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**ORIGINAL ARTICLE**

## **MANAGEMENT OF ANXIETY AND DEPRESSION DISORDERS BY UNIVERSITY STUDENTS DURING THE COVID-19 PANDEMIC: A Cross-Sectional Study**

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**Highlights:**

- (1) One-third of university students reported having an anxiety and/or depression diagnosis.
- (2) Psychotropic drugs show a higher prevalence of use than psychotherapy among university students, being selective serotonin reuptake inhibitors the most used.
- (3) Ethnicity/race and performance in paid activities may be associated with the use of psychotherapy.

### **ABSTRACT**

**Objectives:** To evaluate the use of psychotropic drugs and/or psychotherapy for anxiety and/or depression management among Brazilian university students during the Covid-19 pandemic. **Methods:** a cross-sectional, quantitative study conducted by an online questionnaire containing sections related to sociodemographic data, academic information, mental health-related information, and evaluation of the severity of anxiety and depression symptoms. Participants included university students aged 18 and older with a previous anxiety and/or depression disorders diagnosis. Descriptive and inferential analyses were performed. The study received approval from the Ethics Committee for Human Research. **Results:** 409 students with an anxiety and/or depression disorders diagnosis participated in the study. Most students reported using psychotropic drugs (62.3%;  $n = 255$ ). There was no significant association between medication use and sociodemographic variables. Psychotherapy use was reported by 36.7% ( $n = 150$ ) of students. A significant association was observed between psychotherapy use and ethnicity/color ( $p < 0.01$ ) and engagement in paid activities ( $p = 0.02$ ). **Conclusion:** The medication use prevalence is higher compared to psychotherapy use. Ethnicity/race and performance in paid activities may be associated with psychotherapy use among Brazilian university students.

**Keywords:** Anxiety; Depression; University students; Psychotropic drugs; Psychotherapy

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## INTRODUCTION

During the Covid-19 pandemic, the prevalence of anxiety and depressive disorders reached, respectively, 4.8% and 3.2% of the general population<sup>1,2</sup>. College students are vulnerable to mental health disorders due to factors such as academic fatigue, stress, and lack of social support<sup>3</sup>. This scenario intensified during the Covid-19 pandemic, when the prevalence of anxiety and depression disorders in this population reached 39% and 33.6%, respectively<sup>4</sup>. At this time, university students had to experience abrupt transitions between the different education systems (on-site, remote, and hybrid), changes in the academic calendar, time off from the university community, and the feeling of fear and uncertainty regarding academic and professional training, which may have contributed to such high prevalence<sup>5</sup>.

Anxiety disorders consist of persistent and excessive feelings of fear and uneasiness, whereas depressive disorders can be described as sufficiently severe or persistent sadness that interferes in the performance of the activities of daily living<sup>6</sup>. Anxiety and/or depression disorders treatment often includes psychoactive medications and psychotherapy, that may be used alone or together, depending on the disorder's severity<sup>7,8</sup>. Psychoactive medications are substances capable of influencing mood, cognition or behavior, changing the brain chemistry and neurotransmission. This action helps normalize chemical imbalances that may contribute to mental disorders management<sup>9</sup>. Psychotherapy is a therapeutic process that helps patients understand their feelings, thoughts, and behaviors, offering strategies to manage their difficulties. Among the various psychotherapy approaches available, cognitive-behavioral therapy is often highlighted for the robustness of its evidence in mental health disorders treatments<sup>10</sup>.

When not managed properly, anxiety and/or depression disorders in university students may cause: reduced performance and learning, dropping out of the course, increasing the inclination to drug and alcohol consumption and, in more severe cases, increased risk of suicide<sup>11,12</sup>. In Brazil, suicide risk among university students increased from 11.3% during the pre-pandemic period to 17.0% during the pandemic<sup>13</sup>. These data highlight the need to understand how psychoactive medications and psychotherapy have been used for mental health disorders management, to limit their negative impacts on the lives of this population.

Although the literature has shown a significant increase in the psychoactive medications use by the general population during the Covid-19 pandemic, studies on mental health disorders management among university students are scarce<sup>14-16</sup>. Although a 15.7% prevalence of antidepressant/anxiolytic use by university students was reported in the pre-vaccination period of the Covid-19 pandemic<sup>16</sup> in Brazil, evidence on psychoactive medications and psychotherapy use after returning to on-site activities are scarce. In this context, this study aimed to evaluate active psychoactive medications and/or psychotherapy use by university students from the Federal University of Espírito Santo (Ufes) who had an anxiety and/or depression disorders diagnosis.

## METHODS

### Type and study place

This is a cross-sectional and quantitative survey study held between July and August 2022, at Ufes. The study was reported according to the *Checklist for Reporting Of Survey Studies* (Cross)<sup>17</sup>. This article's results are part of the research project "Mental Health of undergraduate students at a public university in Espírito Santo during the Covid-19 pandemic." Ufes is a higher education institution, which offers 103 undergraduate courses, with approximately 20 thousand enrolled students. The university has four campuses: Goiabeiras and Maruípe, located in Vitória, the state capital; Alegre, located in southern Espírito Santo; and São Mateus, located in northern Espírito Santo.

## Study participants

University students over 18 years, regularly enrolled in undergraduate courses at Ufes, who reported having a previous diagnosis of anxiety and/or depression disorders, were included. No exclusion criteria were established for this study. Sampling was conducted by convenience and the snowball technique was used to expand access to the research.

## Data collection

Data collection was conducted by an anonymous, self-completion, and semi-structured questionnaire developed by the researchers and answered online on the SurveyMonkey platform. This questionnaire was submitted to a pilot study with 18 undergraduate students to test the understanding by and applicability of the questions to the specific audience.

Student Affairs and Citizenship Dean's Office at Ufes forwarded the invitation and link to the email address of all students. The questionnaire was also shared on the WhatsApp® and Instagram® social networks. The data collection instrument contained items related to: 1) sociodemographic variables (age, gender, marital status, ethnicity and/or skin color, and paid activity execution); 2) academic information (undergraduate course, campus, start of academic activities and shift); 3) information related to mental health ("Do you have a medical diagnosis for any anxiety disorder?", "Do you have a medical diagnosis for depression disorder?", "Do you use medication(s) to treat anxiety and/or depression? Which medication(s)?", "Do you use psychotherapy for anxiety and/or depression?"); 4) Scales to evaluate the severity of anxiety and depression symptoms.

To evaluate the severity of anxiety and depression symptoms, university students answered the Brazilian version of the scales *General Anxiety Disorder-7* (GAD-7) and *Patient Health Questionnaire-9* (PHQ-9). These scales have been widely adopted worldwide for tracking and evaluating the severity of anxiety and depression disorders symptoms, with high reliability, sensitivity, and specificity<sup>18-20</sup>. The translated and validated versions of the GAD-7 and PHQ-9 scales in Brazilian Portuguese are available online at Pfizer (Copyright© 2005 Pfizer Inc., New York, NY) and the psychometric properties of both have been evaluated and considered satisfactory<sup>21-25</sup>.

The GAD-7 is a seven-item scale that evaluates the presence of anxiety characteristic symptoms in the last two weeks. These items are scored from zero to three points, and the total score ranges from zero to 21 points. The condition's severity is: 0-4 points – no anxiety or minimal anxiety; 5-9 points – mild and/or non-pathological anxiety; 10-14 points – moderate anxiety; 15-21 points – severe anxiety<sup>18</sup>. The PHQ-9 is a scale composed of nine items that evaluate the presence of depression characteristic symptoms in the last two weeks. Each item can receive a score from zero to three, with the total score varying from 0 to 27. The condition's severity is: 0-4 points – no depression; 5-9 points – mild and/or non-pathological depression; 10-14 points – moderate depression; 15-19 points – moderately severe depression; 20 to 27 points – severe depression<sup>20</sup>.

## Data analysis

Descriptive statistics with absolute and relative frequency were used for data analysis. The undergraduate courses were selected according to the area of knowledge in: Biological and Health Sciences; Exact and Earth Sciences; Human and Social Sciences; Applied Social Sciences; and Engineering and Technologies. The medications were classified according to the World Health Organization (WHO) Classification System "Anatomical Therapeutic Chemical Classification System" (ATC)<sup>26</sup>. The chi-square test was used to verify associations between categorical variables and the use of medication and psychotherapy to treat anxiety and/or depression symptoms. The significance level adopted was  $p < 0.05$ .

## Ethical aspects

The study was approved by the Ethics Committee on Research with Human Beings of the Center for Medical Sciences (CCS) of Ufes (CAAE: 56870322.0.0000.5060 – Opinion No.: 5.469.123). All participants were previously informed about the goals and the voluntary nature of the project, signing the informed consent form. Participants who showed interest in the results received, by e-mail, information about their severity scores for anxiety and depression symptoms, suggestions and information about mental health care and health education materials developed during the project.

## RESULTS

### Participants characteristics

Among the 1103 university students who took part in the survey, 37.1% ( $n = 409$ ) reported having a previous diagnosis of anxiety and/or depression disorders, meeting the inclusion criteria of this study. Most participants were: female ( $n = 301$ ; 73.6%), single ( $n = 360$ ; 88.0%) and declared themselves white ( $n = 210$ ; 51.3%). The participants' average age was 24 years  $\pm$  6.2 (Max.: 62 – Min.: 18). Most started the course during the Covid-19 pandemic ( $n = 211$ ; 51.6%) and 41.8% ( $n = 171$ ) had to work on-site and perform academic activities simultaneously during this period. The data related to the students' profile are in Table 1.

Table 1 – Students' profile at the Federal University of Espírito Santo who reported having a previous diagnosis of anxiety and/or depression, 2022 ( $n = 409$ )

Participants characteristics	n	%
<b>Gender</b>		
Female	301	73.6
Male	95	23.2
Non-binary person	12	3.0
Did not answer	1	0.2
<b>Marital status</b>		
Single	360	88
Separated/Divorcee/Divorced	5	1.2
Married/Living with partner	44	10.8
<b>Ethnicity/color</b>		
White	210	51.3
Brown	136	33.3
Black	60	14.7
Yellow (Asian origin)	3	0.7
<b>Undergraduate course Campus</b>		
Goiabeiras	199	48.7
Maruípe	124	30.3
Alegre	53	13.0
São Mateus	33	8.0
<b>Shift</b>		
Full-time (Morning and afternoon)	268	65.5
Morning	43	10.5
Afternoon	27	6.6
Night	71	17.4

Participants characteristics	n	%
<b>Undergraduate course area</b>		
Biological and Health Sciences	179	43.8
Exact and Earth Sciences	40	9.8
Humanities and Social Sciences	65	15.9
Applied Social Sciences	52	12.7
Engineering and Technology	73	17.8
<b>Did you start the course during the pandemic period?</b>		
Yes	211	51.6
No	198	48.4
<b>Do you perform any paid activity?</b>		
Yes	174	42.5
No	235	57.5
<b>Did you work on-site during the pandemic?</b>		
Yes	171	41.8
No	238	58.2

Source: prepared by the authors

### Anxiety and depression disorders among university students

According to the students' reports, 53.5% ( $n = 219$ ) had an anxiety and depression disorders diagnosis, whereas 39.6% ( $n = 162$ ) and 6.9% ( $n = 28$ ) had only an anxiety or depression disorder diagnosis, respectively. Among the participants, 36.6% ( $n = 150$ ) indicated anxiety and/or depression disorder diagnosis occurred after the Covid-19 pandemic.

From the data obtained by the GAD-7 scale, it can be observed that 81.9% ( $n = 335$ ) of the students had scores compatible with moderate to severe anxiety. In addition, according to the PHQ-9, 82.9% ( $n = 339$ ) had scores compatible with moderate to severe depression at the time of the study (Table 2). In addition, most students (64.3%;  $n = 263$ ) indicated that the symptoms described in the PHQ-9 scale caused a lot or extreme difficulty in performing work, taking care of things at home or relating to people.

Table 2 – Severity of anxiety and depression symptoms among students at the Federal University of Espírito Santo who reported having a previous anxiety and/or depression diagnosis, 2022 ( $n = 409$ )

	n	%
<b>Anxiety (GAD-7)</b>		
Anxiety absence	10	2.4
Mild and nonpathological anxiety	64	15.6
Moderate anxiety	121	29.6
Severe anxiety	214	52.3
<b>Depression (PHQ-9)</b>		
Depression absence	13	3.2
Mild depression	57	13.9
Moderate depression	97	23.7
Moderately severe depression	107	26.2
Severe depression	135	33.0

Source: prepared by the authors

## Anxiety and/or depression disorders management

Regarding anxiety and/or depression disorders management, most students (62.3%;  $n = 255$ ) indicated they were using psychoactive medications, and 36.7% ( $n = 150$ ) indicated they were undergoing psychotherapy. It was also observed that 25.4% ( $n = 104$ ) were not using these interventions. The most mentioned medication types by the students were selective serotonin reuptake inhibitors (64.2%;  $n = 164$ ) and benzodiazepine derivatives (45.8%;  $n = 117$ ) (Table 3). Regarding the medications use, it is important to highlight that, among the 409 students participating in the study, 50.4% ( $n = 206$ ) indicated they had already interrupted the treatment on their own.

Table 3 – Medications used by students at the Federal University of Espírito Santo who reported having a previous anxiety and/or depression diagnosis, 2022 ( $n = 255$ )

Medication	n	%
<b>Benzodiazepine derivatives (N05BA)</b>	<b>117</b>	<b>45.8</b>
Alprazolam	39	15.3
Clonazepam	73	28.6
Diazepam	3	1.2
Midazolam	2	0.8
<b>Azaspirodecanedione derivatives (N05BE)</b>	<b>6</b>	<b>2.3</b>
Buspirone	6	2.3
<b>Non-selective monoamine reuptake inhibitors (N06AA)</b>	<b>25</b>	<b>9.8</b>
Amitriptyline	19	7.4
Clomipramine	3	1.2
Imipramine	1	0.4
Nortriptyline	2	0.8
<b>Other antidepressants (N06AX)</b>	<b>102</b>	<b>40.0</b>
Desvenlafaxine	40	15.7
Bupropion	21	8.2
Venlafaxine	19	7.4
Trazodone	14	5.5
Mirtazapine	3	1.2
Agomelatine	2	0.8
Vortioxetine	2	0.8
Duloxetine	1	0.4
<b>Selective serotonin reuptake inhibitors (N06AB)</b>	<b>164</b>	<b>64.2</b>
Citalopram	9	3.5
Escitalopram	50	19.6
Fluoxetine	31	12.1
Paroxetine	17	6.7
Sertraline	52	20.4
Fluvoxamine	5	1.9
<b>Other antipsychotics (N05AX)</b>	<b>8</b>	<b>3.1</b>
Aripiprazole	2	0.8
Risperidone	6	2.4
<b>Diazepines, oxazepines, thiazepines and oxepines (N05AH)</b>	<b>12</b>	<b>4.7</b>
Quetiapine	11	4.3
Olanzapine	1	0.4
<b>Butyrophenone derivatives (N05AD)</b>	<b>1</b>	<b>0.4</b>

Medication	n	%
Haloperidol	1	0.4
<b>Antipsychotics (N05A)</b>	<b>23</b>	<b>9.0</b>
Lithium carbonate	23	9.0
<b>Other antiepileptics (N03AX)</b>	<b>8</b>	<b>3.1</b>
Lamotrigine	6	2.4
Topiramate	1	0.4
<b>Acetic acids derivatives</b>	<b>8</b>	<b>3.1</b>
Valporex sodium	7	2.7
Divalporex sodium	1	0.4
<b>Carboxamide derivatives (N03AF)</b>	<b>1</b>	<b>0.4</b>
Oxcarbamazepine	1	0.4
<b>Benzodiazepine-related medications (N05CF)</b>	<b>7</b>	<b>2.7</b>
Eszopiclone	1	0.4
Zolpidem	6	2.3
<b>Others</b>	<b>17</b>	<b>6.7</b>

Source: prepared by the authors.

Factors associated with the use of psychoactive medications and/or psychotherapy for anxiety and/or depression treatment among university students

The analysis of the chi-square test indicated that there was no statistically significant association ( $p > 0.05$ ) among the factors analyzed in the study with the use of medications for anxiety and/or depression disorders treatment (Table 4). On the other hand, self-declared ethnicity/color ( $p < 0.01$ ) and the execution of paid activity ( $p = 0.020$ ) were associated with psychotherapy execution (Table 5).

Table 4 – Evaluation of the association between psychoactive medications use among students at the Federal University of Espírito Santo who reported having a previous anxiety and/or depression diagnosis, 2022 ( $n = 396$ )

Variables	Use of medications							
	No	Yes	$\chi^2$	p	No	Yes	$\chi^2$	p
<b>Gender</b>								
Male	46	49	1.398	0.237	64	31	1.462	0.227
Female	125	176			182	119		
<b>Age group</b>								
Up to 21 years	69	80	5.025	0.08	101	48	3.282	0.194
22-23 years	30	61			54	37		
$\geq 24$ years	72	84			91	65		
<b>Marital status</b>								
Single/Separated/Widower	150	203	0.629	0.428	221	132	0.325	0.569
Married	21	22			25	18		
<b>Ethnicity/color</b>								
White	92	111	3.216	0.359	121	82	5.115	0.164
Brown	53	79			80	52		
Black	26	32			42	16		
Yellow (Asian origin)	0	3			3	0		
<b>Performs paid activity</b>								
No	89	137	3.1	0.78	143	83	0.297	0.585

Variables	Use of medications							
	Anxiety				Depression			
	No	Yes	$\chi^2$	p	No	Yes	$\chi^2$	p
Yes	82	88			103	67		

Source: Prepared by the authors

Table 5 – Factors associated with psychotherapy use for anxiety and/or depression disorders treatment among students at the Federal University of Espírito Santo who reported having a previous diagnosis of anxiety and/or depression, 2022 (n = 396)

Variables	Psychotherapy			
	No	Yes	$\chi^2$	p
<b>Gender</b>				
Male	64	31	0.66	0.420
Female	189	112		
<b>Age group</b>				
Up to 21 years	96	53	2.604	0.27
22-23 years	52	39		
≥ 24 years	105	51		
<b>Marital status</b>				
Single/Separated/Widower	224	129	0.264	0.610
Married	29	14		
<b>Ethnicity/color</b>				
White	121	82	12.65	< 0.01*
Brown	81	51		
Black	49	9		
Yellow (Asian origin)	2	1		
<b>Performs paid activity</b>				
No	155	71	5.03	0.020*
Yes	98	72		

\*Statistically significant association

Source: prepared by the authors

## DISCUSSION

This study identified a considerable proportion of university students who reported having anxiety and/or depression disorders diagnosis, and psychoactive medications were the most used strategy for these disorders management. The results are in line with the international literature, suggesting a worsening of mental health conditions in the general population due to stress and social isolation during the Covid-19 pandemic period<sup>4,5</sup>. The high occurrence of students with anxious and depressive symptoms classified as moderate to severe, according to GAD-7 and PHQ-9 scores, further highlights the urgency of providing professional support and implementing effective and accessible interventions within university environments. This aspect gains more relevance when it is observed that a quarter of the students do not use psychoactive medications and/or psychotherapy, the gold-standard approaches to treat such disorders.

More than half of the students reported using medications to treat anxiety and/or depression disorders, being selective serotonin reuptake inhibitors the most frequently mentioned. Studies conducted in recent years have shown the growing use of psychoactive medications by university students<sup>14,16</sup>. Morris et al.<sup>27</sup>, when evaluating the psychoactive medications use by university students in the United States for more than a decade (2007-2019), observed that antidepressant prescriptions increased from 8.0% to 15.3%. Among the types of psychoactive medications, serotonin reuptake inhibitors stand out as first-choice treatments for anxiety and depression disorders, due to their proven efficacy and generally well-tolerated adverse effect profile<sup>28,29</sup>. These characteristics justify the high use prevalence in this study.

On the other hand, it is important to emphasize that benzodiazepines represented the second type of medication most frequently used by university students. The wide use of this category of medication was also observed in other studies<sup>30,31</sup>. In the Brazilian population, among those with a previous diagnosis of mental health disorder, the prevalence of benzodiazepine use was 7.8%<sup>32</sup>. In this study, the occurrence of benzodiazepines use among university students reached 45.8%. Benzodiazepines are effective for the acute treatment of anxiety symptoms, but should be used for short periods due to adverse effects, especially acquired tolerance, dependence, and abstinence crisis<sup>33</sup>. Although the occurrence of benzodiazepines use is high among university students in this study, the use of convenience sampling is noteworthy and the data should be evaluated with caution. Moreover, the dosage and duration of these medications use were not collected, which makes it impossible to explore treatment adequacy. Pharmacoepidemiological studies are needed to examine the use of these medications among university students, understand its relevance and provide guidelines for discontinuation and/or appropriate replacement of these medications.

Using pharmacological measures for anxiety and/or depression treatment was common for most students in this study; however, half of the sample indicated that they had already interrupted pharmacological treatment on their own. The interruption of pharmacological treatment is a common behavior among students, which may be related to one's lack of knowledge about their health condition and their therapy<sup>34,35</sup>. The widespread perception that medications are not necessary in the absence of symptoms, or that they can be stopped when patients feel better, reflects a trend described in the literature<sup>36</sup>. However, it is curious to observe that, even among university students in the health area, adherence to psychoactive medications use is challenging, indicating that the adherence issue is complex and goes beyond technical knowledge<sup>37</sup>. In this sense, exploring the underlying reasons for low adherence to treatment among university students will contribute to developing more targeted and effective interventions. This deeper understanding may allow the implementation of strategies that address not only the technical aspects of treatment, but also the psychosocial factors that may influence adherence.

Psychotherapy had a lower use rate when compared to the use of pharmacological measures. A significant relationship was observed between the variables ethnicity and/or skin color of the student and paid activity execution with the use of psychotherapy. Although this study did not collect the income variable, studies have shown that ethnicity and/or skin color can work as a predictor of social privileges for White individuals, whereas the access to health services among non-White individuals is usually lower<sup>38</sup>. In this context, the relevance of the availability of psychotherapeutic care services by the university is highlighted, covering both individual and collective interventions. This initiative is especially crucial for students facing financial restraints, who may not have the resources to pay for such services.

This study provided a comprehensive view of mental disorders and management strategies adopted by university students at Ufes. However, when interpreting these results, the inherent research limitations must be considered. Despite the considerable sample size, non-probabilistic sampling limits the generalization. Self-reported diagnoses and treatments can also introduce biases, such as selective memory and the tendency to overestimate or underestimate symptoms and behaviors.

## CONCLUSIONS

This study revealed that a considerable proportion of students reported having anxiety and/or depression disorder diagnosis. Most students are under treatment with psychoactive medications, whereas a third are undergoing psychotherapy. The study did not find significant associations between the use of medication and sociodemographic variables, whereas paid activities execution and self-reported skin color were associated with the use of psychotherapy.

The implications of these results for higher education institutions include the need to promote more equitable access to different forms for anxiety and depression disorders treatment. Developing mental health policies that prioritize prevention and mental health education is also crucial, as is the ongoing support for students, especially those who started their courses during or after the Covid-19 pandemic.

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