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PSYCHOTROPIC MEDICATION USE AMONG POSTGRADUATE STUDENTS AND ASSOCIATED FACTORS

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Abstract

This study examined the prevalence and influencing factors of psychotropic medication use among 5,334 postgraduate students from across Brazil. It was a cross-sectional and observational investigation, which collected electronic data through the REDCap platform over three months in 2022. The data analysis revealed several factors associated with psychotropic medication use, including psychological distress in the previous year, self-reported mental disorders, continuous medication use, pandemic-related disruptions, a positive COVID-19 test, and illicit drug use during the pandemic. However, certain factors, such as living in the north or southeast regions and accessing psychological counseling before the pandemic, showed a protective association. These findings demonstrate that mental health policies that support and monitor students using psychotropic medications are crucial for enhancing well-being in postgraduate programs.

Keywords: COVID-19. Mental health. Postgraduate students. Psychotropics drugs.

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1. Introduction

The physical and mental health of the general population during and after the COVID-19 pandemic has been at the forefront of pandemic-related concerns. The pandemic caused symptoms such as panic, phobia, stress, anxiety, and sleep disorders (Banerjee and Rai 2020). A study conducted in the Brazilian population during the pandemic identified that 40% of respondents expressed feeling sad or depressed, 53% felt anxious or nervous, and 44% reported frequent changes in sleep patterns (Barros et al. 2020).

During the pandemic, efforts were directed toward protecting individuals particularly vulnerable to COVID-19. Thus, young individuals and college and postgraduate students experiencing a life stage marked by strong social dependence and subsequent entry into the job market became more predisposed to a psychosocial crisis (Kuitunen et al. 2023). Considering the uncertainty about their future and anxiety related to the lack of economic stability, younger populations were more mentally affected by confinement than older populations (Santomauro et al. 2021). Students were more vulnerable to the pandemic's negative psychological impacts than the general population (Kantorski et al. 2023).

COVID-19 pandemic effects may relate to various factors associated with daily routines, particularly for postgraduate students, including long study hours in competitive environments, distance from the family core, socioeconomic vulnerabilities, and frequent sleep deprivation. Additionally, the progress of these students' research and the need to adapt to new teaching methods, which became significant stress sources, contributed to the emergence of depressive and anxious symptoms and psychotropic medication use (Bilodeau et al. 2021; Arora et al. 2022).

Although psychotropic medications are significantly beneficial when prescribed and used correctly, they may pose a risk to mental health when misused. Studies in recent years show that the overall prevalence of psychotropic medication use among young adults varies from 6.5% to 22.3% (Wege et al. 2016; Rodrigues et al. 2020). The United States identified an increased consumption of Z-hypnotics (zolpidem, zaleplon, and eszopiclone), persisting at elevated levels across successive COVID-19 waves (Milani et al. 2021). Similarly, Levaillant et al. (2021) identified a weekly increase of 2.5% in new hypnotics users among young individuals in France during the pandemic.

An analysis of the national Brazilian database demonstrated an upward trend in psychotropic medication sales, showing a solid correlation between the number of COVID-19-related deaths in Brazil and psychotropic medication use, especially zolpidem (Sanborn et al. 2023). However, given the vulnerability of young individuals and the specificities of the daily lives of Brazilian postgraduate students, national analyses of psychotropic medication use in that population and associated factors remain unclear in the literature.

Hence, this study aimed to identify the prevalence of psychotropic medication use and associated factors among Brazilian postgraduate students.

2. Material and Methods

This study is part of a larger project entitled "The Mental Health of Brazilian Postgraduate Students in Times of Pandemic: Harmful Effects and Response Strategy Promotion." The project complied with the Code of Ethics of the World Medical Association (Helsinki Declaration) and received approval from the Universidade de São Paulo Research Ethics Committee, no. CAAE: 56048822.9.0000.5393.

Study Design and Location

The study followed a cross-sectional, analytical, and observational design and applied an electronic form available on the Research Electronic Data Capture (REDCap) platform from May to July 2022, covering the entire Brazilian territory. The study followed the recommended guidelines of the Reporting of Observational Studies in Epidemiology (STROBE) (Von Elm, 2014) and adhered to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (Eysenbach 2004).

Sample and Data Collection

The Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES 2019) showed that, before collecting data for this research, 388,629 postgraduate students were enrolled in master's and doctoral courses in Brazil. The sample size calculation considered a 50% prevalence. That means that, without specific information on outcome prevalence, as in this study, statistical analyses show that calculating 50% ensures a sufficient sample size for any prevalence value (Bolfarine and Bussab 2005). The study applied a 1.5% precision level and a 95% confidence interval, resulting in a minimum sample size of 4,222.

Inclusion criteria were postgraduate students of either sex, aged 18 or older, residing in Brazil, and with internet access. The exclusion criterion was the failure to complete the questionnaire. A total of 6,671 postgraduate students accessed the form, and 5,334 completed it, thus meeting the eligibility criteria.

Data collection used a pre-existing list of publicly accessible records of all 4,592 research postgraduate programs in higher education institutions in Brazil. The list and e-mail addresses of the postgraduate programs were collected from the Sucupira Platform, a system designed for retrieving information, analyses, and evaluations used as a standardizing basis for the Brazilian National Postgraduate System (CAPES 2023).

Subsequently, all postgraduate programs received an e-mail requesting the dispatch of invitation letters to their students with the link for accessing the data collection instruments. Thus, all enrolled students received invitations to participate in the research.

The postgraduate programs were asked to confirm sending invitations to their students to minimize biases inherent to online surveys. A secure data collection platform allowed access to the link on mobile devices. Additionally, all information was assured confidentiality. The participants were invited to read the Informed Consent Form when accessing the link. After consenting to participate, those expressing interest were directed to the electronic questionnaire, where they answered the questions. The outcome variable was psychotropic medication use during the pandemic (yes or no), and the independent variables regarded sociodemographic and economic profiles, academic aspects, physical and mental health, information about COVID-19, and alcohol consumption.

Instruments

Data collection used a questionnaire developed by the researchers and validated for content and the Alcohol Use Disorders Identification Test (AUDIT) by Babor et al. (2001), translated and validated in Brazil by Lima et al. (2005).

Total AUDIT measure scores range from 0 to 40 points, allowing the identification of four alcohol consumption patterns or risk zones: Zone I: Low-risk consumption or abstainers (0-7 points); Zone II: Risky consumption (8-15 points); Zone III: Harmful or high-risk consumption (16-19 points); and Zone IV: Probable dependence (20-40 points).

Statistical Analysis

After data collection, the information compilation was exported to Excel®, and the data analysis used R software with the VGAM package (Yee 2010).

A bivariate analysis was conducted initially to select variables with statistically significant associations with the psychotropic medication use variable (α = 0.05). Given the parallelism assumption for all variables, their selection occurred in the second stage through a stepwise procedure using the Bayesian Information Criterion (BIC). This multivariate analysis identified the most relevant factors associated with psychotropic medication use among Brazilian postgraduate students during the pandemic.

The Likelihood Ratio Test (Agresti 2018) assessed variable significance at each variable inclusion and exclusion stage, thus facilitating the comparison of adjusted models. The binary logistic regression model identified factors associated with psychotropic medication use at a 5% (α = 0.05) significance level. This statistical approach helps determine the most influential factors in predicting psychotropic medication use among the studied population.

3. Results

Postgraduate Student Characterization

The research included 5,334 postgraduate students, with a 21.9% prevalence of psychotropic medication use during the pandemic, and the highest rate regarded antidepressants (22.3%), followed by anxiolytics (11.2%).

A higher percentage of participants was female (66.8%), single (41.3%), had a monthly income from one to three times the minimum wage (36.2%), were heterosexual (77.1%), white (63.0%), without children (74.9%), lived with two household members (30.2%), and had no religious affiliations (40.3%). The average age was 33.1 years (SD = 8.28).

Regarding academic status, the highest rate of participants were enrolled in master's (47.3%) and postgraduate programs (45.9%) in southeastern Brazil, studied health sciences - according to CAPES (21.5%), were scholarship recipients (51.4%), and did not engage in any other paid activity (35.7%).

Concerning health data, 46.9% of students tested positive for COVID-19, 6.6% expressed fear of contracting or transmitting the disease, 85.8% received three or more vaccine doses, and 16.7% self-declared a COVID-19 risk group. Finally, 8.5% reported taking medication to prevent COVID-19.

Among the respondents, 71.1% attended healthcare services three or more times in the previous 12 months, 4.4% had medical follow-up, and 51.1% had psychological follow-up, both during the pandemic. It is noteworthy that 39.2% reported using continuous medication, with 32.5% taking unprescribed drugs.

Overall, 39.1% of participants reported not having health insurance, 36.6% requested a leave of absence from work due to psychological reasons, and 93.6% did not feel well psychologically due to anxiety, fear, stress, sadness, or other factors in the previous 12 months.

Factors Associated with Psychotropic Medication Use

Regarding factors associated with our analysis outcome, participants who reported not feeling well psychologically in the previous 12 months were six times more likely to use psychotropic medications than others (OR = 6.20; CI = 2.50 - 20.76; $p = 0.005$), those diagnosed with a mental disorder were five times more likely (OR = 5.27; CI = 4.25 - 6.54; $p < 0.001$), and those on continuous medications were four times more likely to use psychotropic drugs (OR = 4.24; CI = 3.47 - 5.21; $p < 0.001$).

Risk factors linked to psychotropic medication use in the investigated sample included the need to take time off from activities during the pandemic (OR = 2.70; CI = 2.23 - 3.28; $p < 0.001$), testing positive for COVID-19 (OR = 1.49; CI = 1.24 - 1.81; $p < 0.001$), and illicit drug use during the pandemic (OR = 1.90; CI = 1.27 - 2.84; $p < 0.002$) (Table 1).

Protective factors comprised living in the north (OR = 0.43; CI = 0.24 - 0.75; $p = 0.04$) and southeast (OR = 0.75; CI = 0.58 - 0.99; $p = 0.04$) regions and receiving psychological support before the pandemic (OR = 0.54; CI = 0.43 - 0.67; $p < 0.001$), and these individuals were less likely to use psychotropic medications than other postgraduate students (Table 1).

Table 1. Factors associated with psychotropic medication use among Brazilian postgraduate students.

Variables	β*	EP(β)**	p	OR***	CI****
(Intercept)	-4.82	0.54	<0.001		
Northeast Region	-0.26	0.18	0.13	0.77	0.54 – 1.08
North Region	-0.84	0.29	0.004	0.43	0.24 – 0.75
Southeast Region	-0.28	0.14	0.04	0.75	0.58 – 0.99
South Region	-0.32	0.20	0.10	0.72	0.49 – 1.06
Testing positive for COVID-19	0.40	0.10	<0.001	1.49	1.24 – 1.81
Psychological counseling before the pandemic	-0.62	0.11	<0.001	0.54	0.43 – 0.67
Not feeling psychologically well in the previous 12 months	1.82	0.53	0.005	6.20	2.50 – 20.76
Mental disorder diagnosis	1.66	0.11	<0.001	5.27	4.25 – 6.54
Needing time off from activities	0.99	0.10	<0.001	2.70	2.23 – 3.28
Continuous medication use	1.44	0.10	<0.001	4.24	3.47 – 5.21
Audit – Risk Zone II	0.14	0.13	0.27	1.15	0.90 – 1.47
Audit – Risk Zone III	0.12	0.25	0.63	1.06	0.68 – 1.85
Audit – Risk Zone IV	0.31	0.28	0.25	1.37	0.79 – 2.35
Illicit drug use during the pandemic	0.64	0.20	0.002	1.90	1.27 – 2.84

* Unstandardized regression coefficient; ** Beta Standard Error; ***Odds Ratio; **** Confidence Interval

4. Discussion

This study revealed that 21.9% of the interviewed postgraduate students reported using psychotropic medications during the pandemic. Previous research in Brazil before the pandemic with the same population identified higher use rates (27% and 35.6%) for such drugs (Costa and Nebel 2018; Abreu et al. 2021). These authors attribute their findings to the increasing incidence of mental health issues among postgraduate students, including anxiety, depression, insomnia, and nervous breakdowns (Abreu et al. 2021).

Participants who did not feel well in the previous 12 months were 6.2 times more likely to use psychotropic medications. Numerous factors, such as personal, environmental, structural, social, and economic conditions, may relate to psychological distress and illness among postgraduate students (Reis et al. 2021).

In this context, medications such as psychotropics may provide artificial conditions that allow the tolerance of excessive demands and consequently improve working and academic capacity with an immediate effect (Alvarenga and Dias 2021). The pursuit of higher performance, productivity, and research development among postgraduate students (Reis et al. 2021) may increase the use of these medications.

The literature before the pandemic was already seeking to understand suffering, illness, and medicalization among postgraduate students (Shigaki and Patrus 2017; Costa and Nebel 2018; Pinzón 2019). However, there has been little research on mental health and psychotropic medication use in the context of the COVID-19 pandemic (Pinzón 2019; Reis et al. 2021).

The participants of our study who self-reported a mental disorder diagnosis were 5.27 times more likely to use psychotropic medications, with antidepressants (22.3%) followed by anxiolytics (11.2%) as the most prevalent drugs. A national study with 2,903 postgraduate students found that 74% experienced anxiety, 31% had insomnia, 25% suffered from depression, and 19% reported using medication to aid sleep (Costa and Nebel 2018).

Although psychotropic medications are the first choice for treating mental disorders such as depression and anxiety, their use requires integrated care to provide safe and rational therapy, as they show potential side effects that may cause dependence (Quemel et al. 2021).

Another possible explanation relates to women, who represent the majority of Brazilian postgraduate students (CAPES 2023) and consequently prevailed in this study. Although not statistically significantly associated with psychotropic medication use in our investigation, women are the demographic with the highest psychotropic medication use, especially antidepressants and anxiolytics (Kimati and Muhl 2020; Milani et al. 2021; Santomauro et al. 2021). These drugs help withstand frustration and exhaustion given the demanding standards imposed, including the academic environment of postgraduate students (Alvarenga and Dias 2021).

Participants using continuous medications were 4.24 times more likely to use psychotropic drugs. The pandemic influenced the irrational use and, sometimes, abuse of medications, and its consequences extend beyond the COVID-19 context (Alves et al. 2021). This study showed that 39.2% of postgraduate students were using continuous medications, and 32.5% were taking unprescribed drugs. Directed care beyond medication must be promoted, including alternative or complementary therapies to improve mental health (Cezário et al. 2024).

Participants who reported taking time off from activities were 2.62 times more likely to use psychotropic medications. A survey conducted in 2020 in the United Kingdom identified that approximately 50% of postgraduate students abandoned research, citing reasons such as difficulty finding employment, negative impact on mental health, and prioritizing the pursuit of higher-quality personal and professional lives (Moran et al. 2020). It is worth considering psychological suffering as a possible reason for taking time off, given that psychotropic medications are the first choice for treating mental disorders. However, the performed analysis does not allow this inference.

The mental health crisis within the academic environment is global, with reports of work overload, harassment, and abuse often related to scholarships and knowledge production in high-level journals (Hall 2023). Such exposure in the academic environment may overload and increase the susceptibility to absences and leaves during postgraduate studies.

The participants who tested positive for COVID-19 were 1.51 times more likely to use psychotropic medications. Prolonged quarantine measures and the pandemic created conditions that helped develop mental disorders (Dobrodeeva et al. 2022). Studies conducted early in the pandemic identified psychiatric symptoms, such as posttraumatic stress disorder (PTSD), depression, and anxiety in post-COVID-19 individuals (Bo et al. 2020; Mazza et al. 2020). Additionally, the prevalence of mental disorders after the COVID-19 diagnosis increased for those without previous psychiatric history (Taquet et al. 2021). Such findings have raised concerns about the higher burden of mental health conditions since the COVID-19 pandemic onset (Sanborn et al. 2023).

Participants who used illicit drugs during the pandemic were 1.83 times more likely to use psychotropic medications. Research with undergraduate students during the pandemic identified that those using illegal substances had a higher likelihood of psychiatric disorders and, consequently, psychotropic medication use (Kantorski et al. 2023). A possible explanation is that the postgraduate environment may help develop anxiety and depression symptoms, causing social isolation and facilitating the use of legal and illicit substances as a coping mechanism (Boehs 2020).

Participants from northern Brazil were 55.0% less likely to use psychotropic medications. This finding may regard the higher challenges in accessing health services in that region, thus limiting the identification and diagnosis of possible mental disorders. Especially in the north, where health services are more restricted, particularly concerning mental health, the organization of services and medication distribution may impact psychotropic medication access for treating health problems (Rodrigues et al. 2020).

Conversely, participants from southern Brazil were 25% less likely to use psychotropic medications. Data from the National Survey on Access, Use, and Promotion of Rational Use of Medicines in Brazil (PNAUM) conducted before the pandemic shows this region has the highest percentage of psychotropic medication use in Brazil. However, this use relates to older age and conditions for obtaining these medications (Rodrigues et al. 2020). Notably, the southeast region has the highest socioeconomic index in Brazil and the highest number of professionals, which may favor the initiation of psychotropic use by postgraduate students.

This study showed the prevalence of young adults without health insurance, which may have been reflected in the lower use of health services during the COVID-19 pandemic and, consequently, a lower chance of using psychotropic medications. As these drugs require controlled prescription and supervision, participants who underwent psychological counseling were 46% less likely to use them. In response, psychotherapeutic treatment is an excellent care strategy and may help improve mental health and reduce psychotropic medication use (Quemel et al. 2021).

Psychotropic medications and psychotherapy have proved effective in treating most mental disorders. Future research investigating the influence of the COVID-19 pandemic on psychotherapy alone and combined with psychotropic medications might provide relevant insights into this issue (Sanborn et al. 2023).

Therefore, the interpretation of this study's findings should consider various limitations. The first relates to the cross-sectional design, which does not allow the establishment of a causal relationship. There was a risk of selection bias despite the large sample, as volunteers were evidently concerned about their mental health and may present different characteristics from the general population. Finally, self-administered questionnaires may introduce recall errors, information biases, and a potential response bias, as participants may hesitate to disclose sensitive or embarrassing information. Despite these limitations, this study strongly indicates the high vulnerability of postgraduate students to mental illnesses and psychotropic medication use.

5. Conclusions

Postgraduate students showing psychological symptoms, diagnosed with mental disorders, using continuous medications, not feeling well over time, taking time off from academic activities, testing positive for COVID-19, or using illicit drugs are particularly vulnerable to psychotropic medication use and must be identified within postgraduate courses. The findings of this study should support mental health promotion policies and harm prevention among students in higher education institutions. Longitudinal and

comprehensive studies are also suggested to elucidate cause-and-effect relationships regarding psychotropic medication use by postgraduate students.

Authors' Contributions: MOLIN, N.P.F.: Substantial contributions to the conception or design of the work, or the acquisition, analysis, or interpretation of data for the work, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; JÚNIOR, A.C.P: Drafting the work or reviewing it critically for important intellectual content, final approval of the version to be publishe; DONATO, G.: Drafting the work or reviewing it critically for important intellectual content, final approval of the version to be published; JANTSCH, L.B.: Drafting the work or reviewing it critically for important intellectual content, final approval of the version to be published; LACCHINI, R.: Drafting the work or reviewing it critically for important intellectual content, final approval of the version to be published; MIASSO, A.I.: Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work, final approval of the version to be published, Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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