

MENTAL HEALTH AND QUALITY OF LIFE IN BRAZILIAN MASTER'S AND DOCTORAL STUDENTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Introduction: While academic environments are widely recognized as high-stress settings, there is still a scarcity of research investigating this issue. **Objective:** To determine the rates of depressive, anxiety, and burnout symptoms alongside quality of life in a sample of postgraduate students, and to investigate the factors associated with these outcomes. **Methods:** A cross-sectional web survey was conducted with 927 Master's and Doctoral students across Brazil. Generalized Anxiety Disorder (GAD-7), Patient Health Questionnaire-9 (PHQ-9), Maslach Burnout Inventory (MBI) and European Health Interview Surveys Quality of Life (EUROhis-QOL-8) were used in this study. **Results:** Moderate-to-severe anxiety and depressive symptoms were reported by (mean) and (mean) of respondents, while were at imminent risk of burnout. Overall quality of life was low (mean:), and rated their mental health as poor or very poor. Risk factors included younger age and a history of psychiatric illness, both of which predicted higher symptom severity and lower quality of life. **Conclusion:** Our findings underscore a significant mental health crisis among Brazilian postgraduate students, emphasizing the urgent need for institutional policies aimed at promoting mental health support and enhancing overall student well-being.

Keywords: *Depression; Anxiety; Burnout professional; Students.*

INTRODUCTION

Mental health is a fundamental pillar of well-being, influencing individual quality of life, social connections, and economic growth¹. According to the World Health Organization, the global prevalence of mental disorders was 1 in every 7 people in 2021¹. Emotional and psychological distress directly impact the quality of life and overall health in society, contributing to functional impairment, reduced life expectancy, and premature mortality^{2,3}.

Within academic environments, postgraduate students represent a population of growing concern due to the substantial psychological demands associated with advanced academic training and the challenges inherent to postgraduate education. Increasing evidence from different countries indicates that postgraduate students experience disproportionately high levels of psychological distress, with elevated rates of anxiety, depression, burnout, and suicidal ideation compared with the general population and other highly educated groups^{4,5}. In the United States, 39% of master's and doctoral students (PhD) report symptoms of moderate to severe depression, with PhD students being 6 times more likely to experience anxiety compared to the general population⁴. In Brazil, a non-structured survey showed alarming levels of stress and psychological distress in postgraduate students with 74% and 25% of participants reporting symptoms of anxiety and depression, respectively⁵. Compared to studies from Western countries, Chinese postgraduate students also reported mental health issues, albeit at lower levels than those observed in Western populations⁶. This global concern has prompted calls for greater

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institutional support and the implementation of preventive strategies aimed at promoting mental health and well-being throughout doctoral training.

Furthermore, common mental health symptoms have been associated with diminished quality of life among students. A systematic review and meta-analysis encompassing 36 studies (N = 24,704) reported an overall prevalence of depressive symptoms of 27% among high school and university students, with depression consistently associated with lower quality of life, particularly within the psychological domain⁷. Corroborating these findings, a cross-sectional study of 1,616 Brazilian undergraduates demonstrated that anxiety symptoms were more prevalent among women (47.4%) than men (26.9%) and constituted the strongest independent predictor of reduced quality of life, correlating negatively with all quality-of-life domains, particularly health satisfaction and daily energy⁸. These convergent findings underscore the necessity of systematic screening for depression and anxiety within academic settings, not merely to facilitate early diagnosis, but to identify students at greatest risk of impaired psychological, social, and functional well-being.

Mental health outcomes among postgraduate students are determined by a multifactorial interplay of variables encompassing academic demands, psychosocial vulnerabilities, individual/behavioral, sociodemographic characteristics, and health-related conditions^{9,10}. Moreover, in Brazil, socioeconomic factors such as job insecurity, lack of professional regulation, unstable relationships with supervisors, and inadequate compensation relative to the local cost of living exacerbate the competitive and anxiety-inducing environment¹¹. Considering the multifaceted dynamic between these factors, elucidating the determinants of mental health and quality of life among master's and doctoral students constitutes a critical research priority, as it enables the identification of modifiable risk factors. Therefore, the integration of routine mental health assessment into student support services would enable earlier and more targeted interventions, thereby fostering both improved quality of life and academic outcomes, rather than addressing psychological distress only once it has reached clinical severity.

Therefore, the present study aimed to assess the mental health status including symptoms of depression, anxiety, burnout and quality of life of master's and doctoral students in Brazil and examine associated factors.

METHODS

Study Design, Setting and Participants

This was an exclusively online, cross-sectional survey conducted via a single-administration digital questionnaire. Recruitment was carried out through

invitations posted on social media platforms (Instagram® and Facebook®) targeting the eligible population, as well as through direct outreach to the administrative offices of multiple stricto sensu graduate programs across different regions of Brazil, who were asked to forward the invitation to current students and alumni. A snowball sampling technique was also employed, whereby participants were asked to share the invitation with others belonging to the same target population. Data were collected between August 24 and November 10, 2023, using REDCap®, a secure software platform for capturing and managing online scientific surveys (<https://project-redcap.org/>).

Participants were master's and doctoral students, aged ≥18, and current enrollment in, or graduation from, a stricto sensu (master's or doctoral) graduate program in Brazil, regardless of funding source (e.g., CAPES, CNPq, or state-level FAPs) or field of study.

The survey link was publicly accessible to any individual who received the invitation, without password protection or restricted access; however, eligibility criteria were applied at the response level, and ineligible or duplicate responses were subsequently excluded during data cleaning. Participants were explicitly asked whether they had previously completed the questionnaire. Those who answered affirmatively were automatically redirected to a thank-you page, and the survey was terminated without recording a new entry. Additionally, collected data were reviewed during data cleaning to identify and exclude any participants who had indicated prior participation.

Given the recruitment strategy employed in the present study, the possibility of voluntariness bias, sampling, social desirability bias and recall bias cannot be excluded and warrants consideration when interpreting the findings.

Ethical Considerations

Ethical approval for the “*Saúde Mental na Pós-graduação*” project was granted by the Research Ethics Committee of the Hospital de Clínicas de Porto Alegre in July 2023, following registration on Plataforma Brasil (CAAE: 69747723.9.0000.5327). All participants provided informed consent online. The study was conducted in accordance with the Declaration of Helsinki (1964), as updated by the 75th WMA General Assembly (Helsinki, Finland, October 2024), and complied with Brazilian regulations, including CNS Resolution No. 466/2012 and CNS/Conep Operational Guidelines No. 001/2013 and No. 510/2016.

Variables

Outcomes:

- a. *Patient Health Questionnaire-9* (PHQ-9): it is a 9-item, self-reported instrument to assess depressive symptoms¹². The total score allows

depression severity to be classified as minimal (1–4), mild (5–9), moderate (10–14), moderately severe (15–19), or severe (20–27).

- b. *Generalized Anxiety Disorder* (GAD-7): it is a 7-item, self-reported questionnaire to assess anxiety symptoms¹³. The total score allows anxiety severity to be classified as none/normal (0–4), mild (5–9), moderate (10–14), and severe (15–21). Notably, a cut-off score of ≥ 8 is considered indicative of clinically significant anxiety symptoms.
- c. *Maslach Burnout Inventory - Student Survey* (MBI-SS): this 15-item questionnaire, specifically adapted for students, measures the risk of Burnout Syndrome¹⁴. It comprises 6 items, with items 1, 3, and 5 positively worded and items 2, 4, and 6 negatively worded. The domains assessed include the tendency toward rapid recovery following difficult situations, difficulty coping with stressful situations, rapid recovery after a stressful event, difficulty recovering during difficult situations, difficulty facing challenging situations, and the tendency toward prolonged recovery from setbacks. The degree of agreement with each statement ranges from 1 to 5, and the total score is calculated as the mean of the summed items. This score allows resilience to be classified as low (1–2.99), normal (3–4.30), or high (4.31–5).
- d. *Europe Health Interview Surveys Quality of Life Abbreviated Instrument* (EUROhis-QOL-8)¹⁵. This short, eight-item, cross-culturally validated questionnaire was designed to measure subjective quality of life and has four domains: physical, psychological, social, and environmental¹⁵⁻¹⁶. The total score ranges from 8 to 40. Scores significantly below reflect poor perceived quality of life.
- e. Subjective physical and mental health perceptions were assessed as well.

Exposure variables

Sociodemographic characteristics (including sex, age, race, income, etc.) and medical history were obtained through participant-completed questionnaires.

Independent variables

The questionnaire also included items in which participants evaluated their graduate program and identified actions that could be implemented to improve mental health within the academic environment.

Study size

The reference population was estimated at approximately 118,000 master's and doctoral students

enrolled in stricto sensu graduate programs in Brazil, according to data from the Ministry of Education. Sample size calculation was based on a lifetime depression prevalence of 15.5% in the Brazilian population (Ministry of Health, 2023), assuming a 5% alpha error, a 95% confidence level, and an anticipated non-completion rate of 30%, yielding a minimum requirement of 431 completed questionnaires to ensure a representative sample. Given an estimated invitation response rate of approximately 50%, based on the research team's prior experience, a minimum of 862 individuals were targeted for invitation.

Statistical analysis

Descriptive analyses were conducted, with quantitative data expressed as mean $\pm$ standard deviation ($\pm$ SD) or median and interquartile range ([IQR], 25th-75th percentiles), according to the Shapiro-Wilk distribution test. Qualitative variables were described in terms of absolute (n) and relative (%) frequencies. A collinearity analysis was performed to check the orthogonality of the variables, and then the correlation analysis model was defined. Possible associations between qualitative variables were analyzed using the Pearson Chi-Square test with adjusted residual analysis (χ^2), while non-linear correlations were verified using the Spearman test (ρ). Data double entry, review, and analysis were performed using the Statistical Package for the Social Sciences (SPSS), version 29.0 [PASW Statistics for Windows, Version 29.0. Chicago: SPSS® Inc.].

RESULTS

Sample Characterization

A total of 1,119 individuals agreed to participate in the study, with 927 being included in the analysis. The sociodemographic profile of the sample showed a with a mean age of 31 (27-37) with predominance of female participants, as illustrated in Table 1.

The geographical distribution of participants shows a strong concentration in the South region (65.33%), followed by the Northeast (16.97%), Southeast (12.83%), North (3.42%), and CenterWest (1.43%).

Psychiatric Symptoms and Use of Psychotropic Drugs

The assessment of anxiety and depression symptoms, according to the GAD-7 and PHQ-9 scales, showed a mean score of 10.97 (6.63) and 9.42 (5.56), respectively. Approximately 80% of students reported experiencing anxiety symptoms, with 46.2% of them experiencing moderate to severe severity levels, as illustrated in Figure 1A. The prevalence of depressive symptoms was 81%, with 52% of them classified as moderate to severe levels Figure 1B. Moreover,

27.5% of postgraduate students self-reported having a medical diagnosis of an anxiety disorder, while 21.6% reported a diagnosis of depressive disorder. The distribution of self-reported psychiatric disorders and the proportion of participants currently receiving psychological or psychiatric care are shown in Table 2. Approximately half of them (52.8%) reported ongoing use of psychotropic medications. The most used classes were anxiolytics (22.4%) and antidepressants (25.5%), followed by herbal medicines (17.9%),

hypnotics (12.0%), and antipsychotic (2.5%) drugs. At least 11.3% of students reported using three or more drugs.

Finally, approximately 80% of students were satisfied with their physical health, and around 75% of them practice regular physical exercise to promote health and well-being. In contrast, 35% of them rated their mental health as poor or very poor overall. The mean EUROhis-QOL-8 score was 16.39 (5.9), which indicates poor quality of life.

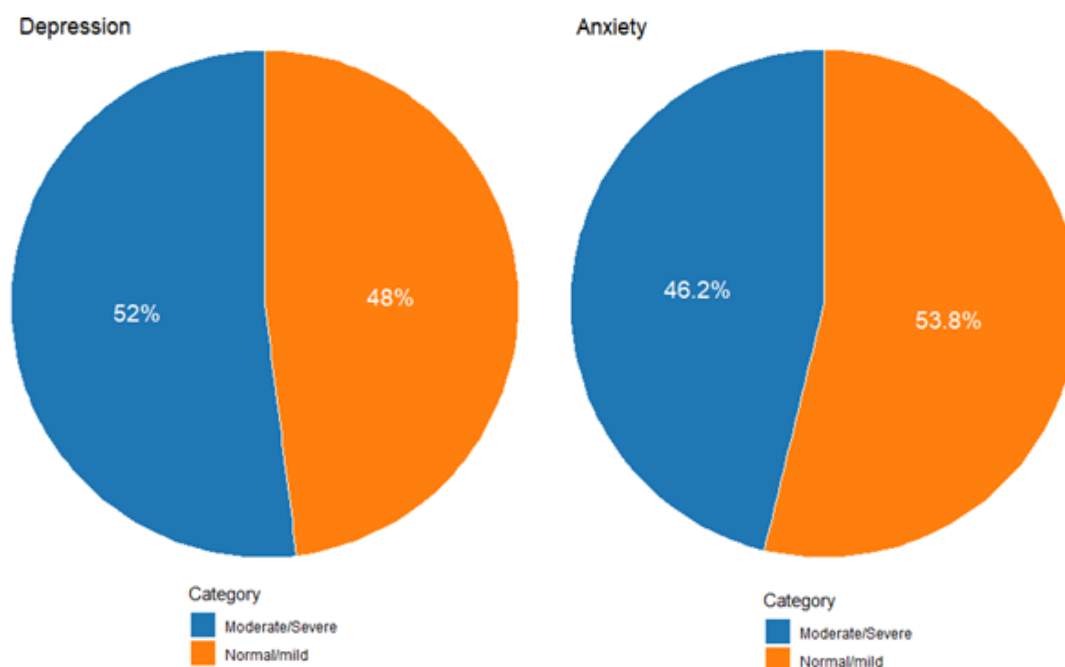
Table 1: Sociodemographic and Academic characteristics of the participants

Characteristics	n	%
Gender		
<i>Male</i>	275	29.6
<i>Female</i>	641	69.2
Race or Ethnicity		
<i>White</i>	697	75.1
<i>Black</i>	60	6.5
<i>Brown</i>	152	16.4
<i>Other</i>	19	2.1
Sexual Orientation		
<i>Bisexual</i>	126	13.6
<i>Heterosexual</i>	672	72.4
<i>Homosexual</i>	101	10.9
<i>Other</i>	16	1.7
<i>Prefer not to answer</i>	13	1.4
Income		
<i>Up to 1 minimum wage^a</i>	94	10.1
<i>1 to 3 minimum wages</i>	465	50.1
<i>3 to 6 minimum wages</i>	284	30.6
<i>More than 7 minimum wages</i>	85	9.2
Work hours ^b		
<i>Up to 20 hours per week</i>	153	28.2
<i>Up to 30 hours per week</i>	81	16.5
<i>Up to 40 hours per week</i>	151	30.8
<i>40 or more hours per week</i>	105	21.4
Level of education		
<i>Master's</i>	489	52.7
<i>Doctorate</i>	398	42.9
<i>Post-doctorate</i>	13	1.4
Postgraduate scholarship	567	61.1
Full-time dedication	416	44.8

Data expressed as absolute (n) and relative (%) frequencies. Legend: CAPES – Coordenação de Aperfeiçoamento de Pessoal de Nível Superior do Ministério da Educação. ^aMinimum wage in Brazil in 2023, equal to R\$ 1320.00. ^bExcluding the time dedicated to postgraduate research activities (parallel occupation).

Table 2: Distribution of self-reported psychiatric disorders and the proportion of participants currently receiving psychological or psychiatric care.

Psychiatric disorder	Total (N = 927)	Psychological or psychiatric care?			*p-value
		No Care (n = 348)	At University (n = 13)	Outside University (n = 566)	
Anxiety Disorder					
No	673 (72.6)	309 (88.8)	11 (84.6)	353 (62.4)	≤ 0.001
Yes	254 (27.4)	39 (11.2)	2 (15.4)	213 (37.6)	
Depressive Disorder					
No	727 (78.4)	319 (91.7)	12 (92.3)	396 (70.0)	≤ 0.001
Yes	200 (21.6)	29 (8.3)	1 (7.7)	170 (30.0)	
Bipolar Disorder					
No	903 (97.4)	348 (100.0)	13 (100.0)	542 (95.8)	≤ 0.001
Yes	24 (2.6)	0 (0.0)	0 (0.0)	24 (4.2)	
Obsessive Compulsive Disorder					
No	907 (97.8)	345 (99.1)	13 (100.0)	549 (97.0)	0.083
Yes	20 (2.2)	3 (0.9)	0 (0.0)	17 (3.0)	
Neurodevelopmental Disorder					
No	878 (94.7)	343 (98.6)	12 (92.3)	523 (92.4)	≤ 0.001
Yes	49 (5.3)	5 (1.4)	1 (7.7)	43 (7.6)	
Stress-related disorder					
No	874 (94.3)	342 (98.3)	13 (100.0)	519 (91.7)	≤ 0.001
Yes	53 (5.7)	6 (1.7)	0 (0.0)	47 (8.3)	
Other					
No	911 (98.3)	346 (99.4)	13 (100.0)	552 (97.5)	0.090
Yes	16 (1.7)	2 (0.6)	0 (0.0)	14 (2.5)	

**Figure 1:** Frequency of severity of (A) anxiety and (B) depression according to GAD-7 and PHQ-9 scales. Data are presented as the percentage of normal/mild and moderate/severe symptoms.

The mean score of the MBI-SS was 50.13 (13.14), indicating a high level of burnout, with a significantly higher prevalence among females than male participants (77.5% vs. 67%, $p < 0.008$). In the overall sample, 51.0% of participants were classified as being at imminent risk of burnout, while 22.2% showed signs of early-phase burnout, and 0.9% were experiencing acute burnout. A total of 25.2% were at possible risk, and only 0.6% had no or minimal risk (Figure 2). Among male participants, 46.2% were at imminent risk, 19.3% in early-phase burnout, and 1.5% in acute burnout, with 32.0% at possible risk and 1.1% with no or minimal risk. Among female participants, 53.5% were at imminent risk, 23.4% at early-phase, 0.6% at acute burnout, while 22.0% were at possible risk and 0.5% had no or minimal risk.

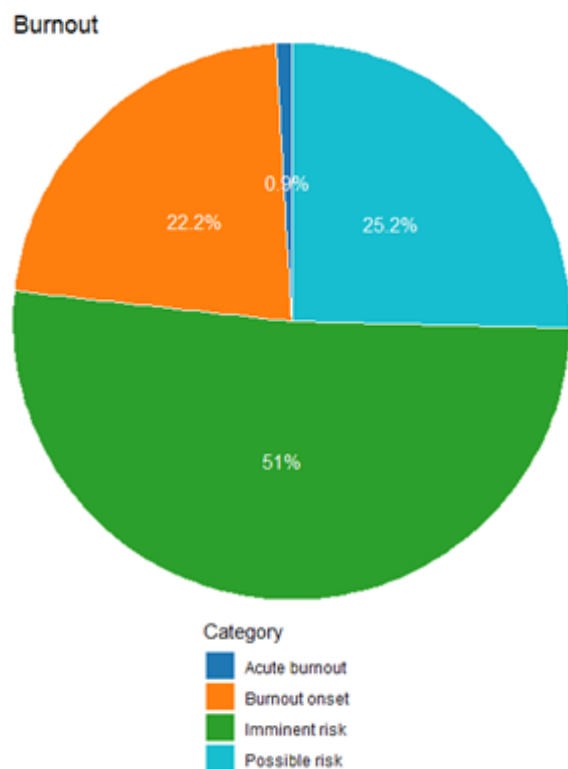


Figure 2: Frequency of burnout risk according to MBI-SS in the sample. Data are the percentage of severity of burnout risk.

Variables associated with anxiety, depression, burnout, and quality of life

As demonstrated in Table 3, age was negatively correlated with depression ($\rho = -0.245$, $p \leq 0.001$), anxiety ($\rho = -0.214$, $p \leq 0.001$), and risk of burnout ($\rho = -0.136$, $p \leq 0.001$), and positively correlated with quality of life ($\rho = 0.150$, $p \leq 0.001$), showing that younger students have poorer mental health outcomes. Women showed a weak correlation with depression ($\rho = 0.094$, $p = 0.004$) and anxiety ($\rho = 0.067$, $p = 0.042$). Non-white ethnicity was also weakly associated with depression ($\rho = 0.087$, $p = 0.008$) and anxiety ($\rho = 0.117$, $p \leq 0.001$). Non-heterosexual orientation showed small, but statistically significant correlation with depression ($\rho = 0.152$, $p \leq 0.001$), anxiety ($\rho = 0.122$, $p \leq 0.001$), risk of burnout ($\rho = 0.100$, $p = 0.003$), and quality of life ($\rho = -0.135$, $p \leq 0.001$). The Higher level of study (doctoral students) was significantly associated with lower depression ($\rho = -0.216$, $p \leq 0.001$), anxiety ($\rho = -0.170$, $p \leq 0.001$), and risk of burnout ($\rho = -0.094$, $p = 0.004$) scores, and higher quality of life ($\rho = 0.291$, $p \leq 0.001$), showing a protective effect according to the academic advancement. Having a paid job in addition to research showed a weak association with depression ($\rho = -0.125$, $p \leq 0.001$) anxiety ($\rho = -0.105$, $p = 0.001$) scores, and with quality of life ($\rho = 0.164$, $p \leq 0.001$). The income variable displayed the same pattern of correlations as the level of study, reinforcing the protective influence of socioeconomic status on mental health. Additionally, history of psychiatric disorder was associated with worse outcomes in all domains, including higher depression ($\rho = 0.196$, $p \leq 0.001$), anxiety ($\rho = 0.165$, $p \leq 0.001$), risk of burnout ($\rho = 0.110$, $p \leq 0.001$) scores, and lower quality of life ($\rho = -0.115$, $p \leq 0.001$). Psychological support was positively correlated with depression ($\rho = 0.157$, $p \leq 0.001$), anxiety ($\rho = 0.151$, $p \leq 0.001$), and risk of burnout ($\rho = 0.087$, $p = 0.008$), and negatively associated with quality of life ($\rho = -0.067$, $p = 0.043$), likely indicating that students with more psychological distress are more likely to seek help. CAPES area (Exact and Health Sciences) did not show significant associations with most mental health outcomes, except for a weak positive correlation with quality of life ($\rho = 0.079$, $p = 0.016$).

Table 3: Relationship between variables, psychiatric symptoms, and quality of life.

Variables	Psychiatric symptoms							
	Depression		Anxiety		Quality of life		Burnout risk	
	ρ	p-value	ρ	p-value	ρ	p-value	ρ	p-value
Age	-0.245	≤ 0.001	-0.214	≤ 0.001	0.150	≤ 0.001	-0.136	≤ 0.001
Female	0.094	0.004	0.067	0.042	-0.042	0.201	0.064	0.053
Race ^a	0.087	0.008	0.117	≤ 0.001	-0.123	≤ 0.001	0.028	0.401

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Table 3: Continuation.

Variables	Psychiatric symptoms							
	Depression		Anxiety		Quality of life		Burnout risk	
	ρ	p-value	ρ	p-value	ρ	p-value	ρ	p-value
Sexual orientation ^b	0.152	≤0.001	0.122	≤0.001	-0.135	≤0.001	0.100	0.003
Level of education ^c	-0.216	≤0.001	-0.170	≤0.001	0.291	≤0.001	-0.094	0.004
Employed ^d	-0.125	≤0.001	-0.105	0.001	0.164	≤0.001	-0.055	0.097
Income	-0.216	≤0.001	-0.170	≤0.001	0.291	≤0.001	-0.094	0.004
Psychological support	0.157	≤0.001	0.151	≤0.001	-0.067	0.043	0.087	0.008
Psychiatric disorder	0.196	≤0.001	0.165	≤0.001	-0.115	≤0.001	0.110	≤0.001
CAPES area ^e	-0.061	0.065	-0.030	0.357	0.079	0.016	0.013	0.688

Legenda: a=non-white ethnicity; b=non-heterosexual; c=Doctoral students or more; d=Having a paid job in addition to graduate course; e=Exact and Health sciences ρ – rho de Spearman. CAPES= Coordenação de Aperfeiçoamento de Pessoal de Nível Superior do Ministério da Educação. Values in Bold indicate significant correlations between variables. $P < 0.05$

Graduate Program Evaluation

Table 4 presents the assessment of students regarding their Graduate Program (PPG). Overall, they reported significant gaps in mental health support, including low awareness of help resources, limited

confidence in program preparedness, discomfort seeking support, and a high prevalence of dropout considerations due to emotional distress. We also recorded students' responses regarding some actions that graduate programs could invest in to improve their mental health.

Table 4: Graduate Program Evaluation

Variable	Total (N = 927)
I feel comfortable sharing my concerns and problems with the Graduate Program coordination and/or my advisor	
Strongly Disagree	198 (21.4)
Disagree	244 (26.3)
Neither agree or disagree	148 (16.0)
Agree	241 (26.0)
Strongly agree	96 (10.4)
I feel that I have the space and resources I need at the University to achieve academic success	
Strongly disagree	97 (10.5)
Disagree	216 (23.3)
Neither agree or disagree	229 (24.7)
Agree	297 (32.0)
Strongly agree	88 (9.5)
I feel well-prepared by the training I received in my lab or research environment	
Strongly disagree	92 (9.9)
Disagree	197 (21.3)
Neither agree or disagree	255 (27.5)
Agree	290 (31.3)
Strongly agree	93 (10.0)
I am satisfied with the academic mentoring I receive from my advisor	
Strongly disagree	77 (8.3)
Disagree	148 (16.0)
Não concordo nem discordo	161 (17.4)
Agree	315 (34.0)
Strongly agree	226 (24.4)

Continue...

Table 4: Continuation.

Variable	Total (N = 927)
My advisor and the Graduate Program are prepared to deal with students' mental health issues	
Strongly disagree	215 (23.2)
Disagree	230 (24.8)
Neither agree or disagree	281 (30.3)
Agree	138 (14.9)
Strongly agree	63 (6.8)
I know where and how to seek help or counseling at the University in case of physical or mental health needs	
Strongly disagree	286 (30.9)
Disagree	307 (33.1)
Neither agree or disagree	127 (13.7)
Agree	146 (15.7)
Strongly agree	61 (6.6)
I have considered quitting graduate school due to psychological or emotional issues	
Strongly disagree	180 (19.4)
Disagree	139 (15.0)
Neither agree or disagree	91 (9.8)
Agree	211 (22.8)
Strongly agree	306 (33.0)

Data presented as absolute (n) and relative frequencies (%).

DISCUSSION

The present study demonstrated the occurrence of mental health problems among Brazilian master's and doctoral students. Approximately 80% of participants reported symptoms of anxiety and depression, with 46.2% and 52.0%, respectively, meeting criteria for moderate-to-severe symptom severity^{6,17}. While these prevalence estimates were substantially higher than those reported among Chinese postgraduate students assessed using the same screening instruments (GAD-7 and PHQ-9), they were more comparable to those observed in Australian PhD students, although the rates observed in the present study remained higher. These findings underscore a critical and persistent mental health burden within the postgraduate academic community, particularly within low- and middle-income countries and highlight the urgent need for targeted institutional strategies to promote mental health, improve access to care, and foster a supportive academic environment.

The considerable rates of anxiety and depression symptoms observed in our study may reflect a combination of socioeconomic and cultural factors that are especially pronounced in low- and middle-income countries. In our sample, more than 60% relied on postgraduate scholarships as their primary source of financial support, over half reported household incomes of up to three minimum wages, and a substantial proportion balanced postgraduate training with paid employment (working 30 hours or more per week) indicating a significant additional

workload and potential strain on their time and energy dedicated to their studies. The combination of financial constraints, intensive academic demands, uncertain career prospects, and the challenge of balancing work and postgraduate responsibilities may contribute to increased vulnerability to anxiety and depression among Brazilian postgraduate students. These factors may also help explain why half of the participants were classified as being at imminent risk of burnout, with this risk being more pronounced among women. Indeed, the prolonged exposure to academic pressure combined with financial insecurity and work-related demands has been consistently associated with emotional exhaustion and reduced psychological well-being among postgraduate students^{5,6}. This observation is corroborated by qualitative research involving 14 master's students navigating the dual demands to work and study, which revealed elevated levels of physical and psychological exhaustion¹⁸. Participants reported experiencing fatigue, lassitude, and exhaustion, alongside stress-related symptoms stemming from their demanding schedules and academic pressures. Consequently, the necessity of balancing work and study likely exacerbates symptoms of anxiety and stress, thereby contributing to burnout among graduate students^{18,19}. These challenges are further exacerbated by contextual factors characteristic of the Brazilian academic environment, including labor market instability, uncertainty regarding career opportunities after degree completion, the broader social devaluation of scientific work and inadequate institutional support.

Among the sociodemographic characteristics examined, age was negatively correlated with depression, anxiety symptoms and burnout risk. This result is congruent with the premise that enhanced life experience and increased financial stability are positively correlated with mental well-being. As individuals progress through the lifespan, they typically accrue experiences to managing adversity²⁰. Conversely, younger individuals are frequently within a developmental stage wherein coping mechanisms are still emergent, and the transition to postgraduate education can impose supplementary emotional demands and, consequently, heighten levels of stress and anxiety²¹. This age-related susceptibility suggests that younger students may encounter more pronounced challenges in managing academic exigencies due to their comparative inexperience in negotiating the intricacies of integrating professional, academic, and personal domains²². Moreover, race and sexual orientation emerged as significant, albeit modest, determinants of mental health outcomes and quality of life among postgraduate students. These findings are consistent with evidence indicating that racial and ethnic minority students frequently encounter systemic barriers and discrimination, factors that can elevate stress levels and contribute to adverse mental health outcomes²³. Likewise, students identifying as LGBTQ+ may experience distinct stressors, including social stigma and insufficient institutional support, which can further compromise their mental well-being²⁴. Although the magnitude of these associations was relatively small, the results suggest that broader social and structural inequalities may contribute to disparities in mental health and quality of life within postgraduate education.

Similarly, students with a history of psychiatric disorders may represent another particularly vulnerable subgroup. In our sample, 20–30% of students who self-reported a prior psychiatric diagnosis showed a positive association with current symptoms of anxiety, depression, and burnout. These findings align with existing evidence on the elevated risk of symptom recurrence among individuals with pre-existing psychiatric conditions^{25,26}, highlighting the complex interplay between prior mental health status, socioeconomic stressors, and the demands of the academic environment in shaping the well-being of postgraduate students. Recognizing the interplay of these factors is crucial for achieving a comprehensive understanding of the vulnerabilities impacting postgraduate students and, consequently, for the subsequent formulation of targeted interventions designed to promote inclusivity and strengthen mental health support systems and ultimately improve quality of life within academic settings.

Moreover, limited institutional investment in student mental health, insufficient training of academic

advisors to recognize psychological distress, and barriers to accessing affordable and effective mental health care may further contribute to the burden of mental health problems among postgraduate students. Although the results of this study reflect the broader social reality of Brazil, they also show specific vulnerabilities that affect the psycho-emotional well-being of master's and doctoral students. Collectively, high levels of stress inherent in their daily routines, financial restriction stemming from insufficient income, and professional instability within the research career trajectory contribute to an increased risk of burnout and psychiatric symptoms in this sample. Furthermore, the absence of policies from universities and the unpreparedness of advisors and graduate programs contribute to the worst in the mental health of students. Indeed, academic institutions should offer support services or implement preventative measures regarding the mental health of their community, promoting well-being in work and study environments, where students and faculty members coexist for extended periods. Indeed, over half of the students who answered our survey reported intention to abandon their postgraduate studies, with at least one-third of them having already done so, specifically due to psycho-emotional challenges. These could explain, in part, the elevated 38.5% attrition rate in *stricto sensu* postgraduate programs in Brazil²⁷. The devaluation of science among the general population also appears to contribute to this elevated attrition rate in postgraduate programs in Brazil.

Several methodological limitations inherent to the online survey design must be considered when interpreting these findings. First, the voluntary nature of web-based recruitment introduces self-selection bias, as individuals experiencing higher levels of psychological distress or possessing a stronger interest in mental health topics may have been more inclined to participate. Second, reliance on self-reported questionnaires leaves the data susceptible to recall and social desirability biases, potentially affecting response accuracy regarding sensitive personal experiences. Although our results did not represent a formal psychiatric diagnosis, they suggest a certain degree of psychological distress. Third, because participation required internet access and digital literacy, sampling and coverage biases may restrict the overall representativeness of the sample and limit the generalizability of these results to the broader population. Fourth, there was an overrepresentation of participants from the South of Brazil, which may reduce the geographical balance and affect the generalizability of the findings to other regions of the country. Finally, this is a cross-sectional study and does not provide causal evidence of risk factors and mental health outcomes found in our study.

In conclusion, this study showed the occurrence of mental health problems, notably symptoms of depression, anxiety, and burnout, in master's and PhD students in Brazil. These factors underscore the urgent necessity for targeted interventions and policies to promote mental well-being within the postgraduate academic environment. Particular attention should be given to students who present greater vulnerability, including those with a history of psychiatric illness and those experiencing academic or personal challenges that may increase psychological distress. Our data underscore the need for prioritizing mental health training for advisors within postgraduate programs, improving students' quality of life and academic

performance. Globally, these results underline the importance of implementing institutional policies to support students in coping with mental health problems and improving their well-being.

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