

ORIGINAL ARTICLE

Anxiety disorders in young people: a population-based study

Thaíse Campos Mondin, Caroline Elizabeth Konradt, Taiane de Azevedo Cardoso, Luciana de Avila Quevedo, Karen Jansen, Luciano Dias de Mattos, Ricardo Tavares Pinheiro, Ricardo Azevedo da Silva

Graduate Program in Health and Behavior, Universidade Católica de Pelotas (UCPel), Pelotas, RS, Brazil.

Objective: To assess the prevalence of anxiety disorders and associated factors in young adults.

Methods: Cross-sectional population-based study of individuals between the ages of 18 and 24 years randomly selected from 89 census-based sectors to ensure an adequate sample size. Household selection within the sectors was performed according to a systematic sampling process. Anxiety disorders were assessed using the Mini International Neuropsychiatric Interview (MINI). The final sample comprised 1,560 young adults.

Results: Of the participants who were diagnosed with anxiety disorders, 12.3% had agoraphobia, 9.7% had generalised anxiety disorder, 4.0% had social phobia, 3.3% had obsessive-compulsive disorder, 2.5% had panic disorder, and 2.1% had post-traumatic stress disorder; only 23.8% had received any previous treatment. Anxiety disorders were associated with sex, socioeconomic status, psychiatric problems in parents, alcohol abuse, and tobacco use.

Conclusions: The identification of factors associated with anxiety disorders in young people enables us to develop intervention strategies. Anxiety disorders are not only highly prevalent but are also associated with significant functional impairment, significant reductions in quality of life, lower productivity, and higher rates of comorbidities.

Keywords: Anxiety disorders; youth; epidemiology

Introduction

Anxiety disorders are among the most frequent psychiatric conditions in the general population, and their symptoms are among the most common complaints.¹ The symptoms of anxiety cause impairments in quality of life, especially with regard to interpersonal relationships and self-realization.²

Anxiety disorders are characterized by an uncomfortable emotional state, negative feelings about the future, or distress that triggers a sense of defense that serves as a warning so that the individual can prepare to face a possibly dangerous situation. Anxiety can be a normal reaction or can become pathological. In the latter case, the subject mounts dysfunctional and inadequate responses to any action that causes anxiety, whether real or imaginary, occurring during daily events or activities.³

Symptoms of anxiety can manifest as psychic or somatic complaints, categorized by the DSM-IV⁴ under the following disorders: obsessive compulsive disorder (OCD), social phobia, specific phobia, generalized anxiety disorder (GAD), panic disorder (PD), posttraumatic stress disorder (PTSD), and agoraphobia.

Adolescence and young adulthood are periods of critical development and transition, and the onset of

symptoms of anxiety in young people is sometimes overlooked as being part of this phase transition. At this time, young people undergo major physical, cognitive, and psychosocial changes, and can be very susceptible to the development of anxiety disorders.⁵ Studies have shown a prevalence of anxiety disorders of 5 to 19% among young people.⁶ Factors such as gender,⁷ parenting stress,⁸ parental anxiety and depression,^{6,9} low income,¹⁰ and alcohol and tobacco use¹¹ can be associated with anxiety disorders in adolescence.

Studies have shown a strong association between psychoactive substance use and anxiety disorder^{11,12} and that individuals suffering from anxiety disorders and substance use have a worse clinical course. In the past, studies have linked tobacco use only with PD^{13,14}; however, greater recognition has been given to studies involving all anxiety disorders and their association with substance use.

The present study sought to determine the prevalence of anxiety disorders and associated factors in young adults in a city in Southern Brazil. Its relevance lies in contributing to the understanding of the prevalence of anxiety disorders in a mostly undiagnosed and untreated young adult population.

Methods

This was a cross-sectional, population-based study including individuals aged 18 to 24 years and living in

Correspondence: Prof. Karen Jansen, Rua Félix da Cunha, 412, CEP 96010-000, Pelotas, RS, Brazil.

E-mail: jansen@ucpel.tche.br

Submitted Dec 20 2012, accepted Jun 15 2013.

the urban area of Pelotas, state of Rio Grande do Sul, Brazil. The sample selection was performed by clusters, considering a population of 39,667 in the age range of interest according to the current census of 448 sectors in the city.¹⁵ Subjects who presented any psychiatric disorders and/or drug abuse were referred for outpatient psychiatric care.

To ensure the necessary sample size, 89 census-based sectors were randomly selected. Household selection in the sectors was performed according to a systematic sampling process, the first house being the one at the corner designated by IBGE as starting the sector; every third house was selected. After identifying the subjects, the duly trained interviewers explained the aims of the study. The study was conducted from 2007 to 2009.

To assess the prevalence of anxiety and associated factors, we estimated the sample size with a confidence interval of 95% and a power of 80%. For prevalence estimation, we considered a 20% prevalence of any anxiety disorder, with a maximum error of 2%. Therefore, 1,478 young adults were needed to compose the sample. We adjusted the sample size by 20% to account for possible confounding factors, resulting in a sample of 1,772 young adults. Furthermore, to detect associated factors with relative risk of 1.4, a sample of 942 participants would have been sufficient.

The study included seven interviewers, all of whom were undergraduate psychology or physical therapy students of Universidade Católica de Pelotas (UCPel). The interviewers were trained to administer the instrument by psychologists with extensive experience and weekly meetings were conducted throughout the data collection period.

Anxiety disorders were assessed by the Mini International Neuropsychiatric Interview (MINI) in the previous month. The MINI is a short structured interview with adequate validity and reliability and evaluates PD, agoraphobia, social phobia, PTSD, OCD, and GAD.¹⁶ The variable any anxiety disorders was defined as the presence of at least one of these anxiety disorders.

In addition to the diagnostic interview, the subjects answered a questionnaire about their socioeconomic status, alcohol and tobacco use, and parental psychiatric disorders, as self-reported by the participants. The socioeconomic evaluation was performed using the Brazilian Association of Research Companies classification scheme,¹⁷ which is based on the number of material goods and the educational attainment of the head of the household. In this scheme, class A is the highest socioeconomic class, and class E is the lowest. Information about alcohol and tobacco use was obtained with the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST 2.0/WHO). This instrument assesses use, abuse, and dependence on alcohol, tobacco, and psychoactive substances. We focused specifically on alcohol and tobacco abuse/dependence, which was defined as a score greater than 4 points. The internal consistency of the instrument was considered good, with adequate sensitivity (84 to 91%), specificity of

79 to 98%, positive predictive values of 80 to 93%, and negative predictive values of 85 to 96%.¹⁸

Statistical analyses were performed using Stata 9 for Windows. The chi-square test was used for comparison between proportions and the *t* test was used to compare means. Logistic regression was applied to control for possible confounding factors, following a multilevel hierarchic model. Variables with a *p*-value ≤ 0.2 on crude testing were included in the model. The significance level was set at 95%.

The project was approved by the UCPel Research Ethics Committee with protocol number 2006/96. All subjects gave written informed consent for the analysis and anonymous publication of research findings.

Results

A total of 1,762 subjects were enrolled in the study. After refusals (11.5%), the final sample comprised 1,560 subjects. It is important to bear in mind that the prevalences reported by the present study refer to diagnoses at the current time. Table 1 shows the distribution of anxiety disorders among the subjects in the sample: 2.5% had PD, 12.3% agoraphobia, 4.0% social phobia, 2.1% PTSD, 3.3% OCD, and 9.7% had GAD. Of all subjects diagnosed with anxiety disorders, 23.8% had undergone previous treatment.

The prevalence of anxiety disorders was 20.9%. The proportion of anxiety disorders was higher among women ($p < 0.001$) and individuals with a lower socioeconomic status ($p < 0.001$), those whose mother or father had psychiatric disorders ($p < 0.001$ and $p = 0.003$ respectively), and those who abused alcohol ($p = 0.008$) or tobacco ($p < 0.001$) (Table 2).

After adjusting for possible confounding variables, anxiety disorders remained associated with sex ($p < 0.001$), socioeconomic status ($p = 0.017$), previous psychiatric or psychological treatment ($p < 0.001$), maternal psychiatric problems ($p < 0.001$), paternal psychiatric problems ($p = 0.016$), alcohol abuse ($p = 0.014$), and tobacco use ($p = 0.002$). The odds ratios (OR) and corresponding 95% confidence intervals (95%CI) for anxiety disorder in subjects with each of these variables are shown in Table 3.

Discussion

In this study, we found a 20.9% prevalence of anxiety disorder in young adults. In this non-clinical sample, the majority of subjects had not previously been diagnosed with anxiety disorders; of all subjects diagnosed with anxiety disorders, only 23.8% had received any previous psychiatric or psychological treatment. A similar prevalence of anxiety disorders was found in the United States in subject older than 18 years (18.1%).¹⁹ On the other hand, a study conducted in São Paulo, Brazil, with an over-18 sample found a prevalence of 12.5%.²⁰ This variation may be due to the application of different assessment methods.

Table 1 Sample distribution

Variables	n (%)
Sex	
Male	680 (43.6)
Female	880 (56.4)
Age (years)*	
18-21	1,012 (64.9)
22-24	535 (34.3)
Socioeconomic status	
A + B	583 (37.4)
C	751 (48.1)
D + E	226 (14.5)
Living with a partner	
No	1,121 (71.9)
Yes	439 (28.1)
Alcohol abuse/dependence	
No	1,141 (73.1)
Yes	419 (26.9)
Tobacco abuse/dependence	
No	1,171 (75.1)
Yes	389 (24.9)
Current or previous treatment	
No	1,197 (76.8)
Yes	221 (14.2)
Mother with psychiatric problems	
No	1,102 (70.7)
Yes	456 (29.3)
Father with psychiatric problems	
No	1,427 (91.7)
Yes	130 (8.3)
Previous psychiatric or psychological treatment	
No	1,197 (76.8)
Yes	221 (15.6)
Panic disorder	
No	1,521 (97.5)
Yes	39 (2.5)
Agoraphobia	
No	1,368 (87.7)
Yes	192 (12.3)
Social phobia	
No	1,497 (96.0)
Yes	63 (4.0)
Posttraumatic stress disorder	
No	1,528 (97.9)
Yes	32 (2.1)
Obsessive-compulsive disorder	
No	1,509 (96.7)
Yes	51 (3.3)
Generalized anxiety disorder	
No	1,408 (90.3)
Yes	152 (9.7)
Total	1,560 (100)

* 12 missing values.

The most prevalent anxiety disorders in our sample were agoraphobia and GAD. Our results differ from the literature, which shows agoraphobia as a less prevalent anxiety disorder.^{19,21} On the other hand, a study conducted in the United States found a prevalence of 15.3% in a Latino population.²² Agoraphobia is among the most disabling mental illnesses, as it significantly limits mobility and autonomy, resulting in isolation and negatively affecting the lives of affected individuals. The damage extends from the personal to the social, emotional, and professional spheres. Important questions about the diagnosis of agoraphobia are being discussed for the DSM-V proposal. One such question is whether agoraphobia is a disorder independent of PD. A review

concluded that agoraphobia is a clinical disorder that occurs regardless of PD and yet, is associated with a persistent course with low rates of spontaneous remission. It should be noted that the prevalence found in our study refers to agoraphobia without a history of PD.²³

We found similar prevalences of PD to those reported in the literature. Kessler et al. found that 2.7% of participants had PD in the U.S. National Comorbidity Survey Replication; in our study, we found a prevalence of 2.5%.¹⁹ Our results were also similar to those of Peterlin et al., who reported a 2.6% prevalence of PTSD in the previous 12 months and of 2.1% in the previous month among 18- to 98-year-old adults. The lower prevalence found in our study can be explained by the young age of the participants, who are thus less likely to have experienced a traumatic event.²⁴

Another cross-sectional study of 6,616 participants in Singapore found a 1.1% prevalence of OCD in the previous year. When analyzed with GAD, the prevalence increased to 3.6%. The overall prevalence of OCD ranges from 1 to 2.5% in studies around the world. A study conducted in Canada by phone showed a 3.1% prevalence of current OCD, with the rate dropping to 1.1% when subjects were assessed by experienced interviewers.²⁵ It is important to note that this study featured overestimation of the prevalence of OCD by lay interviewers, who tend to label regular concerns as obsessive. In our study, the interviewers were relatively inexperienced (last-year psychology and physical therapy majors). Although we must cite as a potential source of bias, we believe that extensive training on the assessment procedures minimized any possible effect.

Regarding social phobia, a study compared the prevalence rates in Latino and non-Latino residents of the United States.²² The prevalence was 4.5% in the Latino population, similar to that found in our study. However, the prevalence in non-Latinos was much higher. In São Paulo, Andrade et al. reported a lifetime prevalence of social phobia of 3.5% and a prevalence of 1.7% in the previous month.²⁶ Prevalence estimates of social phobia still differ considerably among studies; further investigation of this statistic and associated factors in different populations is required to provide a better understanding of the disorder.

A study comparing the prevalence of GAD among different ethnicities reported that white Americans showed a higher prevalence (8.5%) than African Americans (4.9%), Hispanic Americans (5.8%), or Asian Americans (2.4%).²⁷ Individuals with GAD are more likely to have chronic medical conditions.²⁸ This shows the need to investigate anxiety disorders in patients who present to primary care services, because this disorder is often associated with other medical conditions.

In our study, anxiety disorders were more prevalent in women. Studies have shown gender differences in the incidence, prevalence, and course of mental and behavioral disorders. Women have a higher prevalence of anxiety disorders than men.^{20,24} According to epidemiological surveys of the general U.S. population, women are significantly more likely than men to develop PD, GAD, or

Table 2 Anxiety disorders and associated factors in young adults

Variables	No anxiety disorder, n (%)	Anxiety disorder, n (%)	p-value*
Sex			< 0.001
Male	580 (85.4)	99 (14.6)	
Female	653 (74.2)	227 (25.8)	
Age (years)			0.244
18-21	792 (78.3)	220 (21.7)	
22-24	433 (80.9)	102 (19.1)	
Socioeconomic status			< 0.001
A + B	408 (82.3)	103 (17.7)	
C	594 (79.2)	156 (20.8)	
D + E	159 (70.4)	67 (29.6)	
Living with a partner			0.138
No	897 (80.1)	223 (19.9)	
Yes	336 (76.5)	103 (23.5)	
Previous psychiatric or psychological treatment			< 0.001
No	967 (80.8)	230 (19.2)	
Yes	149 (67.4)	72 (32.6)	
Mother with psychiatric problems			< 0.001
No	916 (83.2)	185 (16.8)	
Yes	315 (69.1)	141 (30.9)	
Father with psychiatric problems			0.003
No	1,141 (80.0)	285 (20.0)	
Yes	89 (68.5)	41 (31.5)	
Alcohol abuse/dependence			0.008
No	921 (80.8)	219 (19.2)	
Yes	312 (74.5)	107 (25.5)	
Tobacco abuse/dependence			< 0.001
No	958 (81.9)	212 (18.1)	
Yes	275 (70.7)	114 (29.3)	
Total	1,233 (79.1)	326 (20.9)	-

* Comparison between participants with anxiety disorder by chi-square test.

Table 3 Crude and adjusted analyses of young adults with anxiety disorders

Variables	Crude analysis OR (95%CI)	p-value	Adjusted analysis OR (95%CI)	p-value
First hierarchical level				
Sex		< 0.001		< 0.001
Male	1.00		1.00	
Female	2.04 (1.51-2.65)		2.10 (1.57-2.80)	
Socioeconomic status		0.155		0.017
A + B	1.00		1.00	
C	1.22 (0.92-1.61)		1.10 (0.81-1.50)	
D + E	1.96 (1.37-2.80)		1.61 (1.09-2.39)	
Living with a partner		0.119		0.612
No	1.00		1.00	
Yes	1.23 (0.95-1.61)		1.08 (0.80-1.45)	
Second hierarchical level				
Previous psychiatric or psychological treatment		< 0.001		< 0.001
No	1.00		1.00	
Yes	2.03 (1.48-2.78)		1.87 (1.34-2.61)	
Mother with psychiatric problems		< 0.001		< 0.001
No	1.00		1.00	
Yes	2.22 (1.72-2.86)		1.99 (1.51-2.62)	
Father with psychiatric problems		0.002		0.016
No	1.00		1.00	
Yes	1.85 (1.25-2.73)		1.69 (1.10-2.60)	
Alcohol abuse		0.006		0.014
No	1.00		1.00	
Yes	1.44 (1.11-1.88)		1.48 (1.08-2.02)	
Tobacco abuse		< 0.001		0.002
No	1.00		1.00	
Yes	1.87 (1.44-2.44)		1.64 (1.20-2.25)	

95%CI = 95% confidence interval; OR = odds ratio.

PTSD over the life course.²⁹ Not knowing why women are at increased risk of developing an anxiety disorder has led a few studies to investigate whether the characteristics of women with anxiety disorders differ from those of men with the same disorders.³⁰ Nevertheless, some explanations may be related to factors such as greater cultural acceptance of fear and avoidance behavior in women and different adaptive patterns. Conversely, men tend to use substances such as nicotine and alcohol as self-medication, which could mask the primary symptoms of anxiety disorders.³¹

In this study, we found an association between anxiety disorders and tobacco and alcohol abuse. Both clinical and epidemiologic studies of adults have quite consistently found an association between the presence of anxiety disorders and risk of substance use disorders.³² Tobacco abuse concerns the mental health field, since it is known that smoking is more common among psychiatric patients than among the general public.³³ Studies have shown that smoking is related to increased symptom severity in individuals with anxiety disorders.³⁴ For this reason, it is important to focus attention on the treatment of these patients, providing evidence that smoking is not related to reduced levels of symptoms, but rather can worsen mood, anxiety, and cognition.³⁵ Another study found that patients with GAD are five times more likely to smoke than those who do not have the anxiety disorder.³⁶ Our sample showed a high prevalence (29.3%) of smoking among individuals with anxiety disorder, two times higher than in the general population (15.1%).³⁷ Like tobacco, alcohol is also often used as self-medication to reduce anxiety. Moreover, the presence of any anxiety disorder or substance use disorder is a risk factor for other disorders.³⁸

Our results showed that anxiety disorders in young adults were related to lower socioeconomic standing. The literature shows that common mental disorders are associated with social vulnerability factors, such as low educational attainment, poor housing, low income, and unemployment.³⁹

Another important finding was the relationship between parental mental disorders and anxiety disorders in young people. Studies of youth populations in this regard are scarce, but it is known that maternal anxiety disorder predicts the presence of anxiety disorders in children.⁴⁰ Researchers have suggested that anxiety is familial, with first-degree relatives of anxious probands at increased risk of developing anxiety disorders of their own.^{41,42} These findings suggest a significant role for genetic and environmental factors in the transmission of mental disorders.

One limitation of our study was its cross-sectional design, which precluded any inferences of causality between anxiety disorders and associated factors. Nevertheless, this study is relevant, as the identification of factors associated with anxiety disorders in young people allows us to think of intervention strategies.

Symptoms caused by anxiety have a great impact on the health care system, not only due to the costs of treatment but also because of the greater demand for

medical care to treat physical symptoms.⁴³ Young adults usually only seek health care for physical conditions, and are often unaware that physical symptoms may be indicative of a mental health-related issue. Preventive measures, as well as clinical strategies for detection, should be incorporated into routine health care. This is particularly important in the context of mental disorders that feature isolation as a characteristic, which prevents patients from seeking help. Further studies in young populations are required to gain a better understanding of anxiety disorder and its causalities.

Acknowledgements

The authors have received financial support from Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul (FAPERGS) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

Disclosure

The authors report no conflicts of interest.

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