cases (11) and inpatient treatment has been shown to predict poorer outcome (40). In Finland, two-thirds of young female AN patients have been shown to achieve clinical recovery within five years (11). Many patients, however, have psychological problems for several years (11) and most patients need follow-up treatment after hospitalization (41). Our findings in a non-selected naturalistic study of adolescents suffering from AN and admitted as inpatients corroborate these findings. After the index treatment period, further treatment was needed and planned, and more than a half of the sample had further inpatient admissions during adolescence.

The treatment of AN has proved challenging and so far no unambiguous answer has been found to the question of how to treat adolescents with AN (41). It is also unclear why some patients achieve clinical recovery and some do not. Clinical presentation was only a little helpful in predicting rehospitalization in our data. Motivation is pivotal for behaviour change, in general and in EDs (42-44). A drawback of the present study is that motivation could not be measured using the chart review method.

The strength of our research is that our study only included inpatients. A mixed inpatient/outpatient sample would likely be so heterogeneous as to render a conclusive interpretation of the results impossible. The study unit provided for all specialist

adolescent psychiatric inpatient treatment for the 13-18-year-old population of a well-defined catchment area, thus the data is epidemiologically representative even though it is small. The present study is based on register data. It suffers no bias due to refusal to participate. The retrospective study design ensures that practices of interest were not influenced by the study, thus, the findings give an accurate description of treatment practices. Most of the material collected was readily available for all the cases, and it was recorded into our data in a structured way, which adds to the data quality. The symptoms and family adversities of interest in this study are that kind of information that is typically routinely assessed with all the patients in adolescent psychiatric clinical practice. Symptoms and family risk factors were rated as present if clearly stated in the medical charts. It is possible that the actual symptoms of the subjects were more than recorded in the data, as in cases of uncertainty or no explicit comments on certain types of symptom, and were rated as not present. The same concerns family risk factors. Thus, prevalence of symptoms and family adversities are more likely underestimates than overestimates. Diagnoses were recorded as given by the treating psychiatrists according to the ICD-10, which is the diagnostic classification officially used in Finland. While structured research diagnosis could have added to the reliability of the diagnostic information, it has nevertheless been shown that diagnoses made in Finnish specialist psychiatric health services are sufficiently reliable, particularly as regards the most severe diagnoses (45, 46). The diagnoses were all made or confirmed by the same senior adolescent psychiatrist (J.V.) competent in diagnostic procedures such as K-SADS (Schedule for Affective Disorders and Schizophrenia for school-aged children), SCAN (Schedules for Clinical Assessment in Neuropsychiatry), SCID (Structured Clinical Interview for DSM Disorders) and SIPS (Structured Interview for Prodromal Syndromes).

All the adolescents were hospitalized for the first time because of AN. However, they had extensive treatment histories, in some cases even including inpatient admissions due to other psychiatric disorders. Our sample likely represents the most difficult end in the continuum of eating pathology, however, at a relatively early phase of their ED given their young age. Information gained on severe AN in this kind of sample is likely to be more reliable than that gained among adult patients whose long-term chronic illness has likely developed secondary complications.

Conclusion

Adolescents with AN requiring inpatient admission present with considerable general psychopathology and comorbid psychiatric disorders. Eating pathology is similar among comorbid and non-comorbid AN patients. The possibilities of predicting future hospitalization on the basis of general psychiatric and ED symptoms are limited. Fasting during inpatient care is predictive of poorer outcome during adolescence, and symptom level depression may protect against rehospitalization. Future studies should include measures of motivation for recovery.

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Appendix 1. Symptoms recorded in the 21-item checklist

Suicidal ideation and talk
Suicide attempt
Self-harming behaviour
Positive psychotic symptoms
Depression
Manic behaviour
Non-physical aggression towards other people
Temper tantrums
Violent behaviour towards other people
Breaking and destroying objects
Inappropriate sexual behaviour
Alcohol abuse
Substance use
Truancy or school refusal
Property crimes
Eating disorder symptoms
Isolation
Impulse control problems
Running away
Anxiety (generalized, obsessive-compulsive, phobias, panic disorder symptoms)
Attention problems
Other symptoms (please describe: _____)

Appendix 2. Items in the family adversities checklist

Family violence
Parental substance use problems
Parental divorce or separation
Bereavement
Parental severe somatic illness
Parental severe mental disorder
Severe financial difficulties, distress related to unemployment
Severe problems related to siblings
(Suspected) sexual abuse within the family
Other (_____)

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