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Graduate thesis in Medicine

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Abstract

Background: There is insufficient knowledge of the consequences of adolescent anxiety and depression in the transition to adulthood in clinical samples. The overall aim of the study was to describe mental health and functions among participants diagnosed with anxiety and depression in adolescence in terms of the diversity of mental disorders, education, and employment rates in young adulthood.

Methods: In this follow-up study, a sample of data from the larger St. Olav Child and Adolescent Psychiatry Study at St. Olav Hospital in Trondheim was analyzed. At T2, the participants completed a diagnostic interview. Six years later, at T3, the participants filled out a questionnaire. Information from T3 was investigated based on whether the participants received an anxiety or depression diagnosis at T2 or not.

Results: Adolescent anxiety or depression predicted mental health disorders, educational dropout, and receipt of full disability benefits six years later when adjusting for age and sex as plausible confounders.

Conclusion: Having an adolescent anxiety or depression diagnosis is associated with a severe impairment of function. It is important to treat this group sufficiently to prevent a broad range of negative consequences later in life.

List of abbreviations

CAP clinic	Child and adolescent psychiatry clinic
GAD	Generalized anxiety disorder
OCD	Obsessive compulsive disorder
PTSD	Post-traumatic stress disorder
PD	Panic disorder
ICD-10	International statistical of diseases and related health problems (International classification of diseases), 10 th edition. Published in 1994 by the World Health Organization
DSM-5	Diagnostic and statistical manual of mental disorders, 5 th edition. Published in 2013 by the American Psychiatric Association
NAV	Norwegian Labour and Welfare Organization
CAMHS	Child and Adolescent Mental Health Services

Introduction

Over the past decades, there has been an increased focus on mental health. Globally, around 14% of adolescents have a mental health disorder (1). Furthermore, suicide was the fourth leading cause of death among 15-29-year-olds in 2019 (2). Mental disorders affect the individual's function and have severe consequences in the form of educational underachievement, increased sickness absence, and work disability (3, 4).

In the past years, the number of children and adolescents diagnosed with mental disorders has increased, especially for girls between 12 and 24 years. Between 15% and 20% of children and adolescents in Norway have reduced function due to mental health problems, and 10% of Norwegian children and adolescents had a psychiatric diagnosis registered by a general practitioner in 2020 (5). Each year about 5% of the population under 17 years receive treatment in psychiatric clinics (5). Many of those diagnosed with mental disorders during their childhood or adolescence continue to struggle with mental health problems further on in life (5).

Approximately 16-22% of the adult population fulfills the criteria for a mental disorder over the course of 12 months (6). Our knowledge concerning the prevalence of mental disorders in different age groups is limited. However, several studies indicate that the prevalence is higher among young adults than the elderly (6).

Anxiety and depression are some of the most common mental health conditions in young adults and they are often co-occurring disorders (7). However, research concerning adolescent anxiety and depression in the transition to adulthood in clinical populations is deficient.

Anxiety

The worldwide prevalence among children and adolescents of any anxiety disorder was 6.5% and any depressive disorder was 2.6% in 2015 (8). Anxiety disorders are typically among the first mental disorders that appear in children, and they have a median age of onset less than 15 years of age (9, 10).

Some degree of fear and anxiety is normal in children. For instance, fear of the unknown in infants and young children is common. However, anxiety is atypical when it is age

inappropriate or out of proportion. To diagnose anxiety, it must impact the child's function at home, at school, or among friends. Anxiety is unpleasant for the child, and consequently the child avoids situations that provoke anxiety. Common symptoms are muscle tension, irritability, concentration, and sleep problems (11).

Anxiety disorders in children and adolescents can be divided into several subtypes: Separation anxiety, specific phobias, agoraphobia, panic disorder, social anxiety disorder, generalized anxiety disorder, and obsessive-compulsive disorder. Diagnoses differ with age and gender. Separation anxiety and specific phobias often begin in early childhood and are considered a part of normal development. Usually, they vanish as the child grows. In contrast, panic disorders rarely occur before puberty (7).

Subtypes of anxiety

Separation anxiety is characterized by excessive distress when separated from home, parents, or a critical attachment figure. To set the diagnosis, the problems must have persisted for at least four weeks and started in childhood. Moreover, the child must display at least three out of eight described symptoms: Unrealistic and dominating fear concerning their parents' health and safety, threatening events, going to school, sleeping without the attachment figure nearby, and being alone. In addition, they typically experience recurrent nightmares about separation, and physical symptoms such as rapid heartbeat, headaches, stomach aches, nausea, and vomiting. Furthermore, disproportionate worry expressed by weeping, anger, apathy, and withdrawal when separation might occur (12). Separation anxiety in childhood is associated with later panic disorder. Additionally, separation anxiety might be an early symptom of both depression and later anxiety conditions (7).

Specific phobia is defined as considerable fear or anxiety towards a specific object or situation that constitutes little or no actual danger. The fear is out of proportion and leads to avoidance. DSM-5 divides specific phobias into five subtypes: Fear of animals or insects, natural events, blood or medical procedures, situational, and others (13). Even though the provoking situations are limited, it greatly impacts the individual's function. ICD-10 demands that the mental or autonomic symptoms must be primary manifestations of anxiety, not secondary to other symptoms such as delusions or obsessive thoughts. Furthermore, the anxiety must be limited to the presence of the particular object or situation, and the person avoids it if possible (12).

Agoraphobia includes fear of open spaces, crowds, leaving home, and traveling alone by public transport. The lack of an escape route provokes anxiety. Avoidance of the triggering situation can make some people completely tied to their homes (12). As a result, it is difficult to participate in society. Without effective treatment, symptoms of agoraphobia often continue to display throughout adulthood and become a chronic disorder (11).

Panic disorder (PD) is characterized by recurrent attacks of severe anxiety. The attacks are not caused by a particular situation and are therefore unpredictable. Each attack usually lasts for a few minutes, reaching the maximum intensity of symptoms within 10 minutes. Common symptoms are palpitations, sweating, trembling, shortness of breath, and pain in the stomach and chest. The physical symptoms are often followed by derealization and a fear of dying and losing control (12). PD seldom displays before puberty. Among youths with PD, the typical onset of the first panic attack is between the age of 15 to 19. Panic disorder often develops into a chronic condition and complete remission is rare (11).

Social anxiety disorder is associated with excessive fear of social interaction or performing in front of others (11). Fear of new situations and being the focus of attention are essential. Low self-esteem and fear of criticism are also characteristic. Avoidance is a major part of the condition and this limits participation in society. The result can be severe functional impairment with academic and social difficulties. The typical onset is in adolescence, and the prevalence increases throughout adulthood. ICD-10 requires a display of symptoms for at least four weeks, while DSM-5 demands 6 months duration (7, 11-13).

Generalized anxiety disorder (GAD) is characterized by excessive and uncontrollable anxiety. The worries are not limited to a particular situation but are all-encompassing and involve many different situations and objects. To diagnose GAD, the symptoms must be present almost every day for several weeks, often months. The symptoms usually consist of three components: Anxiety, motor tension, and autonomic overactivity. The disorder usually affects women and is often associated with chronic distress. The trajectory differs but tends to be variable and chronic (7, 11, 12).

Obsessive-compulsive disorder (OCD) is defined by recurrent obsessions and compulsions. Obsessions are unwanted and persistent thoughts that lead to severe mental distress and anxiety (11). Common obsessions are fear of transmissions of disease and bacteria, and excessive need for symmetry (7). Compulsions are repetitive behavior performed with an aim to suppress or neutralize unpleasant obsessions (11). For instance, exaggerated hand washing,

checking, and exactness. To set the diagnosis, the obsessions, or compulsions, or both, must be time-consuming and present most days for two weeks. Furthermore, the symptoms must affect the person's function substantially (12). Unfortunately, the prognosis is poor. 40-60 % of children with OCD develop a chronic condition (7).

Depression

Depression is defined in ICD-10 as a syndrome with three core symptoms: Depressed mood, lack of interest and pleasure in activities, and decreased energy. These symptoms must have been present for at least two weeks. Several other symptoms may also occur, such as reduced self-esteem, guilt, hopelessness, suicidal thoughts, poor concentration, disrupted sleep, and changes in appetite and weight (12).

Depression is a type of mood disorder. There are different patterns of mood disorders including single episode depressive disorder, recurrent depressive disorder, and bipolar disorder. A depressive episode can be categorized as mild, moderate, or severe depending on the number and severity of symptoms, as well as the impact on the individual's functioning.

Depression may be the first stage of bipolar disorder. However, bipolar disorder is difficult to diagnose in children. Usually, the time from the onset of symptoms until an established bipolar diagnosis is long. They often have a more complex semiology, and the condition can be misinterpreted as other diseases. For instance, it may be difficult to distinguish mania from ADHD among children with hyperactivity. Besides, a depressive episode is easier to notice than a manic episode. Some characteristics of mania suit our impression of a happy child. In addition, the typical onset of bipolar disorder is at the age of 25 (14). These factors contribute to making bipolar disorder underdiagnosed among children (7).

Comorbidity of anxiety and depression

Comorbidity is defined as the presence of two or more disorders occurring at the same time in an individual. About 66% of children with depression have a comorbid psychiatric diagnosis (15). There is a strong association between pediatric anxiety and depression. Depressed children and adolescents have a high likelihood of having a comorbid anxiety disorder, with estimates varying from 15% to 75% (16). Among youth with anxiety, around 10% to 15%

have a co-occurring depressive disorder (16). In addition, about 15% of children with anxiety have more than one anxiety diagnosis (15). Comorbid anxiety and depression affect the individual more severely than those with only one of the conditions (17).

The exact correlation between anxiety and depression is unknown, and there may be several reasons why anxiety and depression often co-occur. For example, it may be that individuals with anxiety or depression share a similar tendency of processing information in a negative way. Furthermore, studies on twins and families point to the fact that anxiety and depression in childhood possibly share some common genetic factors (18).

Continuity of anxiety and depression in adolescence

Anxiety and depression in the transition to adulthood affect the individual in a vulnerable and critical phase of life. This period lays the foundation of education, social life, and independence. To achieve better treatment over time, we need to increase our understanding of these disorders and their trajectories from adolescence to young adulthood.

In the past, anxiety in children was considered a mild and temporary condition. However, new studies reveal that children with impaired function due to anxiety will most likely continue to display anxiety further on in life, and especially girls have an increased risk of persistence of anxiety disorders (19, 20). Furthermore, anxiety in childhood or adolescence is a strong predictor of other mental disorders further on in life (11). There is an increased risk for depression later in life for adolescents with anxiety disorders (21-23). Some studies also suggest that major depression elevates the risk of later anxiety disorders, especially GAD (23-25). The risk for anxiety or depressive disorders has been estimated to be 2-3 times higher in individuals who had anxiety or depressive disorders in adolescence compared to those who did not (20, 23).

Depression is often considered an episodic and recurrent disorder. Moreover, the risk of chronicity increases if depression starts before the age of 40 (26). If the participants in our study with a depression diagnosis at the start, have recovered from the depression at our last follow-up, this does not exclude that they may have a depressive episode in the future.

Homotypic vs heterotypic continuity

Homotypic continuity refers to a disorder that does not change much over time, whereas heterotypic continuity indicates that the disorder over time will change into a different type (27). Earlier research based on population studies has found strong evidence of homotypic continuity both for anxiety and depression (21, 28, 29). In addition, the pattern of heterotypic continuity between anxiety and depression is well documented (21-25).

Two studies found strong evidence that patients in psychiatric clinics tend to experience diverse mental disorders in turn across diagnostic families, and that every mental disorder is associated with an increased risk of every other disorder (30, 31).

In a lifetime perspective, mental disorders shift among internalizing, externalizing, and thought disorders. In the Dunedin study, 70% of the participants diagnosed with an internalizing disorder also experienced externalizing or thought disorders in their lifetime (30). These findings may indicate that the participants with internalizing symptoms at the start of our study, may develop externalizing or thought disorders at our last follow-up or later in life.

However, knowledge is limited concerning the development of anxiety and depression into other mental disorders in clinical samples. In the present study, we will investigate homotypic and heterotypic continuity of anxiety and depression in transition to adulthood in a clinical cohort over 6 years. This study has high clinical relevance because it consists of a clinical sample, rather than a population sample. The participants of a clinical population often present more severe symptoms and higher rates of comorbidity than the general population (32).

Moreover, studies have found a strong correlation between younger age at disorder onset, more years' duration of the disorder, and more diverse types of comorbid disorders (30, 31). In addition, juvenile onset had a reduced probability of recovery, which was associated with cognitive decline and older structural brain age by midlife (30, 31). Youth admitted to the CAP clinic are considered a more vulnerable group than their peers, and clinicians need specific knowledge about the morbidity of such clinical populations.

Education and school dropout

Learning disabilities and problems with attention are common among youth with anxiety and depression (33, 34). Mental disorders at an early age are associated with educational underachievement, unemployment, and poor financial income (3, 33, 35).

In the Norwegian general population, there was a 3% dropout from high school in the school years of 2019-20 and 2020-21. This number increased to 3.7% in 2021-22. In Trøndelag, the number of high school dropouts was slightly higher than the national average. In 2019-20, 2020-21 and 2021-22 the number of youths who quit their high school education in this region was 3.4%, 3.2% and 4.6%, respectively (36).

There is a clear association between lower educational attainment and mental health problems overall, especially for males (35, 37). However, studies have concluded in various ways when investigating which types of mental health issues cause educational underachievement and dropout. Dropout from education for both males and females seems to be strongly connected to mental health conditions with externalizing symptoms, such as overactivity, aggression, and problems with impulse control (38-40). In contrast, internalizing symptoms such as anxiety and depression are not always found to have the same strong connection with low educational attainment (39). Some studies suggest that these types of problems only cause dropout from education among girls (40, 41), while others find that both sexes have an increased risk of dropout (42).

However, none of these studies have examined clinical samples of youth that have been treated in a CAP clinic. This group may differ from the results found in population-based studies. Therefore, clinicians and health planners need specific information about school dropout and the level of education in young adults who have been admitted to the CAP clinic earlier on in life, especially for those who have a history of internalizing symptoms. Our study will help to increase knowledge on this topic.

Societal costs

Individuals diagnosed with anxiety in childhood constitute a massive societal cost (11). This group often need psychiatric health care when they are young and as adults many are unable to participate in the labor market and receive disability aid (43, 44). The estimated annual cost of anxiety disorders in the US is between \$42 and \$47 billion (45, 46). In addition, the

annual cost of depression is estimated to be between \$44 billion and \$53 billion (47). However, the total societal burden is most likely even greater, as unemployment and costs associated with comorbidity were not included in these estimates. A study from 2002 suggests that the true societal cost was closer to \$100 billion annually in the US. (9).

In Norway, people who are unable to work receive disability benefits in form of financial support distributed by the government. Criteria for such disability benefits include being between 18 and 67 years old, and the individuals' ability to make an income must be permanently reduced by at least 50 % due to illness, injury, or disability (48).

According to Statistics Norway, 1.8% of the population between the age of 18 and 24 years, and 4% between the age of 25 and 34 years, receive full disability benefits (43). In comparison, 8.1% of the children admitted to the CAP clinic in Trondheim received full disability benefits as young adults at T3 (44). We hypothesize that the adolescents that met the diagnostic criteria of anxiety or depression at T2 compose a substantial proportion of these 8.1% and that the frequencies of full disability benefits will be even higher among adults with a history of anxiety or depression in adolescence.

In the general population, one in three who received disability benefits in 2014 were registered with a mental disorder as their main diagnosis (49). Furthermore, people who receive disability benefits due to mental disorders are on average younger than people who receive disability benefits with other diagnoses. Besides, both anxiety and depression increase the risk of unemployment for other reasons, for instance somatic conditions (49-51).

Therefore, it is of great interest from a socio-economic perspective to provide clinicians with needed knowledge for optimization of treatment provision, aiming to minimize the long-term morbidity of anxiety and depression in adolescence.

Aim

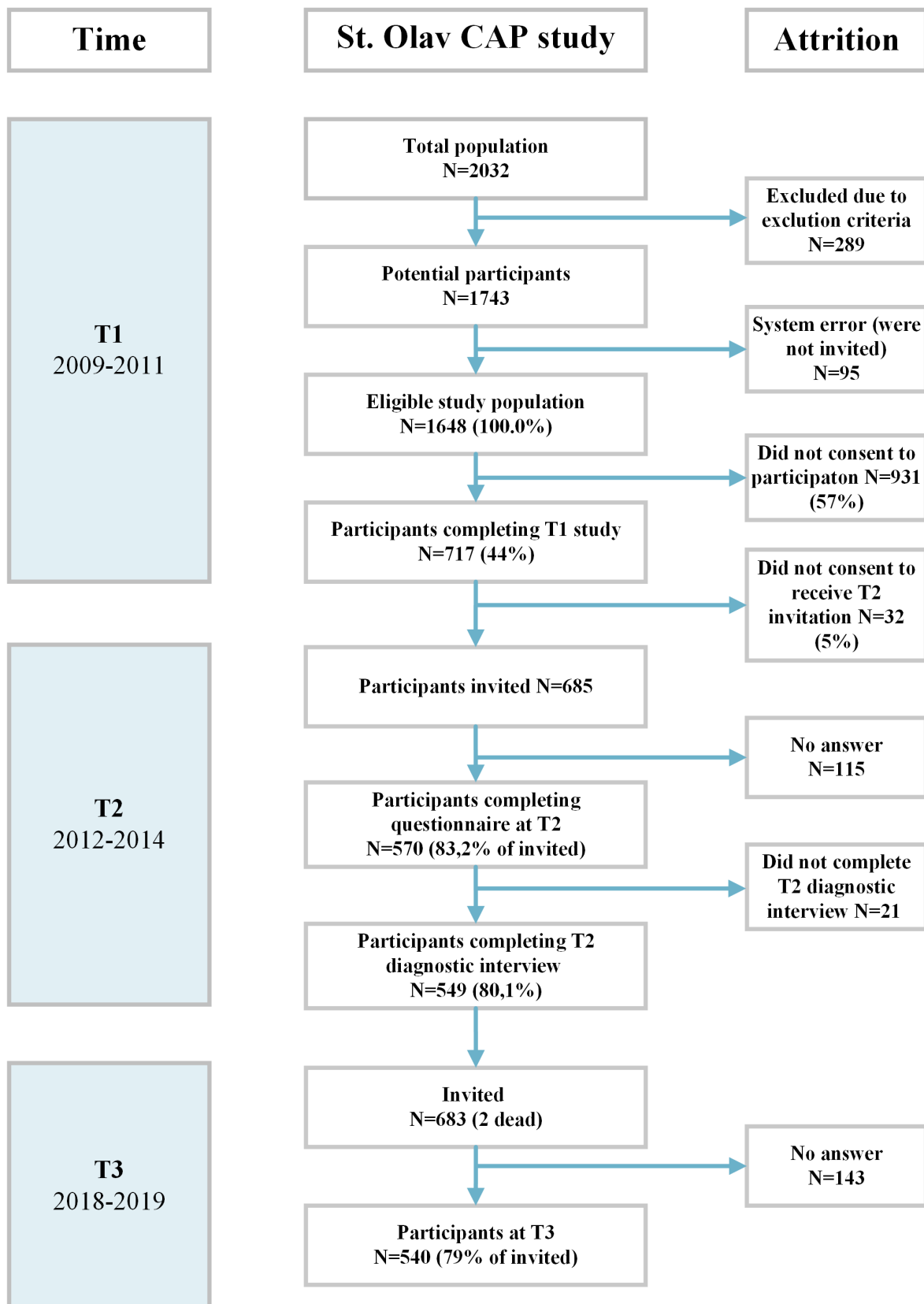
The overall aim of the study is to describe the mental health and functions in young adulthood among those who were diagnosed with anxiety and depression in adolescence.

Research questions

1. What is the prevalence of self-reported psychiatric disorders among young adults (T3) who satisfied the diagnostic criteria of anxiety or depression in adolescence (T2), within a clinical population who has previously been admitted to the CAP-clinic, compared to those who did not have these conditions?
2. In young adults (T3) with a previous CAP-record, how frequent is school dropout for those who had anxiety or depression in adolescence, compared to those who did not?
3. How frequent are disability benefits among young adults (T3) who fulfilled the diagnostic criteria of anxiety or depression in adolescence (T2) compared with young adults without anxiety or depression in adolescence (T2)?

To the best of our knowledge, there are no studies of clinical populations with a similar approach to the continuity and comorbidity of mental disorders in the transition to adulthood among adolescents with anxiety or depression. We aim to increase knowledge concerning how anxiety and depression in the transition to adulthood impact youths' mental health and function further on in life. Hopefully, the results of this study will improve the current clinical practice and contribute to prevent the persistence of psychiatric disorders.

Figure 1: Flowchart of participants



Methodology

Clinical sample

The data used in our study is a sample of data from the larger St. Olav Child and Adolescent Psychiatry Study at St. Olav Hospital in Trondheim, also known as the St. Olav CAP study, which is a 9-year longitudinal cohort study that assessed a defined clinical population at three time points.

The CAP clinic at St. Olav provides psychiatric health care for individuals in the age group between 0-18 years. The clinical population in the CAP study was patients referred to the CAP clinic from all over the region of Sør-Trøndelag, which in 2017 had a population of 317.363 (52).

The subjects that were invited to take part in the CAP study at the baseline assessment (T1) were all adolescents between the ages of 13 to 18 years, who were referred to the CAP clinic at St. Olav hospital between February 2009 and February 2011. They were invited regardless of their diagnosis. To be able to participate, they were required to have at least one personal attendance at the clinic. Emergency patients could also participate, they were invited after being stabilized. Exclusion criteria were significant difficulties in answering the questionnaire because of their psychiatric state, cognitive dysfunctions, or lack of sufficient language skills.

In the set period for the first assessment (T1) a total of 2032 patients visited the CAP clinic. 289 patients were excluded due to the exclusion criteria and 95 were lost in the registration process. The remaining 1648 patients (81.1%) were invited and 717 (44%) of these patients agreed to take part in the study.

The first follow-up (T2) took place 3 years after T1, between 2012 and 2014, determined by the subjects' time of participation in the baseline assessment. At T2 the participants were 16 to 23.5 years old. All individuals from T1 who had consented to be followed up were invited to participate. A total of 549 participants completed the diagnostic interviews at T2. The second follow-up (T3) was conducted in the years 2018 to 2019. 683 were invited, and 540 (79%) took part. An overview of inclusion of participants is shown in figure 1.

In our study we have collected data from the CAP study to compare participants at the T2 and T3 follow-up regarding several factors depending on whether they were diagnosed with anxiety or depression at T2 or not.

Measures

The follow-up at T2 was organized as a diagnostic interview for the participants and a questionnaire for both parents.

The participants were interviewed by a medical doctor or psychiatrist over the phone using the Kiddie Schedule for Affective Disorders and Schizophrenia, Present and lifetime version (K-SADS-PL) (53). This is an in-depth diagnostic interview that covers most psychiatric illnesses in children and adolescents. Based on this interview, the participants could fall into one of three categories concerning each psychiatric diagnosis. They could either fulfill the criteria of the diagnosis according to DSM-5, they could be partly in remission from the disorder, or they did not have the diagnosis. Being partly in remission meant that they had symptoms of the disorder without fulfilling the criteria required to set the diagnosis.

In our study, we will compare the individuals who received any anxiety or depression diagnosis at T2 based on this interview to those who did not have these diagnoses. The category “any anxiety disorder” at T2 included panic disorder, separation anxiety disorder, avoidant disorder/social phobia, agoraphobia, specific phobia, generalized anxiety and obsessive-compulsive disorder.

The second follow-up (T3) was carried out between 2018 and 2019. This follow-up consisted of an electronic questionnaire for the participants, who at the time were between 21 and 28 years old. The questionnaire covered a broad range of topics, including activity, sleep, pain, somatic and psychiatric health, education, work, economy and more.

We have investigated what our subjects from T2 answered to a few specific questions from the questionnaire in T3 (Appendix A). This demonstrates that the psychiatric diagnoses at T3 were self-reported and not set by using a diagnostic interview such as in T2.

Statistical analysis

We have analyzed the data using SPSS version 28.0.1.0. The variables anxiety and depression at T2 are ordinal categorical with three categories, which were studied one at a time as predictor: Not present, partly in remission, and criteria for present diagnosis fulfilled. We created cross tables with the predictor in rows and the dependent variables in columns, for each predictor and outcome variable.

Logistic regression analyses are used with the predictor as covariate, unadjusted, and adjusted for age at T2 and sex as plausible confounders. We did this using the predictor as a categorical covariate.

Ethics

Written informed consent was obtained prior to inclusion from all participants, including at least one parent if the adolescent was below 16 years of age. The project received approval from the Regional committee for medical and health research ethics (REK). The main project has been approved by REK: T2 (2011/1435) and T3 (2017/1486). For this study: REK nr 2017/1486, ref 21938.

Results

Descriptive data of sample at T2

In table 1, the characteristics of the sample at T2 and T3 are presented.

The participants were between 16 and 23.5 years old at the time of T2. There was a high rate of participation at T3, with over 80% in all groups.

Table 1: Characteristics of sample at T2 and T3

Category from T2 or T3	N (%)	Sex	Age: Mean (SD) at T2	Participation at T3 (N at T3/N at T2)
Anxiety diagnosis at T2	119 (21.7%)	93 females (78.2%) 26 males (21.8%)	18.9 (1.6)	104/119
Partly in remission from anxiety at T2	60 (11%)	44 females (73.3%) 16 males (26.7%)	18.8 (1.6)	50/60
Depression diagnosis at T2	39 (7.1%)	31 females (79.5%) 8 males (20.5%)	18.7 (1.3)	35/39
Partly in remission from depression at T2	41 (7.5%)	34 females (82.9%) 7 males (17.1%)	19.1 (1.5)	33/41
Did not have anxiety or depression at T2	342 (62.3%)	151 females (44.2%) 191 males (55.8%)	18.5 (1.7)	276/342
Total		307 females (55.9%) 242 males (44.1%)	18.6 (1.7)	454/549
Reported educational dropout at T3		120 females (64.2%) 67 males (35.8%)		
Received full disability aid at T3		24 females (52.2%) 22 males (47.8%)		

As presented in table 2, there was some overlap between the anxiety and depressive disorders at T2.

Table 2: Cross table describing the overlap between anxiety and depression at T2

		Any depressive diagnosis at T2			Total
		Diagnosis not present	Partly in remission	Criteria for diagnosis fulfilled	
Any anxiety diagnosis at T2	Diagnosis not present	342	11	14	367
	Partly in remission	46	14	0	60
	Criteria for diagnosis fulfilled	78	16	25	119
Total		466	41	39	546

Frequencies of self-reported psychiatric disorders among young adults (T3) with adolescent anxiety or depression (T2)

At T3 the participants were asked to report psychiatric diagnoses during the last 12 months. The results are presented in table 3 with the participants divided into what diagnosis they had at T2. The “other mental health problems” group at T3 is excluded from this table.

Table 3: Self-reported psychiatric disorder at T3 dependent on anxiety or depression diagnosis at T2.

		Psychiatric disorders at T3		
		Psychiatric disorder at T3 not present N (%)	Psychiatric disorder at T3 present N (%)	Total
Any anxiety disorder at T2	Anxiety not present	165 (55.2%)	134 (44.8%)	299
	Partly in remission	25 (50%)	25 (50%)	50
	Criteria for anxiety diagnosis fulfilled	31 (29.8%)	73 (70.2%)	104
Total		221 (48.8%)	232 (51.2%)	453
Any depressive disorder at T2	Depression not present	196 (51.2%)	187 (48.8%)	383
	Partly in remission	14 (42.4%)	19 (57.6%)	33
	Criteria for depression diagnosis fulfilled	10 (28.6%)	25 (71.4%)	35
Total		220 (48.8%)	231 (51.2%)	451

In the questionnaire at T3, the participants were given a list of several psychiatric disorders (see Appendix A) and were asked to report which diagnosis they had during the last 12 months. Tables 4 and 5 display the results for individuals with and without an anxiety or depression diagnosis at T2.

Not all participants in each group answered questions about every diagnosis at T3, which explains the variations in the number of participants (N) displayed in Table 4.

Table 4: Prevalence of mental health disorders in young adulthood (T3) among individuals with and without anxiety disorders in adolescence (T2)

Diagnoses at T3	Anxiety not present at T2	In remission from anxiety at T2	Criteria for anxiety diagnosis fulfilled at T2
	% (N at T3/N at T2)	% (N at T3/N at T2)	% (N at T3/N at T2)
Depression	19.6% (58/296)	22% (11/49)	43.7% (45/103)
Anxiety	16.4% (48/293)	26.5% (13/49)	45.2% (47/104)
Bipolar disorder	3% (9/296)	6.1% (3/49)	8.8% (9/102)
PTSD	6.4% (19/297)	12% (6/50)	10.7% (11/103)
Eating disorder	3.1% (9/295)	8% (4/50)	6.8% (7/105)
ADHD	20.9% (62/297)	20% (10/50)	25% (25/100)
Personality disorder	3.7% (11/294)	6% (3/50)	14.6% (15/103)
Psychosis	0.7% (2/297)	0	0
Obsessive-compulsive disorder	4.4% (13/296)	12% (6/50)	8.7% (9/103)
Tics/Tourette's syndrome	5% (15/298)	0	2.9% (3/103)
Autism/Asperger's syndrome	5.7% (17/297)	12% (6/50)	5.8% (6/103)
Other mental health conditions	6.4% (19/298)	16% (8/50)	15.5% (16/103)

Table 5: Prevalence of mental health disorders in young adulthood (T3) among individuals with and without depressive disorders in adolescence (T2)

Diagnoses at T3	Depression not present at T2 % (N at T3/N at T2)	In remission from depression at T2 % (N at T3/N at T2)	Criteria for depression diagnosis fulfilled at T2 % (N at T3/N at T2)
Depression	21.7% (82/378)	45.5% (15/33)	45.7% 16/35
Anxiety	21% (79/376)	39.4% (13/33)	42.9% 15/35
Bipolar disorder	4% (15/377)	12% (4/33)	2.9% 1/35
PTSD	6.6% (25/380)	15.5% (5/33)	17.1% (6/35)
Eating disorder	4.5% (17/379)	6.1% (2/33)	2.9% (1/35)
ADHD	21.4% (81/379)	12.9% (4/31)	34.3% (12/35)
Personality disorder	5.8% (22/378)	6.1% (2/33)	14.3% (5/35)
Psychosis	0.3% (1/380)	0	0
Obsessive-compulsive disorder	6.6% (25/379)	0	8.6% (3/35)
Tics/Tourette's syndrome	4.7% (18/381)	0	0
Autism/Asperger's syndrome	6.3% (24/380)	3% (1/33)	11.4% (4/35)
Other mental health conditions	8.4% (32/381)	15.2% (5/33)	17.1% (6/35)

Frequencies of educational drop-out among young adults (T3) with adolescent anxiety or depression (T2)

In the questionnaire at T3, the participants were asked if they had dropped out of education although they wanted to complete it. They were also asked what their highest level of completed education was. The frequency and percentage of educational dropout, and of participants who reported that they had not completed high school are presented in tables 6 and 7. They are divided into groups depending on anxiety or depression diagnosis at T2.

The difference in N from T2 within the rows represents that not all participants answered both questions in the questionnaire at T3.

Table 6: Educational dropout reported at T3 dependent on anxiety diagnosis at T2

Any anxiety disorder at T2				
	Not present	Partly in remission	Criteria for diagnosis fulfilled	Total
	% (Frequency T3/ T2)	% (Frequency T3/T2)	% (Frequency T3/T2)	% (Frequency T3/T2)
Educational drop-out at T3	29.5% (87/295)	33.3% (16/48)	52.4% (54/103)	35.2% (157/446)
Did not complete high school	27.3% (81/297)	26% (13/50)	41.7% (43/103)	30.3% (137/450)

Table 7: Educational dropout reported at T3 dependent on depression diagnosis at T2

Any depressive disorder at T2				
	Not present	Partly in remission	Criteria for diagnosis fulfilled	Total
	% (Frequency T3/T2)	% (Frequency T3/T2)	% (Frequency T3/T2)	% (Frequency T3/T2)
Educational drop-out at T3	33.2% (125/377)	34.4% (11/32)	54.3% (19/35)	34.9% (155/444)
Did not complete high school	28.1% (107/381)	31.3% (10/32)	54.3% (19/35)	30.4% (136/448)

Frequencies of full disability benefits (T3) among young adults with adolescent anxiety or depression (T2)

At T3 the participants answered questions regarding receiving full disability benefits. The results are presented in tables 8 and 9.

Table 8: Full disability benefits reported at T3 dependent on anxiety diagnosis at T2

Any anxiety disorder at T2					
		Not present	Partly in remission	Criteria for diagnosis fulfilled	Total
		% (N)	% (N)	% (N)	% (N)
Full disability benefits at T3	Yes	4.3% (13)	10% (5)	12.5% (13)	6.8% (31)
	No	95.7% (291)	90% (45)	87.5% (91)	93.2% (427)
	Total	100% (304)	100% (50)	100% (104)	100% (458)

Table 9: Full disability benefits reported at T3 dependent on depression diagnosis at T2

		Any depressive disorder at T2			
		Not present % (N)	Partly in remission % (N)	Criteria for diagnosis fulfilled % (N)	Total % (N)
Full disability benefits at T3	Yes	6.4% (25)	0	17.1% (6)	6.8% (31)
	No	93.6% (363)	100% (33)	82.9% (29)	93.2% (425)
	Total	100% (388)	100% (33)	100% (35)	100% (456)

The associations between anxiety or depression in adolescence and later psychiatric disorders, educational dropout, and disability benefits

Tables 10 and 11 display that anxiety or depression in adolescence significantly predicts mental health disorders, educational dropout and receiving disability benefits in young adulthood. This finding remained significant when adjusting for age at T2 and sex as plausible confounders.

Table 10: Odds ratio for mental disorders, educational dropout, and full disability benefits in young adulthood for individuals who had anxiety disorders in adolescence (specified as partly in remission or fulfilling diagnostic criteria), compared to individuals who did not have anxiety disorders in adolescence. The analyses were preformed both unadjusted and adjusted for sex and age at T2.

		Anxiety partly in remission at T2				Anxiety criteria fulfilled at T2			
		N	OR	95% CI	P	N	OR	95% CI	P
Mental disorders at T3	Unadj.	50	1.231	0.68-2.24	0.496	104	2.900	1.80-4.68	<0.001
	Adj.	50	1.243	0.67-2.29	0.487	104	2.926	1.78-4.80	<0.001
Educational dropout at T3	Unadj.	48	1.195	0.62-2.29	0.591	103	2.635	1.66-4.18	<0.001
	Adj.	48	1.120	0.57-2.19	0.741	103	2.551	1.57-4.14	<0.001
Disability benefits at T3	Unadj.	50	2.487	0.85-7.31	0.098	104	3.198	1.43-7.15	0.005
	Adj.	50	2.550	0.84-7.80	0.098	104	3.346	1.43-7.84	0.005

Table 11: Odds ratio for mental disorders, educational dropout, and full disability benefits in young adulthood for individuals who had depression disorders in adolescence (specified as partly in remission or fulfilling diagnostic criteria), compared to individuals who did not have depression disorders in adolescence. The analyses were performed both unadjusted and adjusted for sex and age at T2.

		Depression partly in remission at T2				Depression criteria fulfilled at T2			
		N	OR	95% CI	P	N	OR	95% CI	P
Mental disorders at T3	Unadj.	33	1.422	0.69-2.92	0.337	35	2.620	1.23-5.60	0.013
	Adj.	33	1.382	0.67-2.87	0.384	35	2.521	1.17-5.42	0.018
Educational dropout at T3	Unadj.	32	1.056	0.49-2.26	0.888	35	2.394	1.19-4.82	0.014
	Adj.	32	0.941	0.43-2.05	0.878	35	2.390	1.17-4.87	0.017
Disability benefits at T3	Unadj.	33	0.000	0.000	0.998	35	3.004	1.14-7.91	0.026
	Adj.	33	0.000	0.000	0.998	35	3.219	1.18-8.76	0.022

The logistic regression analysis of receiving disability benefits at T3 for the group with “depression partly in remission” as covariate failed. This is because none in this group received these benefits.

Discussion

Summary of the main findings

In our study, we assessed the development of adolescent anxiety and depression in the transition to adulthood in a clinical cohort over 6 years. Our findings advance knowledge in three ways. First, adolescent anxiety or depression predicts mental disorders in young adults. Furthermore, adolescent anxiety or depression predicts educational dropout and receipt of full disability benefits. Our research confirms that mental disorders in adolescence are associated with severe impairment of function in young adulthood.

Our results indicate that fulfilling the diagnostic criteria of anxiety or depression predicts mental disorders, educational drop-out and receipt of full disability benefits. However, anxiety or depression in partly remission during adolescence did not predict mental disorders, educational drop-out, or disability benefits in young adulthood.

Mental disorders among young adults with adolescent anxiety or depression

In the present study, 70.2% of the participants diagnosed with anxiety and 71.4% diagnosed with depression in adolescence (T2) had one or more self-reported psychiatric disorders as young adults (T3), compared to 44.8% and 48.8% of the participants who did not have anxiety or depression in adolescence, respectively. In comparison, approximately 16-22% of the general adult population fulfills the criteria for a mental disorder over the course of 12 months (6). Previous research in this field has indicated that the prevalence is higher among young adults than the elderly (6). However, there is no comparable data on the exact estimate of the prevalence of mental disorders in young adults in a clinical population.

In the present study, adolescent anxiety or depression predicted mental disorders in young adults, adjusted for sex and age we found OR = 2.926 and OR = 2.521, respectively. Table 4 displays that many with anxiety in adolescence had anxiety or depression as young adults, 45.2% and 43.7 %, respectively. In addition, 45.7% of adolescents with depression reported depression at T3 and 42.9% with previous depression reported anxiety at T3. This may suggest that youth with anxiety or depression tend to experience several symptoms in the same diagnostic family as adults. Moreover, our findings indicate a homotypic and heterotypic pattern between anxiety and depression disorders.

However, adolescents with internalizing disorders also presented externalizing and thought disorders as adults. Multiple previous population-based studies (30, 31) have described shifts across diagnostic families in a lifetime perspective. In our study, the participants with adolescent anxiety or depression presented a broad range of mental disorders as adults. It is noteworthy that ADHD and personality disorders were highly prevalent in both groups. ADHD is categorized as a neuropsychiatric disorder with an age of onset before 12 years according to DSM-5 (13). Therefore, we can assume that the participants who reported ADHD at T3, already had the condition at T2.

Personality disorders were one of the most common mental disorders as adults among participants with adolescent anxiety or depression. Anxiety and depression are common comorbidities with personality disorders. Childhood anxiety and depression are associated with an increased risk of developing personality disorders in young adulthood (54).

Signs of personality disorders often display in childhood or adolescence. Despite this, the diagnosis seldom gets identified before adulthood (55). ICD-10 diagnostic system is restrictive about diagnosing patients under the age of 18 with a personality disorder, although in recent years clinical practice has been adjusted to allow for diagnostics of PF in adolescents younger than 18 years (56).

Educational dropout

There was a substantial difference in the percentage of dropout in the general population and in the participants in this study who previously have been treated at the CAP clinic. Out of the participants who received an anxiety or depression diagnosis at T2 the reported dropout was 52.4% and 54.3%, respectively. The average dropout from high school in Trøndelag in the general population from 2019 and 2022 was between 3.2 and 4.6% annually (36).

In the questionnaire at T3, dropout was not specified to mean quitting high school education, it could be interpreted to mean termination of education at any level. However, when asked what level of education was the highest that they had accomplished, 41.7% with an anxiety diagnosis and 54.3% with a depression diagnosis from T2 reported not having completed 3 years in high school. Consequently, we assume that a substantial proportion of the reported dropout reflects terminating high school.

Earlier research has pointed out the fact that mainly mental health conditions with externalizing symptoms can influence the number of dropouts (38-40). Other studies found that internalizing symptoms principally among females can predict termination of education (40, 41). In this study, we found that a substantial proportion of the participants diagnosed with anxiety or depression ended up as dropouts. Having either anxiety or depression in adolescence predicted later dropout in the present study, with OR=2.6 and OR=2.4, respectively. This implies that these internalizing symptoms might be important driving forces behind the failure to finish education among young adults. The group of men who had anxiety or depression at T2, and who also reported dropping out of school at T3 was quite small. Because of this, we did not analyze the difference between the sexes.

There might be several reasons why the percentage of dropouts is so considerable in the study population. Mental health problems are associated with learning disabilities, and they can

affect individuals functioning in everyday life, including school. Anxiety and depression might have affected the participants in a way which has eventually led them to being unable to complete their education.

Since this study focuses on a clinical population, the anxiety and depression cases among the individuals in this study may be more severe than in the general population. The association between juvenile onset of anxiety and cognitive decline can be a factor. In addition, they might have had other co-occurring conditions that also could have been factors that caused them to drop out of education.

The socioeconomic consequences of being unable to finish high school or higher education are substantial. The lack of education can lead to poor personal finances. Financial concerns may lead to the maintenance of anxiety or depression (44). Hence, the ability to complete education can be important for both the individual and for society.

Full disability benefits among young adults

Mental disorders are one of the most common reasons receiving full disability benefits in the general population in Norway (49). Our findings reflect this, as we found that 12.5% of the group that had anxiety and 17.1% of the depression group at T2 received full disability benefits at T3. This is a contrast to the 4% of the Norwegian general population between the ages of 25 and 34 who receive the same benefits. In the groups without anxiety or depression at T2, the percentage is closer to the general population, 4.3% and 6.4%, respectively.

Another study that also used data from the St. Olav CAP study to examine participants at T3 found that 8.1% of the total population at T3 received full disability benefits (44). Our findings confirmed our assumptions that the group from T2 with anxiety or depression would account for a large part of this percentage, and that the percentages of participants who received these benefits within anxiety or depression groups would exceed 8.1%. In addition, our findings showed that having anxiety or depression in adolescence predicted receiving full disability benefits in early adulthood. OR=3.3 for anxiety and OR=3.2 for depression when adjusted for age and sex.

It is noteworthy that the average age for recipients of full disability benefits in general population was 52.6 in 2020 (57). However, in our sample, a great proportion of the participants received disability benefits in their 20s. This is consistent with earlier findings that people with mental health disorders on average receive disability benefits at a younger age (49-51).

Knowledge about the association between juvenile anxiety and depression and later disability benefits provides new insight and might contribute to lowering the number of individuals who are recipients of full disability benefits. Perhaps measures can be implemented in adolescence to help this group to be economically independent in early adulthood. This could have large socioeconomic benefits.

The benefit of being in remission

Being in remission from anxiety or depression at T2 does not significantly predict mental disorders, educational dropout, or disability benefits at T3. We have limited information about what treatment the participants received and if they recovered without treatment. However, our findings indicate that recovery from anxiety or depression is beneficial, and this group presents less severe functional impairment. Clinicians should strive to implement treatment measures to help adolescents diagnosed with anxiety or depression to recover, thereby minimizing the long-term morbidity from anxiety and depression in adulthood.

Strengths and limitations of the study

The present study has numerous strengths. At baseline (T1), the study population consisted of a relatively substantial number of participants. There was a high rate of invited participants taking part in T2 and T3, with 80.1% and 79%, respectively.

This is a follow-up study of a clinical population. This strengthens our study because this group generally presents more severe symptoms than the general population.

1648 patients were invited to take part in the study, but only 717 of these patients agreed to take part. Even though the participation rate at T1 was low, there were no significant differences between participants and non-participants in the main reason for admission to the

CAP clinic (32). Hence, we consider the participants representative enough of the clinical population.

However, our study has some limitations. Even though the sample originally had many participants, our analyses focus on the group with adolescents with anxiety or depression diagnosis at T2. They constitute a relatively small part of the sample. When we investigate several factors at T3, such as full disability benefits and educational dropout, the number of participants in each group is limited. In addition, a limitation of the study is the lack of information about patient histories and what treatment they have received.

In our analyses, we compare individuals with anxiety or depression to others without these conditions who are also part of a clinical sample. This group has also had mental health conditions and could because of this also have severe symptoms and psychiatric comorbidity. Analyzing our group of interest in comparison to the general population might have given an even clearer picture of the severity of anxiety and depression in adolescents.

The diagnostic interview at T2, K-SADS, is a well-documented interview. It was conducted by a psychologist or psychiatrist, and the diagnoses that were set based on this interview are trustworthy. However, at T3, the participants self-reported their diagnoses. This may have led to over- or underestimation. The outcome depends on the participants' comprehension of their own condition and recognition of symptoms. Hence, we can't exclude information bias in our study. The questionnaire at T3 does not distinguish between the subtypes of anxiety and degrees of severity of mental disorders. Furthermore, the participants may struggle with mental health, and still not fulfill the diagnostic criteria. In addition, they might have a psychiatric disorder without having visited a doctor or psychiatrist, and consequently, they have not been diagnosed.

Conclusion and implications

The consequences of adolescent anxiety or depression can be extensive. We found a high degree of homotypic and heterotypic continuity of mental health problems, as well high rates of dropout from education and receipt of full disability benefits among individuals who fulfilled the criteria for anxiety or depression in adolescence. The results indicate that even within a clinical CAMHS cohort, where all participants have been in contact with CAMHS

for various reasons, the presence of adolescent anxiety or depression are substantial risk factors for future mental health disorders, educational drop-out, and the need for full disability benefits.

The findings point to the fact that the measures taken to help this group may be insufficient. Giving adequate help and treatment to adolescents with anxiety or depression may not only be beneficial on an individual level, but also be of great socioeconomic interest. Since the risk of dropping out is increased in adolescents with anxiety or depression, measures to aid this specific group to complete their education is warranted.

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Appendix A

From the questionnaire in T3, a few questions were selected for analysis. Regarding psychiatric health, the following question was examined:

- In the last 12 months, have you had any of the following (diagnosis received by a medical doctor, psychologist, or hospital)?

The participants could answer either “yes” or “no” to the following psychiatric diagnosis:

- Depression
- Bipolar disorder
- Anxiety
- PTSD
- Eating disorder (anorexia, bulimia, binge eating disorder)
- ADHD
- Personality disorders
- Psychosis
- Obsessive-compulsive disorder
- Tics/Tourette syndrome
- Autism/Asperger syndrome
- Other mental health problems

Questions regarding education and economy:

- What is the highest level of education that you have completed?
- Have you dropped out of your education even though you wanted to complete it?
- Are you receiving disability benefits? If so, what type of benefits?



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