

USE OF ANXIOLYTICS AND ANTIDEPRESSANTS AMONG GRADUATE STUDENTS IN BRAZIL DURING THE COVID-19 PANDEMIC

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Highlights: Psychological suffering, being under psychological/psychiatric care, age, being unemployed, residing in the South and Midwest regions of the country and being a student of the human sciences exerted an influence on the use of anxiolytics/antidepressants by graduate students in Brazil during the COVID-19 pandemic.

PRE-PROOF

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ABSTRACT

Investigate the use of anxiolytics/antidepressants by graduate students in Brazil during the COVID-19 pandemic. An analytical cross-sectional study was conducted involving 2225 graduate students. For such, three questionnaires were made available on the SurveyMonkey® platform: one addressing sociodemographic characteristics, a questionnaire addressing aspects related to the course and the self-perceived impact of the COVID-19 pandemic on education, and the Brazilian version of the Depression, Anxiety and Stress Scale (DASS-21), which was employed to measure psychological suffering. Data analysis was performed with the aid of the R software, version 4.3.2, and involved Poisson regression analysis with robust variance ($\alpha = 5\%$), with the estimation of prevalence ratios (PR) and respective 95% confidence intervals (CI). The prevalence of anxiolytic/antidepressant use was 24.0%. The use of these medications was significantly associated with age (PR = 1.03; 95% CI: 1.02 - 1.04), a higher psychological suffering score (PR = 1.01; 95% CI: 1.01 - 1.01), being under psychological/psychiatric care (PR = 6.09; 95% CI: 4.58 – 8.10), being unemployed (PR = 1.22; 95% CI: 1.05 - 1.43), residing in the South and Midwest regions of Brazil (PR = 1.29; 95% CI: 1.01 - 1.64) and being a student of the human sciences (PR = 1.26; 95% CI: 1.04 - 1.53). It is concluded that age, psychological suffering, being under psychological/psychiatric care, being unemployed, residing in the South and Midwest regions of Brazil and being a student of the human sciences exerted an influence on the use of anxiolytics/antidepressants by graduate students during the COVID-19 pandemic.

Keywords: Anxiolytics; Antidepressants; Students; Substance Use Disorders.

USO DE ANSIOLÍTICOS E ANTIDEPRESSIVOS POR ESTUDANTES DE PÓS-GRADUAÇÃO NO BRASIL DURANTE A PANDEMIA DA COVID-19

RESUMO

Investigar o uso de ansiolíticos/antidepressivos por estudantes de pós-graduação no Brasil durante a pandemia de COVID-19. Foi realizado um estudo transversal analítico com 2225 estudantes de pós-graduação. Para isso, foram disponibilizados três questionários na plataforma SurveyMonkey®: um sobre características sociodemográficas, um questionário abordando aspectos relacionados ao curso e o impacto autopercebido da pandemia de COVID-19 na educação, e a versão brasileira da Escala de Depressão, Ansiedade e Estresse (DASS-21), utilizada para medir o sofrimento psicológico. A análise dos dados foi realizada com o auxílio do software R, versão 4.3.2, utilizando regressão de Poisson com variância robusta ($\alpha = 5\%$), com estimativas de razões de prevalência (RP) e respectivos intervalos de confiança de 95% (IC). A prevalência do uso de ansiolíticos/antidepressivos foi de 24,0%. O uso desses medicamentos esteve significativamente associado à idade (RP = 1,03; IC 95%: 1,02 - 1,04), maior escore de sofrimento psicológico (RP = 1,01; IC 95%: 1,01 - 1,01), estar em acompanhamento psicológico/psiquiátrico (RP = 6,09; IC 95%: 4,58 - 8,10), estar desempregado (RP = 1,22; IC 95%: 1,05 - 1,43), residir nas regiões Sul e Centro-Oeste do Brasil (RP = 1,29; IC 95%: 1,01 - 1,64) e ser estudante das ciências humanas (RP = 1,26; IC 95%: 1,04 - 1,53). Conclui-se que idade, sofrimento psicológico, acompanhamento psicológico/psiquiátrico, desemprego, residência nas regiões Sul e Centro-Oeste e ser estudante das ciências humanas exerceram influência sobre o uso de ansiolíticos/antidepressivos por estudantes de pós-graduação durante a pandemia de COVID-19.

Palavras-Chave: Ansiolíticos; Antidepressivos; Estudantes; Transtornos relacionados ao uso de substâncias.

INTRODUCTION

Graduate students may be more vulnerable to mental disorders. One study indicated an increase in levels of psychological disturbance among students during the COVID-19 pandemic in comparison to normal periods ¹. Mental diseases, such as depression, anxiety, panic attacks and insomnia, are frequent among students ². Evidence indicates that more than one-third of

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students (34%) reported depressive symptoms³. The challenges of academic life exert a strong impact on students, resulting in a high frequency of psychological disorders⁴.

Demands related to high academic yield and productivity, along with the excessive burden of personal and professional aspects, favor conditions of restlessness, burnout and social isolation, increasing the vulnerability of such individuals to seeking pharmacological treatment without a medical prescription⁴, with the use of legal and illicit drugs among graduate students⁵.

A significant increase in the use of psychotropic agents was found in the years 2020 and 2021 in comparison to the medical history⁶, possibly attributed to the additional stress caused by the pandemic, which aggravated mental health problems. The benefits of the use of psychotropic drugs during the pandemic include a reduction in symptoms of anxiety and depression, which enabled better adaptation to changes in the academic and social environment⁷.

COVID-19, which was declared a pandemic by the World Health Organization, increased gaps in the educational sector, exerted an impact on students and led to the shutdown of campuses in compliance with social distancing measures⁸. The need for changes in one's personal routine caused uncertainties with regards to the continuity of academic activities and generated conditions of emotional discomfort and psychological distress, such as anxiety and depression⁹.

This novel scenario resulted in the implementation of remote (online) teaching, which is characterized by use of virtual communication and learning technologies and platforms, altering the processes of teaching, knowledge-building and research¹⁰. Some aspects were highlighted as obstacles to the development of studies, such as the need for investments in online systems to provide classes and collect information, the lack of theoretical resources available in the online literature, insufficient technological devices for all students, inefficient communication between advisers and students and difficulties with regards to the learning of statistical methods for the creations of databanks for studies⁸.

The lack of psychological support on the part of the educational institution constitutes a triggering factor of suffering for graduate students⁴. One study showed that graduate students have higher levels of psychological suffering than the general population¹¹. There is growing evidence of the harmful effects of the pandemic on mental health¹²⁻¹³, although an epidemiological profile of postgraduate students' mental health during this period is not yet known. One way to document and monitor the mental health of populations is by studying their

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drug consumption¹⁴. Thus, the use of anxiolytics/antidepressants may have increased during the pandemic⁶.

Adolescents and young adults are vulnerable to mental health disorders¹⁵⁻¹⁶. This age group is also at risk for the negative effects of pandemic contexts¹⁷⁻¹⁸. However, few studies have performed an investigation of this issue. Therefore, the aim of the present study was to assess the use of anxiolytics e antidepressants and associated factors among graduate students in Brazil during the COVID-19 pandemic.

METHODS

This study received approval from the Institutional Review Board (approval certificate number: 4.495.426). All volunteers agreed to participate by signing a statement of informed consent and all study procedures followed the ethical precepts stipulated in Resolution nº 510/16 of the Brazilian Board of Health, which addresses projects involving electronic forms¹⁹.

Study design and sample

An analytical cross-sectional study was conducted in a virtual environment involving graduate students in Brazil during the COVID-19 pandemic. According to the Brazilian Higher Education Census, approximately 8.6 million students were enrolled in 2457 higher education institutions in the year 2020²⁰.

The sample size was calculated with the aid of the *G*Power* software program based on a proportion estimate. A 95% significance level, 50% rate of anxiety, depression or stress and a 5% admissible rate of error were considered and an additional 20% was added to compensate for possible dropouts. The final sample was composed of 2225 graduate students selected through non-probabilistic convenience sampling.

Eligibility criteria

Graduate students enrolled in public and private higher education courses in Brazil (specialization, master's and doctoral levels) were included. Individuals with vision impairment were excluded from the study.

Data collection

Data were collected virtually through three questionnaires available on the *SurveyMonkey*® platform in the period from September to December 2020. The databank was checked for the consistency of the answers to ensure that only graduate students participated. Email addresses provided by the participants were used as unique identifiers to identify and exclude possible duplicate responses.

Contact with the coordinating boards of the universities was achieved through an active search of the institutional websites of the respective programs as well as contact with collaborating researchers from other institutions. The e-mail included a presentation letter of the study with details on the objectives and methods, along with a link to the electronic questionnaire to be sent to graduate students from all field's knowledge at the respective institutions. The link was also publicized via the social media (Instagram®, Facebook® and WhatsApp®) of the researchers involved in the study. After seven days, a second e-mail was sent to the programs that did not respond to the first message.

Data collection instruments

The following data collection instruments created by the authors were employed:

Questionnaire addressing sociodemographic characteristics: sex, age, marital status, monthly family income (based on the monthly minimum wage of R\$1212 in Brazil in the year 2020), period of graduate school and geographic region of reference.

Questionnaire addressing aspects related to the course and self-perceived impact of the COVID-19 pandemic on education: type of teaching institution (public or private), graduate course, period of the day when classes were given, period of the course, satisfaction with course, performance in the course during the pandemic, the extent to which the pandemic affected the graduate course, job market prospects, psychological/psychiatric treatment and the use of anxiolytics/antidepressants. The use of anxiolytics/antidepressants was assessed through a dichotomous question (yes/no), based on participants self-report regarding the use of these medications at the time of data collection.

Depression, Anxiety and Stress Scale (DASS-21): The version validated for use in Brazil²¹ was employed to measure psychological suffering. The DASS-21 has 21 items equally distributed among three subscales. The response options for each item are organized on a four-point ordinal scale: 0 = "did not apply to me at all"; 1 = "applied to me to some degree or some

of the time”; 2 = “applied to me a considerable degree or a good part of the time”; 3 = “applied to me very much or most of the time”. For diagnostic purposes, the total score was used for the determination of psychological suffering, which has adequate psychometric properties for measuring the construct in question ²².

The items from the three instruments were grouped into a single questionnaire to facilitate the process. The first page contained the statement of informed consent. The second page presented all items related to the study united in a single questionnaire. The estimated time for completing the questionnaire was 20 minutes. The use of virtual means for the execution of studies due to the limitations imposed by the COVID-19 pandemic is highly efficient. Indeed, evidence suggests that the computerized research mode in a supervised school environment produces nearly the same results as the traditional mode ²³.

Data processing and analysis

Descriptive statistics were used, with the calculation of absolute and relative frequencies for quantitative variables and mean and standard deviation values for continuous variables. Statistical analysis was performed with the aid of the *R* software, version 4.3.2 ²⁴. Unadjusted and adjusted Poisson regression models were run to investigate associations between socioeconomic/demographic/course-related characteristics and the outcomes (impacts on academic performance and education). Variables with a *p*-value < 0.25 in the bivariate analysis (unadjusted model) were incorporated into the multivariate analysis (adjusted model). The significance level for all analyses was set at 5%.

RESULTS

The total sample was composed of 3237 questionnaires. After the exclusion of incomplete forms, the final sample was composed of 2225 graduate students in Brazil and the human sciences had the most represented among the different graduate programs (36.9%). Other academic fields also formed the sample (exact sciences, health and biological sciences, etc.), with masters' programs predominating among the participants (55.3%) (Table 1).

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Table 1. Characterization of sample (N = 2225).

Variables	n	%
Sex		
Male	708	31.8%
Female	1517	68.2%
Marital status		
Married/Stable union	816	36.7%
Single	1409	63.3%
Family income		
< 2 x monthly minimum wage	440	19.8%
> 2 x monthly minimum wage	1785	80.2%
Employment status		
Unemployed	546	24.5%
Employed	1679	75.5%
Region of residence		
Midwest	419	18.8%
Northeast	879	39.5%
North	160	7.2%
Southeast	298	13.4%
South	469	21.1%
Graduate level		
Doctoral	964	43.3%
Master's	1231	55.3%
Specialization	30	1.3%
Field of course		
Exact Sciences	620	27.9%
Human Sciences	822	36.9%
Health and Biological Sciences	619	27.8%
Others	164	7.4%
Type of institution		
Public	2192	98.5%
Private	33	1.5%
Scholarship for graduate school		
No	1149	51.6%
Yes	1076	48.4%
Satisfaction with graduate studies		
High	1276	57.3%
Medium	778	35.0%
Low	171	7.7%
Performance in course		
High	474	21.3%
Medium	1027	46.2%
Low	724	32.5%
Satisfaction with health		
Satisfied	1525	68.5%
Unsatisfied	700	31.5%
Under psychological/psychiatric care		
No	947	42.6%
Yes	1278	57.4%
Use of anxiolytics/antidepressants		
No	1691	76.0%
Yes	534	24.0%
Psychological suffering	Mean	SD
	49.12	27.86
Age	Mean	SD
	31.68	7.43

SD: standard deviation

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Mean age was 31.7 ± 7.4 years. The female sex (68.2%), single category of marital status (63.3%), family income higher than two times the monthly minimum wage (80.2%), individuals with employment (75.5%), residents of the Northeast region of the country (39.5%), students at public institutions (98.5%) and individuals with no graduate level scholarship (51.6%) predominated in the sample (Table 1).

Satisfaction with the course was high (57%), but 32.5% of the students had a low academic performance. With regards to self-rated health and the use of medications, 31.5% of the graduated students reported being unsatisfied with their own health, 57.4% reported being under psychological/psychiatric care, 24% reported taking anxiolytics/ antidepressants and the average DASS-21 score (psychological suffering) was 49.12 (Table 1).

Age (PR = 1.03; 95% CI: 1.02 - 1.04), psychological suffering (PR = 1.01; 95% CI: 1.01 - 1.01), being under psychological/psychiatric care (PR = 6.09; 95% CI: 4.58 - 8.10), being unemployed (PR = 1.22; 95% CI: 1.05 - 1.43), residing in the South and Midwest regions of the country (PR = 1.29; 95% CI: 1.01 - 1.64) and being a student of the human sciences (PR = 1.26; 95% CI: 1.04 - 1.53) were significantly associated with the use of anxiolytics/antidepressants by graduate students in Brazil (Table 2).

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Table 2. Unadjusted and adjusted Poisson regression of independent variables associated with use of anxiolytics/antidepressants by graduate students.

Variable	Use of anxiolytic or antidepressant		Unadjusted models		Adjusted model	
	Prevalence		PR (95% CI)	p-value	PR (95% CI)	p-value
Sex						
Male	19.07%		1		1	
Female	26.30%		1.38 (1.16 - 1.64)	< 0.01	1.07 (0.91 - 1.26)	0.4
Marital status						
Married/Stable union	24.26%		1		-	
Single	23.85%		0.98 (0.84 - 1.15)	0.82	-	-
Family income						
< 2 x monthly minimum wage	24.54%		1		1	
> 2 x monthly minimum wage	21.82%		0.89 (0.73 - 1.08)	0.24	0.97 (0.81 - 1.15)	0.7
Employment status						
Unemployed	23.34%		1		1	
Employed	26.01%		1.11 (0.94 - 1.31)	0.20	1.22 (1.05 - 1.43)	< 0.01
Region of residence						
Midwest	21.14%		1		1	
Northeast	28.88%		1.37 (1.05 - 1.78)	< 0.05	1.29 (1.01 - 1.64)	< 0.05
North	19.57%		0.93 (0.72 - 1.20)	0.56	0.93 (0.74 - 1.18)	0.55
Southeast	21.88%		1.03 (0.72 - 1.49)	0.86	1.07 (0.77 - 1.50)	0.68
South	30.49%		1.44 (1.11 - 1.87)	< 0.01	1.37 (1.08 - 1.74)	< 0.01
Graduate level						
Doctoral	24.27%		1		1	
Master's	24.13%		0.99 (0.86 - 1.15)	0.94	1.04 (0.90 - 1.20)	0.62
Specialization	10.00%		0.41 (0.14 - 1.21)	0.11	0.51 (0.17 - 1.49)	0.22
Field of course						
Exact Sciences	17.58%		1		1	
Human Sciences	29.44%		1.67 (1.37 - 2.05)	< 0.01	1.26 (1.04 - 1.53)	< 0.05
Health and Biological Sciences	22.94%		1.30 (1.04 - 1.63)	< 0.05	1.19 (0.96 - 1.46)	0.11
Others	25.00%		1.42 (1.04 - 1.95)	< 0.05	1.12 (0.82 - 1.51)	0.47
Type of institution						
Public	0.24%		1		-	
Private	0.24%		1.01 (0.55 - 1.86)	0.97	-	-
Scholarship for graduate school						
No	24.16%		1		-	

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Yes	23.85%	0.99 (0.85 - 1.14)	0.86	-	-
Satisfaction with graduate studies					
High	0.226489	1		1	
Medium	0.2506427	1.11 (0.94 - 1.30)	0.21	0.89 (0.77 - 1.03)	0.11
Low	0.2923977	1.29 (1.001 - 1.665)	< 0.05	1.04 (0.82 - 1.32)	0.75
Performance in course					
High	19.62%	1		1	
Medium	22.20%	1.13 (0.91 - 1.40)	0.26	1.06 (0.87 - 1.29)	0.58
Low	29.42%	1.50 (1.21 - 1.86)	< 0.01	1.14 (0.92 - 1.41)	0.22
Satisfaction with health					
Satisfied	21.38%	1		1	
Unsatisfied	29.77%	1.39 (1.20 - 1.61)	< 0.01	1.03 (0.88 - 1.19)	0.74
Under psychological/psychiatric care					
No	5.17%	1		1	
Yes	37.95%	7.33 (5.53 - 9.82)	< 0.01	6.09 (4.58 - 8.10)	< 0.01
	Mean (SD)	PR (95% CI)	p-value	PR (95% CI)	p-value
Psychological suffering					
	61.1 (29.61)	1.01 (1.01 - 1.02)	< 0.01	1.01 (1.01 - 1.01)	< 0.01
Age					
	32.49 (7.41)	1.01 (1.00 - 1.02)	< 0.01	1.03 (1.02 - 1.04)	< 0.01

SD: standard deviation; PR: prevalence ratio; CI: confidence interval. Variables incorporated into adjusted model: sex, family income, employment status, region of residence, graduate level, field of course, satisfaction with course, performance in course, satisfaction with health, under psychological/psychiatric care, psychological suffering (total DASS-21 score) and age (in years).

DISCUSSION

In the present study, psychological suffering, being under psychological/psychiatric care, age, being unemployed, residing in the South and Midwest regions of Brazil and being a student of human sciences were associated with the use of anxiolytics/antidepressants among graduate students in Brazil during the COVID-19 pandemic.

This study addresses an important issue – the mental health of graduate students – as well as aspects associated with the use of anxiolytics/antidepressants by these students. 24% of the participants reported using anxiolytics/antidepressants in the period of the COVID-19 pandemic. This rate is higher than that described in a previous study, which reported that the prescription of this type of medication was 15.8% in the year 2015 ⁶. This may indicate an increase in the prescription of such drugs during the pandemic, possibly due to the additional psychological impact imposed in this period.

Higher psychological suffering scores and being under psychological/psychiatric care were associated with the use of anxiolytics/antidepressants. However, this association should be interpreted with caution, as psychiatric care represents the primary context for prescribing these medications and may reflect a healthcare-related relationship rather than an independent explanatory factor. This use of such medications may indicate an increase in symptoms of anxiety and depression as well as disturbed sleep ²⁵.

The proportion of graduate students with mental health problems is sixfold higher than that of the general population ¹¹. During COVID-19, mental health services were suspended in approximately 93% of all countries ²⁶. Moreover, the social restrictions imposed by the pandemic and the difficulty in maintaining healthy habits were risk factors for psychological problems ²⁷. Thus, medications served as adjuncts to therapy and alternative strategies to reduce the occurrence of depressive episodes ³.

Age of the graduate students was associated with the use of medications. Anxiety increases in intensification with the increase in responsibilities, the desire to be accepted in one's social group ²⁸ and the increase in age, which also imposes greater responsibilities. Although the age range of the participants in this study was not considered a risk group for mortality by COVID-19 ²⁹, the increase in cases and the negative effects of the virus during the study period may have led to an increase in seeking anxiolytic and antidepressant medications³.

Being unemployed was also associated with the use of anxiolytics/antidepressants. A previous study found that financial difficulties were related to emotional suffering and depressive symptoms among graduate students during the COVID-19 pandemic ³⁰. Graduate

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students without a fixed source of income and burdened with economic uncertainties may have greater psychological vulnerability and difficulties in performing their academic work²⁸, which may explain the search for medications to diminish symptoms of depression.

Residing in the South and Midwest regions of Brazil was associated with the use of anxiolytics and antidepressants among the graduate students, which is in agreement with data described in a previous study in these regions³¹. This aspect may be related to regional differences with regards to services and healthcare providers for mental health needs. High coverage of psychosocial care centers is found in the southern region³¹, which may stimulate individuals to seek such services with greater frequency, leading to more reports of the diagnosis of depression and greater use of medications to control symptoms.

Being a graduate student of the human sciences was also associated with the use of anxiolytics and antidepressants. A previous study found that students of the humanities had higher levels of depression (20.6%) and social anxiety (38.8%)³². Such students may have a more reflective profile, as they are more involved in discursive activities that strengthen critical thinking³³, which may have generated greater awareness and the search for medicinal treatment during the COVID-19 pandemic.

Investigating factors associated with the use of anxiolytics/antidepressants assisted in the identification of aspects involved in the mental health of graduate students during the COVID-19 pandemic, which was a time in which the world experienced transformations that placed academic and teaching sustainability at risk in graduate programs³⁴. Further studies should be developed to determine the current scenario of the use of medications by graduate students. The present findings underscore the importance of political policies directed at the prevention of mental health disorders and the adequate use of these medications by graduate students. The implementation of interdisciplinary programs with the psychology sectors of the institutions could be a driving force for initiating the process of mental support for these students.

The present study has the limitations inherent to the cross-sectional design, which does not enable the establishment of cause-and-effect relationships. In addition, the assessment of anxiolytic/antidepressant use was based on self-report, which may be subject to information bias, including possible classification bias due to participants lack of knowledge regarding the pharmacological class of the medications used. However, the strong points of this study were its national scope and the involvement of the most diverse fields of graduate programs at public and private institutions.

CONCLUSION

Psychological suffering, being under psychological/psychiatric care, age, being unemployed, residing in the South and Midwest regions of the country and being a student of the human sciences exerted an influence on the use of anxiolytics/antidepressants by graduate students in Brazil during the COVID-19 pandemic.

These findings highlight the vulnerability of this population, especially in contexts of social and academic instability, reinforcing the need for targeted mental health support within graduate programs.

Strategies focused on prevention, early identification and multidisciplinary support may contribute to improving students' mental health and reducing reliance on pharmacological treatment. Future studies should investigate longitudinal patterns of medication use in this population.

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