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# Anxiety Disorders among Adolescents referred to General Psychiatry for Multiple Causes: Clinical Presentation, Prevalence, and Comorbidity

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## Abstract

**Background:** Reports of anxiety disorder characteristics among youth in clinical settings typically include descriptions of patients who have been specifically referred for anxiety treatment. At odds with a large body of evidence which demonstrates these disorders to be most common among young people, prevalence studies in samples referred to general psychiatry for multiple causes are scarce and report highly discrepant estimates.

**Methods:** For this study and regardless of their presenting symptoms, 125 adolescents (57.6% girls) between the ages of 12 and 18 years who were consecutively referred to two child and adolescent general psychiatry clinics in Sweden were assessed for anxiety disorders and comorbidity using the Schedule for Affective Disorders and Schizophrenia for School-Age Children. Self-ratings of anxiety symptoms and difficulties with family, school, friends, sleep, and body aches were also obtained.

**Results:** At least one anxiety disorder was found in 46% of participants. Among anxious adolescents, homotypic comorbidity (concurrent anxiety) was observed in 43%, and heterotypic comorbidity (concurrent non-anxiety psychiatric disorders) was observed in 91%. No comorbidity was observed in 5%. Trauma, ache, and difficulties making friends were more common among anxious adolescents as compared with psychiatrically referred adolescents without anxiety.

**Conclusions:** The finding that only 21% of adolescents diagnosed with anxiety disorders were referred for anxiety further supports the routine use of standardized and structured instruments—irrespective of referral cause—to improve both precision and detection rates in the clinical setting. Comprehensive assessments are of utmost importance to fully address the complexity of the symptoms in this patient group.

**Keywords:** anxiety disorders; adolescents; prevalence; comorbidity; general psychiatry

## Introduction

Anxiety affects 117 million youths worldwide; it is the sixth leading cause of disability, with the highest burden (i.e., time lived with the condition) among people who are 15 to 34 years old (1, 2). Early-onset anxiety is associated with adverse short- and long-term social, academic, financial, and health outcomes, and it also predicts substance use disorders and adult anxiety (3-5). Early identification and treatment are critical to reduce the burden and to prevent negative life outcomes. However, anxiety is still largely unrecognized in primary and mental health care, and only a minority of affected children receives treatment (6-8). Clinicians and decision makers need to be aware of the presence and deleterious impact of childhood anxiety. However, there is a paucity of data regarding the prevalence and clinical correlates of multiple anxiety disorders in non-specialized psychiatric outpatient settings, where anxiety may not be a recognized or primary cause for the seeking of help (8, 9). Only three prevalence studies of multiple anxiety disorders in non-anxiety–specialized psychiatric settings have been reported, with highly discrepant prevalence rates that make adequate service planning and resource allocation for this setting and patient group difficult tasks (10-14).

Hammerness and colleagues (13) used the Schedule for Affective Disorders and Schizophrenia

for School-Age Children (K-SADS) diagnostic interview (15) to examine the characteristics of seven non–obsessive-compulsive disorder (OCD) anxiety disorders in 1375 psychiatrically referred children and adolescents in North America. According to diagnostic criteria presented in the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised* (DSM-III-R) (16), the overall prevalence of anxiety was 57.7%, with a 53.8% homotypic comorbidity (concurrent anxiety disorder) rate and higher rates of depression, bipolar disorder, and pervasive developmental disorder seen among anxious youths as compared with youths without anxiety. By contrast, a much lower prevalence rate of 5.7% was found for five non-OCD anxiety disorders in a Danish study of 13,241 psychiatrically referred youths that included data gathered from a national database of diagnoses from the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision* [ICD-10] (17). Diagnoses in the database were determined during clinical conferences using all available information collected via several unspecified clinical tools rather than just a single instrument or interview (12). Moreover, homotypic comorbidity was found in only 2.8% of anxious youths, whereas heterotypic comorbidity (concurrent non-anxiety psychiatric disorder) was observed in 42.9%. With the use of both data collection methods, six non-OCD anxiety disorders were investigated in 407 children between the ages of 7 and 13 years who were referred to child and adolescent psychiatric care in Norway (14). A prevalence of 32.7% of DSM-IV anxiety disorders was found when the K-SADS interview was used as compared with a rate of only 5% when data was collected from a patient register. On the basis of the K-SADS, homotypic comorbidity was observed in 24.8% of anxiety-disordered children, and heterotypic comorbidity was found in 70.7%.

The authors of the Danish and Norwegian studies suggested the limited use of standardized instruments in routine clinical practice as the main explanation for the low prevalence estimates derived from patient registers.

In two recently conducted meta-analyses of community prevalence studies—one of which investigated mental disorders in children and adolescents and the other that investigated anxiety across all age groups—sources of prevalence variance were analyzed (2, 18). Sample representativeness, sample frame (e.g., schools, households), and diagnostic interviews (as contrasted with K-SADS) were the only significant moderators of prevalence and explained 88.9% of the variability in studies of mental disorders in youths. In prevalence studies of anxiety that included age

categories across the life span, significant moderators of prevalence estimates (with variance explained in parentheses) included the following: age (1%); conflict (e.g., war; 2%); economic status (e.g., low- or middle-income country; 2%); urbanicity (2%); diagnostic instrument used (2%); number of anxiety disorders examined (4%); culture (5%); prevalence period (9%); and gender (25%). More research is needed to determine whether the moderators that influence anxiety prevalence variability in clinical studies are the same as those that influence community studies.

The major objective of the present study was to investigate anxiety prevalence and comorbidity patterns among adolescents using the K-SADS diagnostic interview in a Scandinavian non-anxiety–specialized psychiatric setting. Thus, anxiety among psychiatrically referred adolescents was characterized in three ways: 1) by the prevalence of seven anxiety disorders: social anxiety disorder, generalized anxiety disorder, specific phobia, panic disorder, agoraphobia, separation anxiety disorder, and unspecified anxiety disorder; 2) by clinical presentation; and 3) by patterns of comorbidity, including homotypic and heterotypic comorbidity.

## Methods
### Setting and Enrollment of Participants
Patients who presented at two child and adolescent general psychiatric outpatient clinics in the county of Västmanland, Sweden, between August 2011 and June 2013 were eligible for enrollment. These clinics provide services to children and adolescents 18 years old and younger who live within the catchment area (N = 37,494). There are no specialized anxiety clinics in the area. Referrals to the clinics are made by parents, primary care physicians, social services, school health services, and hospital departments. Data from the clinics' patient administrative systems showed that, in 2010 (when procedures for diagnostic assessment did not include the systematic use of structured interviews), 9.7% of all admitted patients between the ages of 13 and 17 years (N = 1092) had received a diagnosis of anxiety. Patients were eligible if they met the age criteria (12 to 18 years old), regardless of their presenting symptoms. The exclusion criteria were inadequate Swedish-speaking skills and prior diagnosis of intellectual developmental disorder. During the predefined recruitment period, which totaled 63 weeks, 202 patients were found to be eligible for inclusion, whereas 77 were excluded: 28 declined to participate, 45 were missed as eligible and therefore not scheduled for the diagnostic interview, and 4 did not show up for the diagnostic interview. There were no significant differences in sex or age between the

excluded and included patients. Clinical staff confirmed eligibility, checked for exclusion criteria, and obtained informed written consent to participate from both the adolescents and their parents. The project was approved by the Regional Ethical Review Board in Uppsala.

**Measures**

*Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version, 2009*
The K-SADS (15) is a semi-structured diagnostic interview designed to guide clinicians in the collection of evidence for 33 DSM-IV (19) psychiatric disorders in children and adolescents between the ages of 6 and 17 years. It consists of a screening interview; symptom severity above the threshold determines which additional diagnostic supplements should be completed. The K-SADS is widely used as a diagnostic tool and reference standard in child and adolescent mental health research (13, 20, 21).

*Spence Children's Anxiety Scale*
Anxiety symptoms were measured using the Spence Children's Anxiety Scale (SCAS) (22), a 44-item (38 score-generating items and 6 positive filler items to reduce negative bias) Likert-type (0 = "never;" 3 = "always") questionnaire designed to assess anxiety symptoms in children and adolescents. The SCAS provides a total score as well as scores on six subscales: panic attacks and agoraphobia, separation anxiety, physical injury fears, social phobia, OCD, and generalized anxiety. In the original study by Spence, the internal reliability coefficient for the total scale was 0.92, and it ranged from 0.60 to 0.82 for the subscales (22). In an evaluation of the psychometric properties of the Swedish translation of the SCAS, which included a subgroup of the current study sample, Swedish clinical cutoff scores were obtained. Results showed an internal reliability coefficient of 0.94 for the total score and demonstrated the scale's ability to distinguish between adolescents with and without an anxiety disorder in a Swedish non-anxiety–specific clinical setting (23).

*Functional impairment/negative life events*
Self-reports of functional impairment and negative life events were collected from adolescents during their initial visits through a routine intake question-naire. Items were related to problems within the family (any occurrence of child physical abuse in the family, violence between parents, or alcohol or drug problems in the family); difficulties in school (current need for extra help or current failed courses); interpersonal difficulties (school-related bullying or difficulty making new friends ); somatic

concerns (frequent headache or stomachache or pain in the neck, shoulders, back, or legs during the last three months); and sleep concerns (during the last three months). On the basis of the intake questionnaire, nine dichotomous variables were computed and organized into the five functional domains of family, school, interpersonal, somatic, and sleep.

*Procedure*
Clinical staff registered each patient's demographic data, referral cause, and source and administered the SCAS as well as an intake questionnaire as part of a regular intake routine during each participant's first or second visit. A time was then scheduled for each patient to complete the K-SADS interview (median time between intake visit and interview, seven days; interquartile range, 15 days).

*Diagnostic Procedure*
Five experienced clinicians (two psychiatrists, two psychologists, and one counselor) received extensive interview training by a K-SADS teacher before data collection. A free-marginal multirater kappa (24, 25) was chosen to calculate inter-rater reliability. This kappa statistic differs from Cohen's kappa in that it allows for multiple raters and is not dependent on marginal distributions. Calibration meetings were held monthly throughout the study, and these involved video recordings of randomly selected interviews. The average inter-rater reliability and percent overall agreement (Po) during data collection was as follows: all diagnoses, 0.94 ($P_o$ = 0.97); any anxiety, 0.92 ($P_o$ = 0.96); separation anxiety, 0.83 ($P_o$ = 0.92); social phobia, 0.92 ($P_o$ = 0.96); specific phobia, 0.94 ($P_o$ = 0.97); OCD, 1.00 ($P_o$ = 1.00); generalized anxiety disorder, 1.00 ($P_o$ = 1.00); and panic/agoraphobia, 0.94 ($P_o$ = 0.97).
Adolescents and their parents were interviewed together. Interviewers determined the current presence of diagnoses on the basis of full DSM-IV criteria and information collected via the K-SADS only. Diagnoses were not classified as primary or secondary. Anxiety disorders included in the analyses of anxiety prevalence and homotypic comorbidity were social phobia (social anxiety), generalized anxiety disorder, specific phobia, separation anxiety disorder, panic disorder, agoraphobia, and anxiety not otherwise specified (unspecified anxiety disorder). To harmonize with the chapter on anxiety disorders in the DSM-5 (26), the diagnoses of OCD and post-traumatic stress disorder were excluded from the analysis of anxiety prevalence and homotypic comorbidity and included in the category of heterotypic comorbidity. If criteria for the DSM-IV diagnosis of panic disorder with agoraphobia

(code 300.21) were fulfilled, both anxiety categories of Panic disorder and Agoraphobia were coded as "1" (i.e., "present") in the analysis of prevalence and homotypic comorbidity. All non-anxiety disorders were clustered into categories in accordance with the organizational structure of the DSM-5. An overview of the categories and organization of the K-SADS–derived DSM-IV diagnoses is presented in supplementary Table S1.

*Data Analysis*
Statistical analyses were conducted with the use of SPSS 22 software running on the Windows 7 operating system. Between-group differences were analyzed with independent *t*-tests and chi-squared tests. Binary logistic regression analyses were conducted to examine the variables associated with anxiety and comorbidity. In multivariate models, separate for each covariate, we adjusted for sex and age.

**TABLE 1.** Anxiety prevalence and comorbidity among 125 psychiatrically referred adolescents

| Variables | All Participants (N = 125) | Anxious (n = 58) | Non-anxious (n = 67) | $\chi^2$ (df) | *p* value |
|---|---|---|---|---|---|
| | | Prevalence, % (95% CI) | | | |
| **Anxiety disorders** | | | | | |
| Any anxiety | 46.4 (37.9-55.1) | | | | |
| Social anxiety | 27.2 (20.2-35.6) | | | | |
| Generalized anxiety | 17.6 (11.9-25.2) | | | | |
| Specific phobia | 16.8 (11.3-24.3) | | | | |
| Panic disorder | 9.6 (5.6-16.0) | | | | |
| Agoraphobia | 9.6 (5.6-16.0) | | | | |
| Separation anxiety disorder | 4.0 (1.7-9.0) | | | | |
| Unspecified anxiety disorder | 1.6 (0.4-5.6) | | | | |
| **Comorbidity** | | | | | |
| Homotypic | | 43.1 (31.2-55.9) | | | |
| Without heterotypic | | 3.4 (1.0-11.7) | | | |
| No. of anxiety disorders: | | | | | |
| 2 | | 12.1 (6.0-22.9) | | | |
| 3 | | 20.7 (12.2-32.8) | | | |
| 4 | | 8.6 (3.7-18.6) | | | |
| 5 | | 1.7 (0.3-9.1) | | | |
| Heterotypic | | 91.4 (81.4-96.3) | 83.6 /72.9-90.6)* | 1.7 (1) | .193 |
| Without homotypic | | 51.7 (39.2-64.1) | | | |
| Depressive | 44.8 (36.4-53.5) | 53.4 (40.8-65.7) | 37.3 (26.7-49.3) | 3.3 (1) | .070 |
| Neurodevelopmental | 56.0 (47.2-64.4) | 51.7 (39.2-64.1) | 59.7 (47.7-70.6) | 0.8 (1) | .370 |
| Trauma | 9.6 (5.6-16.0) | 15.5 (8.4-26.9) | 4.5 (1.5-12.4) | 4.4 (1) | .037 |
| Conduct | 14.4 (9.3-21.6) | 13.8 (7.2-24.9) | 14.9 (8.3-25.3) | 0.0 (1) | .857 |
| Eating | 6.4 (3.3-12.1) | 8.6 (3.7-18.6) | 4.5 81.5-12.4) | 0.9 (1) | .470† |
| Obsessive | 7.2 (3.8-13.1) | 6.9 (2.7-16.4) | 7.5 3.2-16.3) | 0.0 (1) | 1.000† |
| Psychotic | 3.2 (1.3-7.9) | 3.4 (1.0-11.7) | 3.0 (0.8-10.2) | 0.0 (1) | 1.000† |
| Bipolar | 1.6 (0.4-5.6) | 1.7 (0.3-9.1) | 1.5 (0.3-8.0) | 0.0 (1) | 1.000† |
| Substance | 1.6 (0.4-5.6) | 0 (0.0-6.2) | 3.0 (0.8-10.2) | 1.8 (1) | .499† |

*Presence of one or more non-anxiety psychiatric disorder
†Fisher's exact test, two-tailed

## Results

*Description of Sample*
The study group consisted of 125 consecutively referred adolescents (72 girls; 57.6%) between the ages of 12 and 18 years (mean, 15.7; standard deviation, 1.5). The majority of the patients' parents were separated (60.8%). There were multiple causes for referral, as described by the referral source; the most common were symptoms of attention-deficit/hyperactivity disorder (31.2%) and depression (29.6%). Problematic symptoms of anxiety were reported in 18.4% of patients at the time of referral. Among those referred for more than one cause (38 patients; 30.4%), the most frequent help-seeking causes were symptoms of anxiety (52.6%) and depression (52.6%).

The total number of diagnoses per participant ranged from 0 to 8 (median, 2; interquartile range, 1 to 3). The number of diagnoses was related to sex, with girls having more diagnoses than boys (girls: mean, 2.8; standard deviation, 1.7; boys: mean, 1.8, standard deviation, 1.3; *t*(123) = 3.7; *p* < .001). Eleven participants (8.8%) had no diagnoses.

*Prevalence of Anxiety Disorders*
Fifty-eight adolescents (46.4%; 95% confidence interval [CI], 37.9 to 55.1; 62.5% of all girls and 24.5% of all boys) were diagnosed with at least one

anxiety disorder, with a female-to-male ratio of 3.5:1. The prevalences of the individual anxiety disorders were as follows: social anxiety, 27.2%; generalized anxiety, 17.6%; specific phobia, 16.8%; panic disorder, 9.6%; agoraphobia, 9.6%; separation anxiety disorder, 4.0%; and unspecified anxiety disorder, 1.6%. Significant associations with sex—with more girls meeting the criteria for diagnosis—were found for all anxiety disorders, except for generalized anxiety and panic disorder. The prevalence of anxiety disorders is presented in Table 1.

**TABLE 2.** Demographic and clinical presentation characteristics of anxious versus non-anxious adolescents as defined by the Schedule for Affective Disorders and Schizophrenia for School-Age Children

| Variables | All Participants (N = 125) | Anxious (n = 58) | Non-anxious (n = 67) | t/χ² (df) | p value |
|---|---|---|---|---|---|
| **Demographic data** | | | | | |
| Sex | | | | | |
| Female, n (%) | 72 (57.6) | 45 (77.6) | 27 (40.3) | 17.7 (1) | <.001 |
| Age | | | | | |
| Mean (SD) | 15.7 (1.5) | 15.8 (1.4) | 15.6 (1.5) | 0.6 (123) | .521 |
| Ethnicity | | | | | |
| Swedish, n (%) | 122 (97.6) | 57 (98.3) | 65 (97.0) | 0.2 (1) | 1.000* |
| Parents' marital status | | | | | |
| Divorced, n (%) | 76 (60.8) | 34 (58.6) | 42 (62.7) | 0.2 (1) | .642 |
| **Clinical presentation** | | | | | |
| Referral source, n (%) | | | | | |
| Parent | 44 (35.2) | 20 (34.5) | 24 (35.8) | 0.0 (1) | .876 |
| Primary care | 32 (25.6) | 19 (32.8) | 13 (19.4) | 2.9 (1) | .088 |
| School health services | 27 (21.6) | 9 (15.5) | 18 (26.9) | 2.4 (1) | .124 |
| Hospital departments | 6 (4.8) | 4 (6.9) | 2 (3.0) | 0.8 (1) | .415* |
| Social services | 4 (3.2) | 1 (1.7) | 3 (4.5) | 0.8 (1) | .623* |
| Other | 12 (9.6) | 5 (8.6) | 7 (10.4) | 0.1 (1) | .729 |
| Referral cause, n (%) | | | | | |
| ADHD symptoms | 39 (31.2) | 11 (19.0) | 28 (41.8) | 7.5 (1) | .006 |
| Depressive symptoms | 38 (30.4) | 23 (39.7) | 15 (22.4) | 4.4 (1) | .036 |
| Anxiety symptoms | 23 (18.4) | 12 (20.7) | 11 (16.4) | 0.4 (1) | .539 |
| Neurodevelopmental assessment | 17 (13.6) | 10 (17.2) | 7 (10.4) | 1.2 (1) | .269 |
| Self-harm, suicidal gestures | 16 (12.8) | 9 (15.5) | 7 (10.4) | 0.7 (1) | .398 |
| Autistic symptoms | 8 (6.4) | 3 (53.2) | 5 (7.5) | 0.3 (1) | .724* |
| Other causes | 20 (16.0) | 9 (15.5) | 11 (16.4) | 0.0 (1) | .891 |
| Prior admission to a clinic, n (%) | 37 (29.6) | 24 (41.4) | 13 (19.4) | 7.2 (1) | .007 |
| Anxiety scores (SCAS) | | | 20.2 | | |
| Mean (SD) | 29.8 (19.1) | 40.2 (18.3) | (14.2) | 6.7 (119) | <.001 |
| ≥Diagnostic cutoff, n (%)[†] | 44 (35.2) | 35 (60.3) | 9 (14.3) | 27.7 (1) | <.001 |
| ≥Screening cutoff, n (%)[‡] | 72 (57.6) | 52 (86.7) | 20 (31.7) | 42.0 (1) | <.001 |
| Functional impairment/negative life events: Family, n (%) | | | | | |
| Child physical abuse[§] | 18 (14.4) | 11 (19.0) | 7 (10.4) | 1.8 (1) | .176 |
| Violence between parents | 16 (12.8) | 9 (15.5) | 7 (10.4) | 0.7 (1) | .398 |
| Alcohol/drug problems[a] | 28 (22.4) | 16 (27.6) | 12 (17.9) | 1.7 (1) | .196 |
| School, n (%) | | | | | |
| Extra help/special class | 37 (29.6) | 17 (29.3) | 20 (29.9) | 0.2 (1) | .639 |
| Failed course(s) | 80 (64.0) | 36 (62.1) | 44 (65.7) | 1.5 (1) | .224 |
| Interpersonal, n (%) | | | | | |
| Bullied in school | 37 (29.6) | 22 (37.9) | 15 (22.4) | 3.6 (1) | .058 |
| Difficulty making friends | 28 (22.4) | 21 (36.2) | 7 (10.4) | 11.9 (1) | .001 |
| Somatic (pain), n (%) | 71 (56.8) | 46 (79.3) | 25 (37.3) | 22.3 (1) | <.001 |
| Sleep, n (%) | 55 (44.0) | 27 (46.6) | 28 (41.8) | 0.3 (1) | .593 |
| No. of problems, mean (SD) [b] | 3.0 (1.7) | 3.5 (1.7) | 2.5 (1.6) | 3.6 (123) | <.001 |

*ADHD,* Attention-deficit/hyperactivity disorder; *SCAS,* Spence Children's Anxiety Scale; *SD,* standard deviation
*Fisher's exact test, two-tailed; †Total score of 33 or more (23); ‡Total score 22 or more (23); §Participant or sibling abused by parent;
[a]Any family member; [b]0 to 9

## Clinical Presentation

There were no differences between K-SADS–defined anxious and non-anxious adolescents in terms of age, parents' marital status, or ethnicity. However, there was a significant sex difference, with a higher proportion of girls found among anxious as compared with non-anxious adolescents ($\chi^2(1) = 17.7$; $p < .001$). Significant differences in clinical presentation were found, with higher proportions of prior admission to the clinic ($\chi^2(1) = 7.2$; $p = .007$) and symptoms of depression as the referral cause ($\chi^2(1) = 4.4$; $p = .036$) among anxious adolescents. Symptoms of attention-deficit/hyperactivity disorder as the referral cause were more common among non-anxious adolescents ($\chi^2(1) = 7.5$; $p = .006$). Anxious adolescents rated themselves as having more anxiety symptoms ($t(119) = 6.7$; $p < .001$) and more somatic and interpersonal problems, with higher proportions of frequent symptoms of pain ($\chi^2(1) = 22.3$; $p < 0.001$) and difficulties making friends ($\chi^2(1) = 11.9$; $p = .001$) as compared with non-anxious adolescents. There were no significant differences with regard to referral source, family problems, school functioning, or sleep concerns. There was a tendency for a higher proportion of anxious than non-anxious adolescents to have experienced school-related bullying ($\chi^2(1) = 3.6$; $p = .058$). Table 2 shows the demographic and clinical presentation characteristics of anxious and non-anxious adolescents.

## Associations between clinical presentation and anxiety disorders

For each covariate, separate binary logistic regression analyses, which were adjusted for age and sex, were performed for the total sample to examine associations between clinical presentation and anxiety disorders. A referral cause of anxiety symptoms was not related to any anxiety disorder. Only 21% of K-SADS-defined anxious adolescents were referred for symptoms of anxiety. The category of "any anxiety" was associated with a referral that requested a neurodevelopmental assessment (odds ratio [OR], 4.2; 95% CI, 1.2 to 14.6; $p = .023$), self-reports of frequent body ache (OR, 4.3; 95% CI, 1.7 to 10.4; $p = .001$); and difficulties making new friends (OR, 4.5; 95% CI, 1.6 to 12.3; $p = .004$). Significant associations between generalized anxiety and clinical presentation were more frequently found than they were for the other anxiety disorders, with generalized anxiety being related to three variables: age (OR, 1.4; 95% CI, 1.0 to 2.1; $p = .047$); referral source (i.e., referral from a primary care physician; OR, 3.2; 95% CI, 1.2 to 8.7; $p = .024$); and self-reports of frequent body ache (OR, 5.6; 95% CI, 1.4 to 23.1; $p = .016$).

Panic disorder was related to a referral cause of depressive symptoms (OR, 4.9; 95% CI, 1.3 to 18.7; $p = .021$), as was agoraphobia (OR, 6.9; 95% CI, 1.6 to 29.1; $p = .009$). Social anxiety and specific phobia were associated with difficulties making new friends (OR, 4.3; 95% CI, 1.7 to 11.1; $p = .003$ and OR, 3.8; 95% CI, 1.3 to 10.7; $p = .012$, respectively). Analyses of associations between self-rated anxiety symptoms showed that all anxiety categories, except separation anxiety and unspecified anxiety disorder, were related to the total SCAS scores (all ORs within the 95% CI of 1.0 to 1.1; all $p$ values of <.02).

## Patterns of Comorbidity

Only the 58 participants who had been diagnosed with anxiety disorders were included in the analyses of comorbidity, unless otherwise specified. Three (5.2%) adolescents had no comorbidity (i.e., only one anxiety disorder).

## Homotypic comorbidity

Homotypic comorbidity was found in 25 adolescents (43.1%; 95% CI, 31.2 to 55.9; see Table 1). Homotypic comorbidity without concurrent heterotypic comorbidity was noted in two anxiety-disordered adolescents (3.4%). Age and sex were not significant predictors of total homotypic comorbidity among anxious adolescents, but sex was a significant predictor in the total sample, with more girls having additional anxiety disorders as compared with boys (OR, 7.3; 95% CI, 2.1 to 26.1; $p = .002$). The most frequent overlaps between anxiety disorders were social anxiety with concurrent generalized anxiety (20.7%) and social anxiety with concurrent specific phobia (20.7%). Six adolescents (10.3%) had both: social anxiety with concurrent generalized anxiety and concurrent specific phobia. In the total sample, the diagnoses of social anxiety, generalized anxiety, specific phobia, panic disorder, and separation anxiety disorder were significantly associated with the presence of additional anxiety. When analyses of homotypic comorbidity were limited to anxious adolescents, significant associations remained for the diagnoses of generalized anxiety, specific phobia, and panic disorder. Self-rated symptoms of anxiety were also predictive of homotypic comorbidity, which was congruent with associations between K-SADS–derived anxiety disorders and homotypic comorbidity. In the total sample and among the anxiety-disordered adolescents, a total SCAS score at or above a diagnostic cutoff was a significant predictor of homotypic comorbidity, as were continuous measures of total anxiety symptoms and disorder-specific symptoms. Among referral causes, the only significant predictor of homotypic comorbidity was found in the total sample with the

referral cause of autistic symptoms (OR, 9.6; 95% CI, 1.1 to 80.6; $p$ = .037). Adjusted ORs for the association between anxiety disorders, self-rated anxiety symptoms, and homotypic comorbidity are presented separately for the total and anxious samples in Table 3.

**TABLE 3.** Adjusted odds ratios with 95% confidence intervals for the association between anxiety disorders, anxiety symptoms, and homotypic comorbidity

| Covariates* | Homotypic Comorbidity | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Total Sample (N = 125) | | | Anxious Sample (n = 58) | | |
| | OR | 95% CI | p value | OR | 95% CI | p value |
| **Anxiety disorders** | | | | | | |
| Social anxiety | 11.560 | 3.832–34.872 | <.001 | 2.949 | 0.909–9.573 | .072 |
| Generalized anxiety | 23.812 | 6.429–88.187 | <.001 | 7.226 | 1.857–28.122 | .004 |
| Specific phobia | 18.060 | 5.492–59.392 | <.001 | 6.148 | 1.813–20.848 | .004 |
| Panic disorder | 105.275 | 9.313–1189.995 | <.001 | 38.185 | 3.437–424.235 | .003 |
| Agoraphobia | +∞[†] | – | – | +∞[†] | – | – |
| Separation anxiety disorder | 13.503 | 1.337–136.390 | .027 | 6.476 | 0.611–68.663 | .121 |
| Unspecified anxiety disorder | –∞[†] | – | – | –∞[†] | – | – |
| **Anxiety symptoms (Spence Children's Anxiety Scale, self-report)** | | | | | | |
| ≥Diagnostic cutoff[‡] | 11.420 | 3.336–39.094 | <.001 | 5.664 | 1.498–21.414 | .011 |
| ≥Screening cutoff[a] | 6.706 | 1.402–32.075 | .017 | 0.666 | 0.085–5.188 | .698 |
| Total score[b] | 1.073 | 1.037–1.112 | <.001 | 1.061 | 1.017–1.106 | .006 |
| Social anxiety[b] | 1.327 | 1.146–1.537 | <.001 | 1.229 | 1.032–1.463 | .021 |
| Generalized anxiety disorder[b] | 1.328 | 1.144–1.542 | <.001 | 1.212 | 1.024–1.435 | .025 |
| Physical injury fears (specific phobia) [b] | 1.187 | 1.004–1.404 | .044 | 1.134 | 0.933–1.379 | .206 |
| Panic/agoraphobia[b] | 1.254 | 1.123–1.401 | <.001 | 1.173 | 1.042–1.321 | .009 |
| Separation anxiety[b] | 1.338 | 1.139–1.572 | <.001 | 1.277 | 1.056–1.543 | .011 |

CI, Confidence interval; OR, odds ratio.
*Each multivariate model included a single covariate adjusted for age and sex.
+∞[†]Diagnosis was only present without homotypic comorbidity; –∞[†]Diagnosis was only present without homotypic comorbidity; ‡Total score of 33 or more (23); [a]Total score of 22 or more (23); [b]Continuous scores.

*Heterotypic comorbidity*
Categories of K-SADS–derived heterotypic comorbid diagnoses are presented as supplementary material (see Table S1). Heterotypic comorbidity was found in 53 anxiety-disordered adolescents (91.4%; 95% CI, 81.4 to 96.3). Heterotypic comorbidity without concurrent homotypic comorbidity was found in 30 adolescents (51.7%). Logistic regression analyses showed that no specific anxiety disorder was significantly associated with increased odds of overall heterotypic comorbidity. In separate multivariate models, adjusted for age and sex, single anxiety disorders were used as independent variables, in logistic regression analyses of associations between the four most frequent heterotypic categories and individual anxiety disorders. Significant relationships between three heterotypic categories and four anxiety disorders were observed: trauma disorders and panic disorder (OR, 8.6; 95% CI, 1.6 to 46.1; $p$ = .012); trauma disorders and social anxiety (OR, 0.1; 95% CI, 0.1 to 0.6; $p$ = .011); depressive disorders and generalized anxiety (OR, 4.1; 95% CI, 1.2 to 13.9; $p$ = .024); and conduct disorders and agoraphobia (OR, 5.7; 95% CI, 1.1 to 29.9; $p$ = .040). Overall,

significantly higher rates of trauma-related disorders were observed among adolescents with anxiety than in those without (15.5% vs. 4.5%; $p$ = .037). There were no other significant differences in heterotypic comorbid categories between anxious and non-anxious adolescents. Heterotypic comorbidity in the total sample and separately for anxious and non-anxious adolescents is presented in Table 1.

**Discussion**
This study examined the characteristics of seven anxiety disorders in a sample of 125 adolescents who were consecutively referred to psychiatric outpatient clinics for multiple causes. At least one anxiety disorder was found in 46.4% of adolescents, with girls diagnosed more than three times more often than boys. The most frequent anxiety disorder was social anxiety (27.2%), whereas the least frequent were separation anxiety (4.0%) and unspecified anxiety disorder (1.6%). Conspicuous differences in clinical presentation between anxious and non-anxious adolescents were higher levels of self-rated anxiety symptoms, higher proportions of prior admission, and more frequent reporting of

depression as the referral cause. As compared with psychiatrically referred adolescents without anxiety, anxious adolescents reported more symptoms of pain and difficulties making friends. Nearly all adolescents who were diagnosed with anxiety disorders had concurrent disorders, with heterotypic comorbidity being twice as common as homotypic comorbidity.

To the best of our knowledge, there are no comparable reports involving the use of a diagnostic interview to investigate the specific characteristics of multiple anxiety disorders among adolescents with multiple referral causes in a non-specialized psychiatric setting. Previous studies of youths referred specifically for anxiety treatment have found differences in clinical characteristics between children and adolescents with regard to prevalence rates, especially for separation anxiety disorder (which is uncommon among adolescents) and symptom severity (which has been found to be significantly higher among adolescents) (27, 28). Thus, relating the findings of the current study to three previously reported studies of prevalence in non-specialized psychiatry is curtailed, because the other studies all included either combined samples of children and adolescents or only younger children (12-14). With this limitation in mind, the prevalence of any anxiety disorder observed in this study is more akin to the estimates of 57.7% reported by Hammerness and colleagues in the United States (13) and 32.7% reported by Hansen and colleagues in Norway (14) rather than to the rate of 5.7% reported by Esbjørn and colleagues in Denmark (12). This must be viewed in relation to the methodological similarities and differences of these studies. Similarities included the setting and the inclusion of participants irrespective of referral cause. Dissimilarities in the current study as compared with previous studies were as follows: 1) a higher proportion of girls; 2) the age range (i.e., only adolescents); and 3) the categories and number of studied anxiety disorders. The low-prevalence Danish study differs from both the current study, North American and Norwegian studies in the same way: it used ICD-10 criteria, as well as unstandardized diagnostic assessments. However, not even the 95% CI (37.9 to 55.1%) surrounding the observed prevalence of any anxiety in the current study included the reported estimates from the United States and Norway, although the same K-SADS diagnostic interview was used. It is worth noting that the described between-study differences listed previously are analogous to some of the findings reported by Baxter and colleagues in their meta-analysis of sources of anxiety prevalence variability in community studies (18). Specifically,

Baxter and colleagues found that sex explained 25% of the variance and that there was no effect of the diagnostic instrument after the number of disorders was considered. This observation suggests that anxiety prevalence variability in community and clinical studies may be influenced by the same moderators, although further research is needed to understand their specific impact on child and adolescent psychiatry.

As can be expected in a general psychiatric sample that includes patients with multiple referral causes, total comorbidity among anxiety-disordered adolescents was very high, with only 5% being diagnosed with one single anxiety disorder and no other concurrent disorders. Overall homotypic comorbidity was in line with the findings reported by Hammerness and colleagues in the United States (13), with most anxiety disorders associated with additional diagnoses of anxiety. Although comorbidity estimates reported by Esbjørn and colleagues in Denmark (12) and by Hansen and colleagues in Norway (14) were markedly lower as compared with the findings of the current study, observations of heterotypic comorbidity as the more prevalent type were similar. Moreover, the percentage point (*pp*) differences between homotypic and heterotypic comorbidity in those studies (40 *pp* and 46 *pp*) were similar to the difference observed in the current study (48 *pp*), which implies that this comorbidity pattern is a clinical characteristic that can be expected among anxious youths in non-anxiety–specialized psychiatric settings. The more frequently observed heterotypic comorbidity could also be a possible explanation for the low anxiety prevalence estimates observed in patient registers in Denmark and Norway and in the current study clinics before data collection, if in fact the heterotypic comorbidity was the primary cause for the seeking of help and diagnostic procedures inadequately assessed the presence of concurrent disorders.

As has been seen in other studies, self-ratings of family, interpersonal, school, sleep, and somatic functioning among anxious adolescents revealed problems in all areas. Few significant differences in domain function were found between anxious and non-anxious adolescents, but the frequency and co-occurrence of the inquired problems with anxiety still warrant noting. However, although a high proportion of anxious adolescents rated themselves as having functional impairment or difficulties in multiple areas, the impairment of these adolescents cannot be attributed to anxiety specifically because the intake questionnaire was designed to measure overall functioning, regardless of presenting symptoms. Nonetheless, the clinical correlates of anxiety disorders observed in this study have been

associated with more chronicity and negative outcomes, and they call attention to the necessity of comprehensive assessment and proficient treatment planning to fully attend to the complexity of symptoms in this patient group (5, 29-33).

Finally, in line with the findings of the Norwegian study (14), we determined that a referral cause of anxiety was an inadequate method for identifying adolescents with anxiety, because it yielded a sensitivity of only 21 %.

*Strengths*

There are several indicators of the validity and generalizability of the current investigation. First, participants were consecutively included irrespective of referral cause or presenting symptoms. Second, the diagnostic assessments were based on a standardized interview, thereby increasing both diagnostic precision and detection. Third, data collection was conducted in a non-anxiety–specialized setting and is thus likely to be generalizable to standard clinical care settings. Fourth, the proportion of girls observed in the current sample (58%) was similar to the proportion observed in referrals to the clinics during the 6-month period that followed the end of the study (63%).

*Limitations*

Several limitations of the current study should be acknowledged. Only 13 boys met the diagnostic criteria for an anxiety disorder, thus precluding analyses of sex differences beyond the prevalence of any anxiety disorder. A majority of parents did not report their educational level or socioeconomic status, which precluded the analysis of these demographics in relation to anxiety. Whereas the administration of the K-SADS typically involves separate interviews, adolescents and parents were interviewed together in the current study, which may have had an effect on the inclination of both informants to describe psychiatric symptoms. Moreover, diagnoses were based only on information collected during the K-SADS interview; interviewers were unaware of the results of questionnaires completed at intake or other additional information sources. This diagnostic procedure requires patients to be able to adequately recognize and verbalize their feelings and behaviors, but these skills can be impaired in psychiatrically referred youths for various reasons.

**Clinical Significance**

For the detection of anxiety disorders among adolescents referred to non–anxiety-specialized child and adolescent psychiatry, the findings of this study

provide further evidence for the referral cause of anxiety being an inadequate method, with detection rates ranging from only 21% for any anxiety to 50% for the diagnosis of unspecified anxiety. Thus, this study provides further support for the routine use of standardized and structured instruments to improve both the precision and detection rates of anxiety in this setting. This study also adds important information about clinical presentation and comorbidity patterns, and it underscores the importance of comprehensive assessment to fully address the complexity of the symptoms in this patient group.

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## Supplementary file

**TABLE S1.** Categories of diagnoses from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition,* among 125 adolescents as derived from the Schedule for Affective Disorders and Schizophrenia for School-Age Children.