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Prevalence and factors associated with anxiety among university students of health sciences in Brazil: findings and implications

Prevalência e fatores associados à ansiedade entre universitários de ciências da saúde no Brasil: achados e implicações

DOI: 10.1590/0047-2085000000322

ABSTRACT

Objective: The aim was to evaluate the prevalence and factors associated with anxiety disorders among university students of health sciences at Federal University of Ouro Preto, Brazil. **Methods:** A cross-sectional study between March to June 2019. Data were collected through a self-administered questionnaire including sociodemographic, academic, family and behavioral issues. The Beck Anxiety Inventory was used to assess anxiety. Estimates were obtained through the prevalence ratio and Poisson multivariate analysis. **Results:** Four hundred and ninety-three students participated with a mean age of 23.1 and predominantly women (79.9%). All students had some degree of anxiety, with the frequency of the severe, moderate and mild forms being 28.0%, 29.8% and 27.0%, respectively. The factors associated with anxiety included having suffered psychological and/or physical violence in childhood, having suicidal thoughts, having a deceased parent, living with parents, being dissatisfied with the course and being in the exam period. **Conclusions:** The prevalence of anxiety was high in our study and family problems prior to entering university seem to significantly influence the degree of anxiety, which may compromise the student's academic and social performance.

KEYWORDS

Anxiety, students, prevalence, mental disorders, Brazil.

RESUMO

Objetivo: O objetivo foi avaliar a prevalência e os fatores associados aos transtornos de ansiedade em estudantes universitários de ciências da saúde da Universidade Federal de Ouro Preto, Brasil. **Métodos:** Estudo transversal, entre março e junho de 2019. Os dados foram coletados por meio de questionário autoaplicável, incluindo questões sociodemográficas, acadêmicas, familiares e comportamentais. O Inventário de Ansiedade de Beck foi usado para avaliar a ansiedade. As estimativas foram obtidas por meio da razão de prevalência e análise multivariada de Poisson. **Resultados:** Participaram 493 alunos com idade média de 23,1 anos e predominância do sexo feminino (79,9%). Todos os alunos apresentaram algum grau de ansiedade, sendo a frequência da forma grave, moderada e leve de 28,0%, 29,8% e 27,0%, respectivamente. Os fatores associados à ansiedade foram: ter sofrido violência psicológica e/ou física na infância, ter pensamentos suicidas, ter pai falecido, morar com os pais, ter insatisfação com o curso e estar em período de provas. **Conclusões:** A prevalência de ansiedade foi elevada em nosso estudo e os problemas familiares anteriores ao ingresso na universidade parecem influenciar significativamente no grau de ansiedade, podendo comprometer o desempenho acadêmico e social do discente.

PALAVRAS-CHAVE

Ansiedade, estudantes, prevalência, transtornos mentais, Brasil.

Received in: Sep/28/2020. Approved in: Jan/4/2021

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INTRODUCTION

Anxiety disorders are characterized by intense changes in thinking, mood and behavior, and are associated with persistent excessive worry and fear, which can result in debilitating conditions^{1,2}. The physical changes include tachycardia, muscle tension, breathing difficulties, stomach pains and sweating³. In addition to the relationship between anxiety and the development of physical problems, this disorder is often associated with depression, alcohol and other forms of substance abuse including psychotropic medicines^{3,4}. The development of anxiety disorders is also linked to certain risk factors including being female, low socioeconomic status, environmental risk factors and maltreatment during childhood⁵⁻⁷.

Treating patients with mental health disorders is an increasing priority among countries worldwide with mental health accounting for between 10.0% and 13.0% of the global disease burden, and with mental health seen as the principal reason for years lived with disability among populations⁸⁻¹⁰. Of particular concern is that the global burden of mental health disorders has increased in recent years especially among lower- and middle-income countries (LMICs) due to a number of issues including environmental, demographic and socio-political issues including unrest^{11,12}. In the American continent, anxiety disorders affect more than 57 million people, with Brazil having the highest prevalence of anxiety cases worldwide at 9.3% of the population¹³.

In recent years, a high number of university students including medical students have presented with mental health disorders, mainly anxiety and depression, negatively impacting on their quality of life¹⁴⁻¹⁹. The peak incidence of mental health disorders is typically seen post-secondary education^{14,20,21}, with prevalence rates even more pronounced in undergraduate health students^{15,22}. Overall, it is estimated that between 12% to 46% of all university students are affected by mental health disorders in any one year^{20,21,23}. There is also a high rate of suicidal ideation and suicides among university students^{24,25}. Many situations may trigger the anxiety process in undergraduate students including stress, reduced social support including reduced family support, high workload and volume of study, limited sleep, financial concerns, as well as maltreatment by colleagues and teachers, which can all compromise academic achievement^{15,20,26}. Similarly among undergraduate health students, increased competitiveness and workloads, students' interpersonal contact with their future patients, limited leisure activities, lack of emotional support and a stressful work environment also contribute to high rates of mental health disorders in this population^{18,27}. Other situations outside of the academic environment during the university period can also enhance the development of mental health disorders. These include dissatisfaction with body image as well as feelings of personal and professional

inferiority^{28,29}, financial problems²³ and the effects of the physical environment and climate^{30,31}.

Brazil currently has 296 public higher education institutions, 36.8% of which are federal. The majority of people enrolled in higher education are concentrated in the universities³². In addition, published studies have demonstrated a high level of mental health disorders among medical students in Brazil, impacting on their quality of life^{18,19,33}. There are also initiatives to try and address the impact of mental health disorders in these and other students in Brazil^{34,35}. However, we were unaware of a study in a university in Brazil assessing the extent of anxiety disorders and potential factors where students come from all regions in Brazil as well as abroad. In addition, a study that included students from all potential health science courses and not just those attending medical or dental schools, which are the most studied. We believe such findings will help develop future strategies in Brazil and elsewhere to improve the mental health of students, better equipping them for the future. Consequently, the aim of this study was to identify factors associated with symptoms of anxiety disorder among university students in the health field as a basis for suggesting potential ways of addressing them.

METHODS

Study design

A cross-sectional study was conducted from March to June 2019 with students from health-related courses enrolled in The Federal University of Ouro Preto [UFOP]. According to the UFOP classification, six programs belong to the health field: Food Science and Technology, Physical Education, Pharmacy, Medicine, Nutrition and Social Service courses. All students on these courses received an online questionnaire available on the Google Forms platform, with an average time of completion of 10 minutes. Participation was entirely voluntary and the sample was formed using the snowball technique. Before data collection, the study was disseminated on social networks and local media (Instagram and WhatsApp), in order to stimulate participation. Only students under 18 years of age and those who did not complete the entire Beck Anxiety Inventory (BAI) were excluded from the study.

Sample calculation

The sample was calculated using the entire population of students regularly enrolled in all UFOP health science courses. Enrolled numbers included: Food Science and Technology (n = 220), Physical Education (n = 322), Pharmacy (n = 441), Medicine (n = 464), Nutrition (n = 307) and Social Service (n = 367), totaling 2,191 students³⁶. Considering a prevalence of 19.7% of anxiety among students³⁷, an accuracy of 3% and a drawing effect of 1, the sample was estimated as 500 students.

Data collection

To characterize anxiety disorders, the Beck Anxiety Inventory was applied³⁸. This is a self-report measure of anxiety, translated and validated into Portuguese³⁹.

The inventory consists of 21 questions that address symptoms and the intensity of anxiety in the week prior to the interview, namely: numbness or tingling, feeling hot, feeling unsteady, inability to relax, fear of the worst happening, dizziness or lightheadedness, heart pounding/racing, unsteady, terrified or afraid, nervous feeling of choking, hands trembling, fear of losing control, difficulty in breathing, fear of dying, scared, indigestion, faint/lightheaded, flushed face and hot/cold sweats. Each symptom was scored from zero to three points – zero when the response was negative, one when the response was mild, two when it was moderate and three when the response was severe.

In addition to the BAI, sociodemographic characteristics (gender, age), health conditions (chronic diseases, psychological and psychiatric treatment), details on dwelling arrangements, academic characteristics (program, years of study, satisfaction with the graduate programme), family (deceased parents, relationship with parents), behavioral issues (relationships, leisure activities, physical activity, frequency of physical activity, legal and illicit drug use, sexual orientation) if the respondent had been victim of childhood violence and if suicidal thoughts were present when the questions were answered.

Data analysis

Absolute and relative frequencies were used to describe the variables, using STATA statistical package version 14.0 (StataCorp). As the number of students differed between courses, an analysis of variance – ANOVA, followed by Bonferroni's test, was initially performed, comparing the degree of anxiety among students in the different courses. The total score determined the anxiety level, with 0-7 points indicating a minimum level, 8-15 mild, 16-25 moderate and 26-63 severe anxiety³⁸. The minimum anxiety category was considered as an absence of anxiety and was compared to mild, moderate and severe anxiety in different multivariate models. The association between anxiety and explanatory variables was evaluated by a Poisson regression model. Univariate analysis was performed and variables that showed statistical association ($p < 0.25$) were selected to develop the multivariate model. The selected variables in the univariate models were subsequently included in the multiple model. The backward method was adopted to obtain the final model, where the variables with p-value lower than 0.05 remained. Variables with more than two categories were transformed into dummy variables. The Poisson regression model with robust variance estimations was used to assess the risk factors associated with anxiety disorder. Estimates were obtained through the prevalence ratio [PR] with

95% CI. Due to the large number of women who answered the questionnaire and because gender is a risk factor, the final model was adjusted by gender.

Ethical statement

The study was approved by the Committees of Research Ethics of the University Federal of Ouro Preto (No. 3,057,599). All participants gave written informed consent for the data collection and analysis.

RESULTS

General and univariate analysis

Out of a total 2,192 students in the health sciences, 493 (23.2%) students answered the questionnaire. The majority were female ($n = 394$; 79.9%), mean age of 23.1 (SD 4.3) years and 18.6% ($n = 90$) had at least one chronic disease. Regarding their courses, 269 (54.6%) were studying pharmacy, 55 (11.2%) social services, 52 (10.5%) medicine, 45 (9.1%) physical education, 40 (8.1%) food science and technology and 32 (6.5%) nutrition. Of these students, 231 (48.6%) were not in the ideal period and 134 (27.6%) were on the exam week when they answered the questionnaire. Regarding the degree of satisfaction with the course, 33 (6.8%) were very satisfied, 202 (41.7%) were satisfied, 163 (33.7%) were not satisfied and 86 (17.8%) were dissatisfied (Table 1).

Table 1. Characteristics of the undergraduates of health Science courses at Federal University of Ouro Preto, Ouro Preto, MG, Brazil, 2019

Variables	n (%)
Gender	
Women	394 (79.9)
Age (years)	
18-22	184 (37.3)
23-25	183 (37.1)
>25	126 (25.6)
Chronic disease (yes)	90 (18.6)
Psychological treatment (yes)	223 (45.2)
Psychiatric treatment (yes)	101 (20.5)
Victim of childhood violence	
Physical	15 (3.2)
Mental	52 (11.0)
Physical and mental	38 (8.0)
Suicidal thoughts (yes)	225 (47.7)
Residence with	
Friends (students house)	295 (61.3)
Parents	115 (23.9)
Alone	45 (9.4)
Relatives	26 (5.4)

Variables	n (%)
Deceased parents (yes)	
Father	26 (5.3)
Mother	5 (1.0)
Father and mother	13 (2.6)
Good relationship with (yes)	
Father	380 (81.0)
Mother	462 (95.3)
Sexual orientation	
Heterosexual	404 (83.3)
Homosexual	29 (6.0)
Bisexual	52 (10.7)
Unique sexual partner (yes)	244 (51.1)
Sexual orientation approved by parents (yes)	429 (92.8)
Physical activities (yes)	260 (53.4)
Frequency of physical activity	
Once a week	42 (16.3)
Two times a week	77 (29.8)
Three times a week	71 (27.5)
Four times a week or more	68 (26.4)
Consume of alcoholic beverages (yes)	369 (75.8)
Frequency of alcohol consumption	
Often	60 (16.3)
Occasionally	259 (70.2)
Rarely	50 (13.5)
Use of illicit drugs (yes)	80 (22.5)
Frequency of illicit drugs use	
Often	15 (19.0)
Occasionally	32 (40.5)
Rarely	32 (40.5)
Ideal period of the course (yes)	231 (48.6)
On exams period during the study data collection (yes)	134 (27.6)
Satisfaction with the course	
Very Satisfied	33 (6.8)
Pleased	202 (41.7)
Unhappy	163 (33.7)
Dissatisfied	86 (17.8)

It was observed that 324 (65.7%) students who responded to the survey were undergoing treatment for mental disorders with 223 (45.2%) on psychological therapy and 101 (20.5%) on psychiatric treatment. Fifty-two students (11.0%) reported having suffered mental violence during childhood, 38 (8.0%) physical and mental violence and 15 (3.2%) suffered physical violence. In addition, it was observed that 225 (47.7%) had suicidal thoughts. Most students shared houses with friends in students' houses (n = 295; 61.3%). 115 (23.9%) were living with their parents, 45 (9.4%) were living

alone and 26 (5.4%) living with a relative. Most students had parents that were still alive (n = 447; 90.7%) and reported a good relationship with their parents (n = 380; 81.0%), especially and with their mothers (n = 462; 95.3%).

Regarding sexual orientation, the majority were heterosexual (n = 404; 83.3%) and had a single sexual partner (n = 244; 51.1%). Most students (n = 399; 82.8%) reported that their sexual orientation did not influence their emotional status and 429 (92.8%) reported having parental approval for their sexual orientation. With respect to physical activity, 260 (53.4%) of the participants practiced in some kind of activity with frequency varying from one to four times a week. Regarding alcohol consumption, 369 (75.8%) reported alcohol consumption, most of them (70.2%) occasionally; 80 (22.5%) had used illicit drugs, with 15 (19.0%) using these frequently.

The univariate analysis according to the degrees of anxiety (mild, moderate and severe) is presented in Table 2.

Prevalence of anxiety

All students (n = 493) showed some degree of anxiety according to the Beck Anxiety Inventory with 138 participants having severe anxiety, 147 moderate, 133 mild and 75 a minimum degree. Consequently, the frequency of severe anxiety was 28.0% (95% CI: 24.2-32.1), moderate anxiety 29.8% (95% CI 25.9-34.0), mild anxiety 27.0% (95% CI 23.2-31.1) and minimal anxiety was 15.2% (95% CI 12.2-18.6). Due to the difference in the samples obtained for each course, we evaluated whether the level of anxiety varied between the courses.

Overall, students of Medicine had a lower degree of anxiety compared to those enrolled into Food Science and Technology (p < 0.05) and Social Services (p < 0.05) programs. No significant differences were found in the other courses (Figure 1). Consequently, all participants were included into risk factors analyzing for anxiety.

Risk factors associated with different degrees of anxiety

According to the multivariate analysis, the risk factors associated with the prevalence of anxiety in the undergraduate students were: (i) having suffered psychological and physical violence in childhood (RP 1.4 95% CI 1.1-2.0 for mild anxiety and RP 1.7 95% CI 1.4-2.1 for severe anxiety), (ii) having suicidal thoughts (RP 1.4 95% CI 1.1-1.7 for moderate anxiety and 1.8 95% CI 1.4-2.4 for severe anxiety), (iii) deceased father and mother (RP 2.1 95% CI 1.1-4.1 for moderate anxiety), (iv) having a good relationship with their father (RP 1.2 95% CI 1.1-1.5 for moderate anxiety), (v) being unhappy or dissatisfied with the course (RP 2.6 95% CI 1.1-6.2 for moderate anxiety) and (vi) being on the exams week (RP 1.3 95% CI 1.1-1.6 for mild anxiety and RP 1.5 95% CI 1.2-1.8 for severe anxiety) (Table 3).

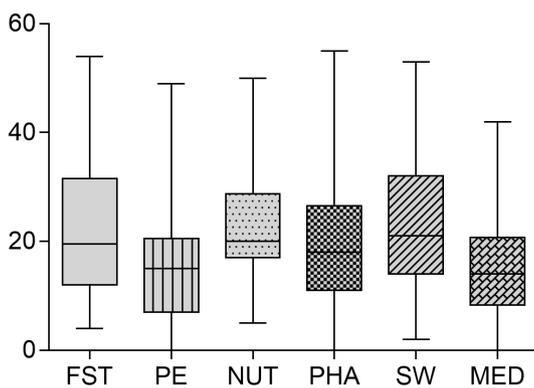
Table 2. Univariate analysis according to the degrees of anxiety in the students of health Sciences at Federal University of Ouro Preto, Ouro Preto, MG, Brazil, 2019

Variables	Degrees of anxiety					
	Mild RP (IC 95%)	p-value	Moderate RP (IC 95%)	p-value	Severe RP (IC 95%)	p-value
Age (years)						
18-22	-	-	-	-	-	-
23-25	0.9 (0.7-1.1)	0.454	0.9 (0.7-1.1)	0.273	0.8 (0.6-1.0)	0.049
>25	0.9 (0.7-1.2)	0.427	1.0 (0.8-1.3)	0.899	0.7 (0.5-0.9)	0.021
Gender						
Male	-	-	-	-	-	-
Female	1.2 (0.9-1.5)	0.192	1.45 (1.1-1.9)	0.013	2.0 (1.3-3.2)	0.001
Chronic disease						
Yes	-	-	-	-	-	-
No	1.0 (0.7-1.3)	0.820	0.8 (0.7-1.0)	0.075	0.7 (0.6-0.9)	0.006
Victim of childhood violence						
No	-	-	-	-	-	-
Yes, physics	1.1 (0.5-2.5)	0.799	1.5 (1.2-1.9)	0.001	1.4 (0.8-2.5)	0.286
Yes, mental	1.5 (1.2-1.8)	0.000	1.4 (1.1-1.8)	0.003	1.7 (1.4-2.0)	0.001
Yes, both	1.4 (1.0-2.0)	0.032	1.5 (1.2-1.8)	0.001	1.7 (1.5-2.1)	0.001
Suicidal thoughts						
No	-	-	-	-	-	-
Yes	0.9 (0.7-1.2)	0.378	1.4 (1.2-1.7)	0.001	2.2 (1.6-3.0)	0.001
Sexual Orientation						
Heterosexual	-	-	-	-	-	-
Homosexual	0.8 (0.5-1.4)	0.475	1.0 (0.8-1.5)	0.730	0.8 (0.5-1.5)	0.538
Bisexual	0.6 (0.3-1.1)	0.103	0.9 (0.6-1.3)	0.540	1.0 (0.8-1.3)	0.848
Deceased father and/or mother						
Not	-	-	-	-	-	-
Yes father	2.0 (1.1-3.7)	0.029	2.7 (1.1-6.5)	0.032	1.4 (1.0-1.8)	0.029
Yes mom	1.5 (0.6-3.5)	0.345	2.3 (0.9-5.9)	0.087	1.0 (0.5-2.0)	0.345
Yes both	1.3 (0.7-2.4)	0.441	1.8 (0.7-4.3)	0.215	0.9 (0.6-1.2)	0.441
Good relationship with their fathers						
Yes	-	-	-	-	-	-
No	1.2 (1.0-1.5)	0.052	1.3 (1.0-1.5)	0.032	1.4 (1.1-1.7)	0.052
Good relationship with their mothers						
Yes	-	-	-	-	-	-
No	1.2 (0.8-1.8)	0.431	1.3 (0.9-1.7)	0.126	1.2 (0.8-1.8)	0.431
Physical activity						
Yes	-	-	-	-	-	-
No	1.0 (0.8-1.2)	0.972	1.1 (0.9-1.4)	0.180	1.4 (1.1-1.7)	0.004
Ideal period of the course						
Yes	-	-	-	-	-	-
No	1.2 (0.9-1.4)	0.121	1.1 (0.9-1.3)	0.313	1.2 (0.9-1.4)	0.144
Satisfaction with the course						
Very satisfied	-	-	-	-	-	-
Pleased	1.1 (0.7-1.7)	0.651	2.7 (1.0-7.6)	0.052	1.3 (0.7-2.4)	0.404
Unhappy	1.4 (0.9-2.2)	0.100	3.6 (1.3-9.9)	0.013	1.9 (1.1-3.5)	0.033
Dissatisfied	1.4 (0.9-2.2)	0.165	3.8 (1.4-10.6)	0.010	2.2 (1.2-4.0)	0.009
Being on exams week						
No	-	-	-	-	-	-
Yes	1.2 (1.0-1.5)	0.038	1.3 (1.1-1.6)	0.001	1.3 (1.1-1.6)	0.004

Table 3. Multivariate analysis of factors associated with anxiety in different grades, Ouro Preto, Minas Gerais, 2019

Variables	Degrees of anxiety					
	Mild RP (IC 95%)	p-value	Moderate RP (IC 95%)	p-value	Severe RP (IC 95%)	p-value
Victim of childhood violence						
No	-	-	-	-	-	-
Physical (Yes)	-	-	1.4 (1.1-1.9)	0.01	-	-
Mental (Yes)	1.5 (1.2-1.9)	0.01	-	-	1.4 (1.1-1.8)	0.01
Both (Yes)	1.4 (1.1-2.0)	0.02	-	-	1.7 (1.4-2.1)	0.01
Suicidal thoughts						
No	-	-	-	-	-	-
Yes	-	-	1.4 (1.1-1.7)	0.01	1.8 (1.4-2.4)	0.01
Deceased father and/or mother						
No	-	-	-	-	-	-
Father (Yes)	1.9 (1.1-3.5)	0.04	2.7 (1.1-6.3)	0.02	-	-
Mother (Yes)	-	-	2.3 (1.1-5.0)	0.04	-	-
Both (Yes)	-	-	2.1 (1.1-4.1)	0.04	-	-
Good relationship with their father						
Yes	-	-	-	-	-	-
No	-	-	1.2 (1.1-1.5)	0.03	-	-
Degree of satisfaction with the course						
Very satisfied	-	-	-	-	-	-
Pleased	-	-	-	-	-	-
Unhappy	-	-	2.5 (1.1-5.8)	0.03	-	-
Dissatisfied	-	-	2.6 (1.1-6.2)	0.03	-	-
Being on exams week						
No	-	-	-	-	-	-
Yes	1.3 (1.1-1.6)	0.01	-	-	1.5 (1.2-1.8)	0.01

Model adjusted by gender

**Figure 1.** Score of anxiety according to the different health courses at UFOP. FST: Food Science and Technology; PE: Physical Education; NUT: Nutrition; PHA: Pharmacy; SW: Social Work; MED: Medicine.

DISCUSSION

We believe this is the first study among universities in Brazil including students from all the regions in Brazil and wider as well as enrolled into multiple courses.

The results in the present investigation showed a high prevalence of anxiety among university students of health sciences, similar to trends observed in other countries^{14,16,22}, emphasizing that not only the medical students are affected. This is a concern since mental health disorders may compromise the academic and social performances of undergraduate students²⁷. Our findings suggest that the prevalence of anxiety was higher in university health students who experienced some kind of violence in childhood, physical and/or psychological. This is perhaps not surprising since children who have experienced stress or some situations of threat to their physical integrity, develop feelings of fear which extend into adulthood, causing mental disorders⁴⁰. Meyers *et al.* (2019) confirmed the hypothesis that early exposure to sexual trauma may influence the risk of psychopathology, i.e. depression, anxiety, and suicidal ideation, through neurological developmental mechanisms⁴¹. In addition, Fergusson *et al.* (2008) found that exposure to sexual abuse as children may be related to increased risks of mental health problems later in life including anxiety disorders, with other authors also demonstrating child mistreatment is associated with the development

of psychiatric disorders, including internalized (anxiety, depression) and externalized (aggression) behaviors^{42,43}, corroborating our findings. Psychological consequences of physical or mental abuse during childhood can acutely affect mental health until adulthood, and are a major social problem which need to be taken into account when dealing with mental health disorders among students^{44,45}.

The high prevalence (45.6%) of students with suicidal ideation in our study is a particular concern and associated with those students with moderate to severe anxiety. These results are in line with Eskin *et al.* (2016) analyzing undergraduates from 12 countries who found that the prevalence of suicidal ideation ranged from 20.0% to 49.1%²⁴. We are aware that anxiety gradually increases the rate of suicidal thoughts in individuals suffering from this disorder helping to explain the findings^{46,47}. Consequently, policies and initiatives need to be instigated in UFOP to address this high rate and the potential implications.

We found that the prevalence of anxiety was related to certain family issues such as having a deceased father and/or mother and the absence of good relationship with one's father in addition to kind of violence in childhood, physical and/or psychological. This is similar to other studies which have also shown a higher prevalence of anxiety in individuals who do not have a good relationship with family members^{20,48}. Overall, the absence of adequate family support negatively influences the maintenance of mental and emotional health⁴⁹. Contrasting with this, family support, including good relationship with friends, reduces the predisposition to the development of mental disorders⁵⁰. To help with this in UFOP, students' houses are common and traditional. Currently, Ouro Preto has 59 such houses provided by the Federal University, with a total capacity of 794 residents, located around the Morro do Cruzeiro campus and in the historic center³⁶. Whilst no association was observed between housing types and anxiety disorders in our study, Machado (2014) highlighted that living with people who feel the same longings, participate in the same accomplishments, share the same goals and difficulties, and provide life with renewed hope reduces anxiety disorders⁵¹.

Regarding academic factors, it was found that undergraduates dissatisfied with the course were approximately 2.5 times more likely to develop moderate anxiety. These results corroborate other studies that have pointed out that satisfaction with the course decreases the possibility of developing stress and mental health disorders including anxiety and depression^{52,53}. Another academic factor was anxiety during exams period, with students on test week presenting a higher prevalence of anxiety compared to those not in this period. This is a concern as strong anxiety reactions to tests can lead to a decline in performance and may compromise the student's professional education although there are potential approaches to reduce this⁵⁴.

Anxiety has been shown to be greater in women than men⁵⁵. This can be justified, among other factors, by the very high hormonal rates, which trigger anxiety symptoms^{37,55}. In the present study there was a greater participation of female students, so the multivariate model was adjusted for this variable.

In addition, other studies have found that the lower the income, the greater the chance of developing mental disorders and that social inequalities are factors associated with worse mental health^{56,57}. Whilst we did not address these issues in our study, we believe it is important to include them in future studies.

Finally, in Brazil there is a National Student Assistance Program (PNAES) which aims to expand and improve the conditions of stay of young people in Federal public higher education facilities⁵⁸. The student assistance actions are geared to various aspects of academic life, including health care. However, the high prevalence of mental disorders in this and other studies in Brazil highlights the need to strengthen this program. We believe based on our findings, it is extremely important to have greater effectiveness and coverage of the PNAES making it accessible for all university students. More specifically in detecting anxiety symptoms, it is known that debates, lectures and other forms of information dissemination would help the academic community detect the signs and symptoms and demystify the taboo surrounding mental health disorders, breaking prejudice and changing the views of society. Special attention must be paid to this vulnerable population in order to prevent and adequately treat mental disorders among Brazilian students in federal universities, especially among female students, who are our future and we will be following this up in future studies.

We are aware of a number of limitations with this study. First, because the questionnaire was applied using an online platform and not in person, by a psychologist or psychiatrist, the results may not reflect the real degree of anxiety of the participants. BAI also only assesses student's anxiety in the week prior to the interview and the results may not reflect the student's actual situation. Despite this limitation, we believe the BAI is a good instrument for cross-sectional studies as it can be self-applied and it is a validated and widely used scale, designed with questions to differentiate anxiety from depression^{38,59}. Prevalence rates may be overestimated since in general, people who have a greater interest in the subject usually participate more in studies, especially in those with self-administered questionnaires. However, this is a feature of all such studies using this methodology. Finally, since this was a cross-sectional study, it was not possible to establish the temporality of the associated factors. Despite these limitations, we believe the findings are robust with this study pointing to a high prevalence of anxiety in students of health sciences at UFOP, which needs to be addressed going forward.

CONCLUSIONS

The prevalence of anxiety among health students at UFOP was high in our study and family issues prior to entering university seem to significantly influence the extent of their anxiety and may compromise academic and social performance. Additional studies are required, focusing on first year university students, in order to assess the prevalence of anxiety and depression symptoms at the beginning of the course and how university life can influence these mental disorders.

Addressing factors associated with anxiety in this population, such as family issues and satisfaction with the course, and enabling the exchange of experiences, could reduce anxiety symptoms and improve the quality of life of students. As a result, making the University a more welcoming environment for students. Implementing support actions are essential to protect and help students during their academic life. Promoting joint work between university staff and health teams would also enable improvements in the support of these students. We are looking to progress these initiatives and subsequently reporting on them.

INDIVIDUAL CONTRIBUTIONS

Júlia Vasconcelos de Sá Alves, Wendel Coura-Vital –

Conception and design of study.

Júlia Vasconcelos de Sá Alves – Acquisition of data.

Júlia Vasconcelos de Sá Alves, Waléria de Paula, Patrícia Ribeiro Rezende Netto, Brian Godman, Renata Cristina Rezende Macedo do Nascimento, Wendel Coura-Vital –

Data analysis and/or interpretation of data

Júlia Vasconcelos de Sá Alves, Waléria de Paula, Patrícia Ribeiro Rezende Netto, Brian Godman, Renata Cristina Rezende Macedo do Nascimento, Wendel Coura-Vital –

Draft and revising the manuscript.

All authors approved the final version.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

ACKNOWLEDGMENTS

We are grateful to the Federal University of Ouro Preto and to all students who accept to participate in this study.

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