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Prevalence and associated factors to anxiety symptoms in a university setting: findings and implications

Prevalência e fatores associados a sintomas de ansiedade em um ambiente universitário: Achados e implicações

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ABSTRACT

Introduction: Mental health is an increasingly debated topic that has gained prominence as one of the leading causes of morbidity worldwide. **Objective:** To evaluate the anxiety symptoms in students and workers of the Federal University of Espírito Santo. **Methods:** A cross-sectional study was performed in 2020. Data were collected using an online self-administered questionnaire including sociodemographic variables, academic profile, life habits, and the Beck Anxiety Inventory. Associated factors to anxiety were identified using prevalence ratios estimated by Poisson regression. **Results:** A total of 519 were included. Approximately 40% of the university population had suggestive symptoms of anxiety. The prevalence of suggestive symptoms of anxiety was 47.6% in undergraduates, 42.1% in graduate students, 27.6% in administrative technicians, and 12.5% in teachers ($p < 0,05$). Having satisfactory sleep was a protective factor against anxiety. However, the female sex, only studying and studying and working were associated factors to anxiety ($p < 0,05$). **Conclusion:** A high prevalence of anxiety symptoms was found in the university setting, especially among students. A higher prevalence was associated with the female sex, poor sleep, being a student, and working concurrently with the studies. These results point to the need to implement measures to promote and improve mental health in a university setting.

Keywords: Mental health. Epidemiology. Cross-Sectional Studies.

RESUMO

Introdução: A saúde mental tem sido cada vez mais debatida e tem ganhado notoriedade como uma das principais causas de morbidade em todo o mundo. **Objetivo:** Avaliar os sintomas sugestivos de ansiedade (SSA) em estudantes e trabalhadores de uma Universidade Federal. **Métodos:** Estudo transversal foi realizado em 2020. Os dados foram coletados através de um questionário online autoadministrado, incluindo variáveis sociodemográficas, perfil acadêmico, hábitos de vida e o Inventário de Ansiedade de Beck. Os fatores associados à ansiedade foram identificados usando razões de prevalência estimadas por regressão de Poisson. **Resultados:** Foram incluídos 519 participantes. Aproximadamente 40% da população universitária apresentava SSA. A prevalência de SSA foi de 47,6% em graduandos, 42,1% em pós-graduandos, 27,6% em técnicos administrativos e 12,5% em professores ($p < 0,05$). Ter sono satisfatório foi um fator protetor contra a ansiedade. No entanto, ser do sexo feminino, estudar apenas e estudar e trabalhar simultaneamente foram fatores associados à ansiedade ($p < 0,05$). **Conclusão:** Observou-se uma alta prevalência de SSA no ambiente universitário, especialmente entre os estudantes. Uma maior prevalência estava associada ao sexo feminino, sono inadequado, ser estudante e trabalhar simultaneamente. Esses resultados apontam para a necessidade de implementar medidas para promoção da saúde mental na Universidade.

Palavras-chave: Saúde mental. Epidemiologia. Estudo transversal.

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1. INTRODUCTION

Mental health is an increasingly debated topic that has gained prominence as one of the leading causes of morbidity worldwide [1]. In 2019, 301 million people were living with an anxiety disorder including 58 million children and adolescents, a scenario that can worsen during the Covid-19 pandemic. Furthermore, 46.8 million incident cases were identified [2]. Anxiety is characterized as a feeling of emptiness, tension, and apprehension and is considered a natural and fundamental reaction to self-preservation[3]. Nonetheless, in its pathological state, it manifests symptoms such as diarrhea, vertigo, hyperhidrosis, increased reflexes, palpitations, pupil dilation, restlessness, syncope, tachycardia, tingling of the extremities, tremors, and stomach disturbance, which reduces the quality of life [4]. Anxiety can also affect thinking, behavior, perception, and learning, distorting time perception and interfering with daily life [5].

There are several determining factors for health maintenance as the social and economic environment, the natural or artificial physical environment, personal attitudes, individual capacities, relationships, and the services that promote, maintain, and restore health. In this regard, irritability, insecurity, and competitiveness can be exacerbated by the work and study environment [6]. Concerning the university environment, it is important to note that all these factors, such as self-demand, the collection of society and the university itself about deadlines, and the productivity of students and servers, can have a significant impact on the development of anxiety[7]. The pressure in work routines causes exhaustion and the development of problems that make engagement and professional evolution increasingly difficult, as well as interfering with the worker's social life[8].

Furthermore, in a competitive environment like the university, undergraduate and graduate students face challenges such as adaptation, deadlines, and new responsibilities, factors that contribute to the development of anxiety. According to a recent review, the social skills that students must develop, such as expressing opinions, receiving and issuing criticism, and establishing communications, generate psychological stress, which is transmitted through physical and emotional reactions, causing anxiety symptoms[9]. This set of factors implies the need for an improvement in the psychological support of the university population in general, particularly in light of the current global public health situation, due to the Covid-19 pandemic[10]. An investment in mental health would reduce costs for both the government and workers and students, such as treatments, diagnoses, and absence

costs[11]. According to the Ministry of Health, Brazil has the highest prevalence of anxiety in the world, affecting 9.3% of the population, which corresponds to 18.6 million anxious Brazilians [2]. In addition, anxiety, depression, and eating disorders represent approximately 12% of the needs for continuous or occasional mental health care. This demonstrates the importance of this issue for society not only on a national but also on a global scale[12].

In this regard, the objective of this study was to evaluate the anxiety profile and its associated factors among students and workers from a public university in Brazil.

2. MATERIALS AND METHODS

An observational cross-sectional study was conducted with students and workers of the Federal University of Espírito Santo (UFES) - Campus de Alegre. This university has 3389 students and offers 17 undergraduate courses as well as nine graduate programs. Furthermore, this institution employs 380 people, including professors and technicians. All regular undergraduate and graduate students, as well as active workers, were invited to participate in the research via institutional email. Furthermore, the study was promoted within the University via posters and social media to encourage participation. Data was collected virtually between June and September 2020 using a self-administered questionnaire through Google Forms.

A stratified random sampling with an estimated anxiety prevalence of 9.3% [2], a precision of 5%, a confidence interval of 95%, and a design effect of 1.2 was used. The sample size was estimated using a population of 3389 students and 380 workers. As a result, the estimated sample size was 150 students and 117 workers, for a total of 267 people.

Students and workers from all areas of knowledge at UFES, such as Exact and Earth Sciences, Biological Sciences, Education, Engineering, Health Sciences, Agricultural Sciences, and Computer Sciences were eligible to participate in the study. Individuals who did respond to the questionnaires providing incomplete or contradictory answers were excluded from the study.

The following variables were addressed using a structured questionnaire adapted from Vigitel[11]: Academic trajectory (if a student) or institutional trajectory (if a worker), sociodemographic data, lifestyle habits, and health conditions[11]. The Beck Anxiety Inventory (BAI), a validated self-report instrument, was used to investigate suggestive anxiety symptoms [12,13]. The BAI consists of 21 items designed to assess the presence and severity

of anxiety symptoms in the week preceding the interview. Each symptom was assigned a score ranging from 0 to 3, with higher scores indicating more severe anxiety symptoms [12,13]. The total score determined the anxiety level, with 0-7 indicating minimal signs of anxiety, 8-15 mild anxiety, 16-25 moderate anxiety, and 26-63 severe anxiety. A score ≥ 16 was used as a cut-off point, with lower scores representing minimal and mild levels of symptoms, while values equal to or higher indicating signs of moderate or severe anxiety[14–17] .

Before data analysis, data consistency analysis was performed to ensure the quality of the data collected. The Kolmogorov-Smirnov normality test was used to define the measures of central tendency and dispersion used. The quantitative variables were described using the median and interquartile ranges. The qualitative variables were described using absolute and relative frequency distributions. Pearson's chi-square or Fisher test was used to compare the prevalence of the study. A post-hoc Bonferroni test was used for pairwise comparisons of qualitative variables with more than two categories. A significance level of 5% was adopted in these analyses.

Poisson regression with robust variance was used to identify the associated factors to anxiety. Bivariate analysis was performed using a significance level of 20% and the variables that showed association ($p < 0.20$) were included in the multivariate model. A significance level of 5% and a backward method were adopted in the multivariate model. The Hosmer & Lemeshow test was used to validate the final model's fit and adherence. The prevalence ratios (PR) were estimates with a 95% confidence interval (CI 95%).

The Ethics Committee on Human Research at the Federal University of Espírito Santo, Campus Alegre, approved the study under number 3.551.181. All participants provided written informed consent to participate in the study.

3. RESULTS

A total of 519 people were included, with 410 students and 109 workers. Among students, 372 were undergraduate and 38 were graduate level. Among workers, 80 were professors, and 29 were technical-administrative. For the undergraduates, 94.3% were in the first superior course, with the most common area of knowledge Agricultural Sciences (29.4%). However, most of the participants were from the Pharmacy course (11.3%). Undergraduates were participating in activities of scientific initiation (30.2%), monitoring (22.4%), extension (20.2%), and internships (18.6%). As for graduate students, 68.4% were coursing a master, 26.3% a doctorate, and 5.3% a postdoctoral degree.

Most participants were female (68.2%), with a median age of 22 years (IQR 20 to 29), and single (74.8%). In terms of housing, 83.2% lived in Alegre city, 46.6% were from large cities, and 40.7% were from republics. It was observed that 71.7% of interviewees are exclusively dedicated to their studies, 61.1% had a per capita family income of up to three minimum wages, and 63.8% have 3 to 5 family members who benefit from this income (Table 1).

Table 1. Sociodemographic characteristics of the university population.

Variables	Workers n (%)	Students n (%)	Total n (%)	P-value
Sex				0.037
Male	44 (40.4)	121 (29.5)	165 (31.8)	
Female	65 (59.6)	289 (70.5)	354 (68.2)	
Median Age	40	21	22	< 0.001
(Interquartile Range)	(36-44)	(20-24)	(20-29)	
City of Residence				0.872
Alegre	91 (82.7)	341 (83.4)	432 (83.2)	
Others	19 (17.3)	68 (16.6)	87 (16.8)	
Region of Origin				0.136
Southeast	102 (92.7)	393 (96.1)	495 (95.4)	
Others	8 (7.3)	16 (3.9)	24 (4.6)	
Housing				0.785
Alone	25 (22.7)	88 (21.5)	113 (21.8)	
With someone	85 (77.3)	321 (78.5)	406 (78.2)	
City of Origin				0.921
Small Size	19 (17.3)	76 (18.6)	95 (18.3)	
Midsize	38 (34.5)	144 (35.2)	182 (35.1)	
Large	53 (48.2)	189 (46.2)	242 (46.6)	
Marital status				< 0.001
With someone	79 (71.8)	52 (12.7)	131 (25.2)	
Alone	31 (28.2)	357 (87.3)	388 (74.8)	
Professional activity				< 0.001
It works	89 (80.9)	0 (0.0)	89 (17.1)	
Study	2 (1.8)	370 (90.5)	372 (71.7)	
Study and works	19 (17.3)	39 (9.5)	58 (11.2)	
Monthly income				< 0.001
Up to 3	2 (1.8)	315 (77.0)	317 (61.1)	
From 3 to 9	40 (36.4)	77 (18.8)	117 (22.5)	
More than 9	68 (61.8)	17 (4.2)	85 (16.4)	
Members of the family				0.262
Up to 2	42 (38.2)	123 (30.1)	165 (31.8)	
From 3 to 5	64 (58.2)	267 (65.3)	331 (63.8)	
More than 5	4 (3.6)	19 (4.6)	23 (4.4)	

Sample Profile				< 0.001
Professors	81 (73.6)	0 (0.0)	80 (15.6)	
Technicians	29 (26.4)	0 (0.0)	29 (5.6)	
Undergraduate	0 (0.0)	371 (90.7)	372 (71.48)	
Graduate	0 (0.0)	38 (9.3)	38 (7.3)	

Regarding health conditions, 88.4% of the university population had no type of physical disability. In terms of lifestyle habits, 59.2% slept less than 7 hours per night, 52.2% reported having adequate sleep, 58.6% drank alcohol, 13.1% were smokers, 5.8% smoked but stopped, and 81.1% never smoke. In terms of physical activity, 61.8% of participants engage in physical activities, 51.1% engage in physical activities at least twice a week, and most (75.3%) had not experienced any discomfort while performing them. Nonetheless, 59.0% do not engage in any leisure activity, while 14.2% engage in more than one (Table 2).

Table 2. Health characteristics of the university population.

Variables	Students n (%)	Workers n (%)	Total n (%)	P-value
Physical activity				< 0.001
Yes	236 (57.7)	85 (77.3)	321 (61.8)	
No	173 (42.3)	25 (22.7)	198 (38.2)	
Alcohol consumption				0.732
Yes	238 (58.2)	66 (60.0)	304 (58.6)	
No	171 (41.8)	44 (40.0)	215 (41.4)	
Smoking				< 0.001
Yes	66 (16.1)	2 (1.8)	68 (13.1)	
No	318 (77.8)	103 (93.6)	421 (81.1)	
Smoked, but stopped	25 (6.1)	5 (4.5)	30 (5.8)	
Satisfactory Sleep				0.023
Yes	203 (49.6)	68 (61.8)	271 (52.2)	
No	206 (50.4)	42 (38.2)	248 (47.8)	
Hours of Sleep				0.078
≥ 7 hours per night	159 (38.9)	53 (48.2)	212 (40.8)	
< 7 hours per night	250 (61.1)	57 (51.8)	307 (59.2)	
Leisure Activity				0.001
Yes	153 (37.4)	60 (54.5)	213 (41.0)	
No	256 (62.6)	50 (45.5)	306 (59.0)	
Physical Limitation				< 0.001
Yes	35 (8.6)	25 (22.7)	60 (11.6)	
No	374 (91.4)	85 (77.3)	459 (88.4)	

Regarding suggestive symptoms of anxiety, 35.6% did not present symptoms, 23.7% had mild, 19.7% had moderate, and 21.0% had severe symptoms. As a result, with a score cut point ≥ 16, it was found that 40.7% of the university population had symptoms suggestive of anxiety. Anxiety was more prevalent among undergraduate (47.6%) and graduate students (42.1%) in the university setting. In addition, undergraduate and graduate students have a higher anxiety prevalence than professors (12.5%) (p-value < 0.05) (Table 3).

Table 3. Comparison of symptoms suggestive of anxiety among groups and subgroups.

University Population	**Symptoms Suggestive of Anxiety**	**BAI**
	n (%)	**median (interquartile range)**
Workers	**19 (17.3)**	**7.00 (3.00 - 11.00)**
Professors	11 (13.6)	5.00 (2.00 - 10.00)
Technicians	8 (27.6)	9.00 (7.00 - 16.00)
Students	**192 (46.9)**	**14.00 (6.00 - 25.00)**
Undergraduates	176 (47.4)	14.00 (6.00 - 26.00)
Graduates	16 (42.1)	14.00 (10.00 - 20.75)
Total	**211 (40.7)**	**11.00 (5.00 - 23.00)**

Statistics: The comparison between two groups, Workers and Students, revealed statistically significant differences using the Chi-square test (p ≤ 0.05) for Symptoms suggestive of Anxiety (categorical variable), as well as the Mann-Whitney test (p ≤ 0.05) for BAI - median (continuous variable).
Within the four subgroups, namely Professors, Technicians, Undergraduates, and Graduates, the Chi-square test (p ≤ 0.05) indicated significant differences in Symptoms suggestive of Anxiety (categorical variable) between Professors vs. Undergraduates and Professors vs. Graduates. Additionally, the Kruskal-Wallis test (with Dwass-Steel-Critchlow-Fligner [DSCF] test for multiple comparisons) (p ≤ 0.05) also demonstrated significant differences in BAI - median (continuous variable) between Professors vs. Undergraduates and Professors vs. Graduates. However, no significant differences were found in the other comparisons (Professors vs. Technicians, Technicians vs. Undergraduates, Technicians vs. Graduates, and Undergraduates vs. Graduates) using both the DSCF test and Chi-square test.

Regarding associated factors to anxiety, it is observed that adequate sleep is inversely related to anxiety; that is, adequate sleep reduces the prevalence of anxiety by 82%, making it a protective factor for anxiety. Being a woman increased the prevalence of anxiety by 42%, implying that being a woman increases the likelihood of having anxiety symptoms by 1.42 times. Anxiety levels rise by 175% when studying, and by 127% when studying and working. Thus, being a woman, being a student, and studying and working are all risk factors for anxiety in the population studied. Multivariate Poisson Regression had a 5.6% explanatory power and a good adherence (p=1.00) (Table 4).

Table 4. Multivariate Poisson regression and associated factors to symptoms suggestive of anxiety.

Variables	*PR*	*P-value*	*Confidence Interval (95%)*
Female Sex	1.42	0.005	1.11 - 1.82
Studying	2.75	< 0.001	1.68 – 4.49
Study and work	2.26	0.005	1.28 – 4.02
Satisfactory sleep	0.55	< 0.001	0.45 – 0.69

PR = Prevalence Ratio.

4. DISCUSSION

This study found a high prevalence of anxiety (40.7%) in the university setting, primarily among undergraduate students (47.6%). Professors had the lowest anxiety prevalence (12.5%). Furthermore, anxiety was associated with female sex, poor sleeping, being a student, and working. This is concerning because anxiety was found to be more prevalent in all of the subgroups studied than the national prevalence of 9.3% [2]

Some studies in Brazil are corroborated by our results. According to Lopes and collaborators[18], 43.14% of students had mild anxiety symptoms, while 12.75% had severe symptoms. Furthermore, it was found that the most anxious students perform worse academically, demonstrating the importance of discussing this topic.

It is well known that the university environment contains numerous stressors that can negatively impact the well-being, leading to conditions such as anxiety and other related disorders. As a result, there is a significant need for mental health care in this setting. According to the literature, students are a particularly vulnerable group, and their mental health is frequently weakened as a result of a combination of factors. However, they do not seek treatment because of feelings of fear and insecurity[3].

A recent study with Palestinian medical students using a similar methodology discovered that 25.5% of students had moderate anxiety symptoms and 21.3% had severe anxiety symptoms [19]. According to the Beck-BAI anxiety inventory, Alves and collaborators[20] found that 15.2% of students in Brazil had minimal anxiety, 27.0% had mild anxiety, 29.8% had moderate anxiety, and 28% had severe anxiety. As we can see, several studies show a high prevalence of anxiety disorders in the university setting.

In this regard, some studies show that the excess of activities and assessments can be a determining factor for developing anxiety symptoms[18,21]. According to a study conducted at the Federal University of Ouro Preto, students who are little satisfied or dissatisfied with the course have a 2.5 and 2.6 greater chance of experiencing moderate anxiety [20]. Another study discovered that students attributed more weight to motivation and

personal effort, whereas professors attributed more weight to anxiety and stress as variables affecting academic performance[22].

Several studies have found that women experience more anxiety symptoms than men[23–25]. Furthermore, females frequently have a demand for their daily obligations to be met, such as family obligations and household care. In addition, factors as wage inequality, gender inequality, the high rate of violence against women, genetic, cultural, emotional, and social aspects, and the wide variation in hormone levels are cited as reasons for the association between females and a higher prevalence of anxiety symptoms[26,27]. Our findings, like other studies, show that being a woman increases the likelihood of developing anxiety by 1.42 times[28–30]. According to a study conducted with medical students at the University of Chile, the proportion of women who had anxiety was 1.6 times higher than men[17].

Regarding the other associated factors with anxiety, it was found that most academics only study, which increased anxiety by 175%. Furthermore, studying and working increased anxiety by 127%. It was observed that most students (63.3%) participated in other academic activities besides study and that among students who work, those who worked more hours per week tended to be more stressed than those who worked fewer hours[28]. Furthermore, the high prevalence of students who only study may be related to the extensive workload required by some courses, as well as the high demand that a study and work routine can bring, resulting in sleep deprivation and stress. In addition, it is known that lifestyle habits can have an impact on both physical and mental health[30].

In terms of habits and health conditions, getting enough sleep reduces anxiety prevalence by 82%. According to some studies, insomnia is associated with an increase in anxiety. In this regard, students have a high prevalence of short sleep duration and poor sleep quality on class days, and about a third of students reported low-quality sleep with a prevalence of 32% of insufficient sleep on school days, which contributes to the development of anxiety symptoms[24,29,31].

Several measures can be implemented in the university to improve the mental health of its students. A recent study identified actions that can be taken to improve the mental health such as the promotion of mental health campaigns and practices such as self-massage, dance, and breathing and relaxation techniques during class breaks [32]. Furthermore, host programs for newcomers to the university are recommended, as program with the assistance of health professionals such as psychologists and nurses to host servers

and students with mental disorders[32]. In this regard, talking about life habits like illicit drug use and physical exercise, as well as supporting low-income students, is critical in mental health prevention projects[33].

Finally, given that sociodemographic factors, health conditions, and academic trajectory can all have a negative or positive impact on health, it is critical to promote practices and projects that encourage healthier lifestyles within the university to maintain physical and mental health. This has significant implications for university administration as well as university communities.

The current study has limitations that must be considered. Among them, it is worth noting that the questionnaire was administered in a non-face-to-face setting, and the self-administered results may not accurately reflect the true level of anxiety among the university population. However, the BAI is a consolidated questionnaire that has been widely used in cross-sectional studies. Another point to consider is that the sample size of workers is smaller than that of students, making it difficult to make an equal comparison of the prevalence of anxiety among subgroups and in the construction of new debates opening new avenues for the topic of epidemiological research to all those involved in the university environment.

5. FINAL CONSIDERATIONS

In summary, anxiety was found to be prevalent in the university environment, particularly among students. Moreover, the female gender, sleep, being a student, and working were all associated with a high prevalence of anxiety. As a result, it is critical to implement projects, conversation circles, support groups, and individual and collective reception to increase the dissemination and demystification of this topic, which is the mental health of students and workers.

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