EVIDENCES OF A MENTAL HEALTH CRISIS IN BRAZILIAN POSTGRADUATE PROGRAMS

EVIDÊNCIAS DE UMA CRISE DE SAÚDE MENTAL EM PROGRAMAS DE PÓS-GRADUAÇÃO BRASILEIROS

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A B S T R A C T

Mental health in stricto sensu postgraduation programs has attracted attention and aroused interest among researchers. Although studies have shown that student's mental health can be affected by common practices in some programs, this article attempts to advance the discussion by identifying the prevalence of stress, depression, and anxiety among students in the Brazilian context and their associations with sociodemographic, behavioral, and interpersonal relationship characteristics. To fill gaps in this topic understanding, the DASS21 clinical instrument was applied through a virtual survey to a sample of 332 Brazilian master's and doctoral students. The results indicate that 25.6% of these students have some degree of stress, 30.8% of depression, and 43.4% of anxiety, with this prevalence being common in both men and women. Relationships with advisors, the research qualification process, financial uncertainties, and demands generated by course disciplines impact emotional conditions. This study contributes by revealing that students with mental disorders and those who do not have any - before entering a postgraduation program - can suffer from disorders when experiencing negative experiences during the course, to the point of generating a mental health crisis in the academic environment.

K E Y W O R D S

Mental health; postgraduation programs; DASS21

R E S U M O

O tema saúde mental na pós-graduação stricto sensu tem chamado atenção e despertado o interesse entre pesquisadores. Apesar de estudos revelarem que a saúde mental do estudante pode ser afetada por práticas comuns em alguns programas, este artigo tenta avançar na discussão objetivando identificar a prevalência de estresse, depressão e ansiedade entre estudantes e egressos de programas de pós-graduação brasileiros e suas associações com características sociodemográficas, comportamentais e de relacionamento interpessoal. No intuito de colmatar lacunas na compreensão desse tema, o instrumento clínico DASS21 foi aplicado por meio de um survey virtual numa amostra de 332 mestrandos e doutorandos brasileiros. Os resultados indicaram que 25,6% desses discentes têm algum grau de estresse, 30,8% de depressão e 43,4% de ansiedade, sendo essa prevalência comum tanto em homens quanto mulheres. Relacionamento com os orientadores, processo de qualificação, incertezas financeiras e demandas geradas pelas disciplinas são aspectos que impactam nas condições emocionais. Este estudo contribui ao revelar que tanto discentes que não apresentam nenhum tipo de transtorno mental quanto os que apresentam - antes de ingressar na pós-graduação - podem sofrer com distúrbios ao vivenciarem experiências negativas durante o curso, a ponto de gerar uma crise de saúde mental no meio acadêmico.

P A L A V R A S - C H A V E

Saúde mental; pós-graduação; DASS21.

INTRODUCTION

The mental health crisis is increasingly acknowledged as a critical public health concern, yet the prevalence of mental health issues among graduate students often goes unnoticed by institutions and relevant organizations (Evans et al., 2018; Tu et al., 2023). Graduate students are particularly prone to experiencing heightened levels of stress, depression, and anxiety, surpassing the averages observed in the general population (Prakash, Votta, & Deldin, 2023). Research indicates that 40% of graduate students suffer from moderate to severe anxiety, while 39% of them experience comparable levels of depression. In contrast, only 6% of the general population reports experiencing these conditions to any extent (Evans et al., 2018).

In doctoral programs, the prevalence of mental health issues is notably high, with approximately one-third of students at risk of developing disorders such as depression (Berry, Niven & Hazell, 2021; Levecque et al., 2017). These disorders not only compromise well-being but also increase suicidal ideation by 23% when considering depression alone and by 35% when anxiety is included (Moskow, Lipson, & Tompson, 2022). According to a report by the Council of Graduate Schools in the United States, over 55% of graduate students report dissatisfaction with their work-life balance. Furthermore, these students are six times more likely to experience anxiety and depression compared to the general population (CGS, 2021).

Certain challenges prevalent in the academic environment contribute to increased rates of mental illness among graduate students and faculty members. This highlights an urgent need for interventions and structural reforms aimed at addressing the underlying causes of stress and declining mental health within this population (Bjørndal, Antonsen & Jakhelln, 2022; Forrester, 2021). Thus, it is essential to broaden the discussion surrounding mental health in academia, especially in the Brazilian context.

Previous studies have highlighted a significant prevalence of stress, anxiety, and depression among academics. However, there is a noteworthy lack of empirical research in various cultural and educational contexts despite the global impact of these issues (Forrester, 2021; Hope & Henderson, 2014). Berry, Niven, and Hazell (2021) identified several predictors that influence the mental health of graduate students, emphasizing that mental health is affected by a combination of demographic, occupational, psychological, social, and relational factors. The authors have found that perfectionism, impostor thoughts, and inadequate supervision are consistently related to an increase in symptoms of mental health problems (Berry, Niven & Hazell, 2021).

Previous studies have indicated that analyses of students' emotional disorders concerning sociodemographic, behavioral, and interpersonal relationship aspects are still underdeveloped. Therefore, this article aims to identify the prevalence of stress, depression, and anxiety among students and graduates of Brazilian postgraduate programs and their relationships with sociodemographic, behavioral, and interpersonal relationship characteristics. The DASS-21 clinical instrument was applied to assess the prevalence of these disorders due to its robustness and scientific validity (Lovibond, 1995; Vignola & Tucci, 2014).

This study compared participants with psychological disorders to those without any mental health issues, focusing on sociodemographic, behavioral, and interpersonal relationship characteristics. This manuscript began with a literature review on mental health issues, followed by the method, the results analysis, and conclusions.

STRESS, ANXIETY AND DEPRESSION

Depression and anxiety are psychological disorders that, although distinct, share several symptoms. According to Clark and Watson (1991), these shared symptoms can be grouped into three main categories. The first category encompasses symptoms of general distress, such as malaise, nervousness, and difficulty relaxing. These symptoms are not exclusive to either disorder, underscoring the intersection between depression and anxiety.

The second category includes symptoms specifically related to anxiety, characterized by somatic tension and heightened excitement, which may present through physical signs such as a rapid heartbeat, sweating, and tremors. These signs indicate an exaggerated activation of the autonomic nervous system. Lastly, the third category, which is closely tied to depression, encompasses anhedonia - the inability to experience pleasure from activities that are typically enjoyable - and a diminished capacity to feel positive emotions like joy and satisfaction (Clark & Watson, 1991).

Anxiety can also be influenced by interactions with specific environmental elements, such as places, people and activities, which are evaluated in light of past experiences, activating brain systems with important adaptive functions. This process is a crucial aspect of behavioral risk assessment, which plays a vital role in an individual's adaptive capacity to environmental changes (Feng, Xu & Lei, 2023; Graeff, 2007; Vignola & Tucci, 2014).

Anxiety typically manifests as hyperarousal and physical tension, whereas depression is often marked by a diminished interest in daily activities and challenges in experiencing pleasure. Particularly, anxiety is defined by a pervasive sense of fear or apprehension, accompanied by tension or discomfort in anticipation of a perceived threat (Graeff, 2007). Symptoms of general distress shared by both disorders underscore the common intersection between anxiety and depression (Casselli et al., 2021; Watson et al., 1995). These negative emotions can escalate, creating a vicious cycle of cognitive and emotional decline (Feng, Xu & Lei, 2023; Kehne, 2007; Kehne & Cain, 2010).

Stress can be characterized as a response to harmful stimuli that involves alarm, resistance, and exhaustion. This response pattern encompasses initial alarm, followed by efforts to cope with or resist the stressor, ultimately leading to exhaustion if stress persists. These characteristics highlight the body's adaptive mechanisms to challenging situations, showing a complex interaction between psychological and physiological responses (Fink, 2016). Moreover, a substantial and negative effect of stress on both physical and psychological health has been documented. Specifically, a one-unit increase in stress is associated with a decrease of 0.756 units in overall health. This finding underscores the role of stress in contributing to various physical and mental health issues (Badri, Refaeli & Aljakoub, 2022).

An array of factors can contribute to the emergence of stress, anxiety, and depression. These factors encompass the ramifications of previous traumatic experiences, adverse childhood events, the difficulties encountered during the withdrawal process from addictive substances, and inherent genetic vulnerabilities (Kehne & Cain, 2010). Typically, the first episode of any of these disorders is triggered by more severe stressors than those that trigger subsequent episodes (Stroud, Davila & Moyer, 2008). Kvarta et al. (2021) highlight that both stressors experienced throughout life and current stress levels are related to depressive symptoms, especially in individuals who already have a history of previous diagnosis.

The influence of the environment on the manifestation of depressive symptoms is widely recognized, with studies pointing to its central role in the emergence of these symptoms (Kvarta et al., 2021; Stroud, Davila & Moyer, 2008). For example, in the context of the workplace, a lack of support may contribute to the development of depressive symptoms, while the presence of a supportive environment may mitigate these effects. In the domestic environment, the active engagement and involvement of parents in the educational experiences of adolescents are significant determinants of their mental well-being. This parental participation serves as a critical mitigating factor in promoting positive health outcomes among young individuals. Not only does this parental engagement boost young adults' academic performance, it also has a significant positive impact on their emotional well-being. A strong, caring family environment can protect against stress and anxiety, reducing the risk of depression. This support helps alleviate the everyday pressures young people face, increasing their resilience and mental health (Wang & Sheikh-Khalil, 2014).

MENTAL ILLNESS IN POSTGRADUATE STUDIES

Mental illness in postgraduate studies is a growing concern in the global scientific community, reflected in the literature that points to worrying rates of depression, anxiety and stress among students (Forrester, 2021; Tu et al., 2023). In this context, the statistical values are, on average, elevated when compared to the general population (Prakash & Votta; Deldin, 2023; Pinho et al., 2021).

Studies show that 40% of graduate students suffer from moderate to severe anxiety, and 39% face depression at similar levels. In comparison, only 6% of the general population experiences these conditions to any extent (Evans et al., 2018). In doctoral courses, the situation is even more critical: approximately one-third of students are at risk of developing mental disorders, such as depression (Berry, Niven & Hazell, 2021; Levecque et al., 2017).

Furthermore, these problems have been associated with various factors, including academic pressure, uncertainty about the professional future, and a lack of balance between personal and academic life (Forrester, 2021; Woolston, 2019). A study found that despite 85% of students spending more than 41 hours per week on their graduate programs, 74% failed to complete their studies within the allotted time. This data suggests that lack of dedication is not the main problem, suggesting that other factors may affect students' academic performance and well-being (Woolston, 2019).

In 2020, the COVID-19 pandemic caused major socioeconomic and behavioral changes, altering human relationships in interpersonal, work, and educational environments. This scenario negatively affected mental health, especially impacting graduate students and vulnerable groups, such as ethnic minorities (Sahu, 2020; Tu et al., 2023). The repercussions of the pandemic on mental health have underscored the imperative need for enhancing support systems and raising awareness regarding mental health within academic settings. This scenario emphasizes the critical importance of employing reliable diagnostic instruments to effectively address the emerging mental health challenges in this context (Pinho et al., 2021).

When looking at groups vulnerable to stress, anxiety, and depression disorders, women are particularly susceptible, with insomnia and other sleep disorders playing a significant role in mental health problems (Balijon et al., 2023). It is important to note that susceptibility to mental disorders is particularly evident among younger students, who constitute a significant portion of the academic population. Furthermore, individuals with a prior history of psychological issues are often more adversely impacted by the demanding nature of the academic environment (Balijon et al., 2023; Forrester, 2021; Tu et al., 2023). The intensely competitive nature of academia contributes to a pervasive stigma surrounding the pursuit of assistance, resulting in many students grappling with impostor syndrome. This psychological phenomenon, characterized by feelings of intellectual inadequacy and self-doubt, is frequently exacerbated by comparisons to peers who appear to be more successful (Forrester, 2021).

Research conducted across diverse geographical regions supports these findings at both undergraduate and postgraduate levels. For instance, a study carried out in Saudi Arabia indicated that a significant proportion of students experience heightened levels of stress, which they directly

correlate with issues related to anxiety and depression. (Alwhaibi, Alotaibi & Alsaadi, 2023). Similarly, a study in Vietnam highlighted the prevalence of moderate stress levels among students. This suggests the need for preventative mental health measures to help them cope with the challenges of the academic environment (Nguyen-Thi et al., 2023).

A more recent study analyzed reports and experiences that typify bullying from the perspective of master's and doctoral students. The results indicated that situations can constitute bullying from various sources, especially those originating from faculty advisors. They also found that bullying is related to depression, loss of confidence, decreased productivity, a desire to change career paths, stress, anxiety, and, in more severe cases, student suicide attempts. Despite this, due to asymmetrical power relations, the subtleties manifested in the aggressors' actions, and their prestigious positions, most students do not formalize the incident with their educational institutions (Costa & Paiva, 2023).

In the context of academic relationships, it is essential to emphasize that the coexistence between advisors and advisees constitute a pivotal factor in student well-being. Inadequate guidance practices, coupled with the inherent pressures of the academic environment, can exacerbate student mental health issues, thereby mirroring the significant challenges encountered by the teaching staff (Damaceno et al., 2019; Forrester, 2021; Tu et al., 2023). Also, it is essential to consider the perspectives and challenges encountered by teachers. Professional burnout is a persistent issue among educators (Skaalvik & Skaalvik, 2020). This phenomenon adversely impacts not only the quality of teaching but also student engagement (Bjørndal, Antonsen & Jakhelln, 2022; Wong et al., 2017).

Despite extensive research on teacher stress since the 1970s, this topic is still little addressed in teacher training, which is paradoxical considering the high turnover and burnout rates in the profession (Ansley et al., 2021). This indicates that the management of mental illnesses continues to be perceived primarily as an individual responsibility within the teaching profession (Bjørndal, Antonsen & Jakhelln, 2022). In this context, it becomes crucial to evaluate the relationship between advisor and advisee, aspects that are widely explored in leadership studies in the market, but still little developed in the academic environment.

Leadership styles can have varying effects on subordinates. For example, one study showed that in emergency situations, directive (autocratic) leadership helped reduce stress levels in highly stressed subordinates, while empowering (democratic) leadership had no significant effect (Curral et al., 2023). On the other hand, abusive leadership, which can be considered an extreme form of autocratic leadership, had even physical effects on subordinates and was associated with an increased risk of headache and neck pain, while transformational leadership, a style related to servant and democratic leadership, was associated with a decrease in these risks (Christensen et al., 2020).

Finally, when examining support within the public sector, it is evident that in some countries, mental health services have been successfully integrated into the public health system, thereby enabling assistance for students as well (Rich & O'Donnell, 2023). However, these initiatives prove to be most effective when they are aligned with the institutional policies of universities. For instance, several universities have adopted measures such as introducing fall breaks with reduced

academic expectations to help minimize student stress and prevent other psychological disorders (Pilato et al., 2022).

METHOD

This study utilizes a quantitative approach, employing statistical techniques for data analysis (Malhotra, 2012). It is classified as descriptive, as it seeks to explore the characteristics related to the manifestation of depression, stress, and anxiety within the context of postgraduate studies, establishing relationships among sociodemographic, behavioral, and interpersonal variables. Primary data were gathered through an online survey. The study adopts a cross-sectional design, featuring a sample that does not include a temporal follow-up (Zuleika & Legiran, 2022).

The research sample consists of students currently enrolled in or who have recently completed stricto sensu graduate programs in Brazil. Data collection was carried out using non-probability sampling, specifically employing the snowball sampling technique, where initial contacts were encouraged to share the survey with their peer groups in graduate school (Biernacki & Waldorf, 1981). To ensure the well-being of participants, the researcher sought guidance from psychological health professionals on strategies to mitigate any potential adverse effects. The survey was conducted between November 16 and December 28, 2023, yielding 332 valid responses.

Data collection instrument

The DASS21 scale was employed to gather data. This clinical instrument, which is a widely recognized psychometric tool, comprises three dimensions, each assessing levels of stress, depression, and anxiety, with seven items in each subscale (Lovibond, 1995; Vignola & Tucci, 2014). Scores are derived by summing the items within each subscale, with a total score capable of reaching a maximum of 63 points (Lovibond, 1995). Recommended cutoff scores for each category are detailed in Table 1. A pretest involving 28 participants was conducted, revealing no issues with the instrument. The results from this preliminary phase aligned with the findings of the final analysis of the research.

Table 1. Degrees of emotional states.

Emotional states	Normal/Mild	Minimal	Moderate	Severe	Extremely Severe
Stress	0-14	15-18	19-25	26-33	34+
Depression	0-9	10-13	14-20	21-27	28+
Anxiety	0-7	8-9	10-14	15-19	20+

SOURCE: LOVIBOND & LOVIBOND (1995).

To accomplish the proposed objectives, the following variables were incorporated into the instrument: age, income, gender, region, number of children, race, financial situation, area of postgraduate study, diagnosis or symptoms before and after enrollment in the course, practices and activities of the program that may contribute to stress, depression, and anxiety, course completion status, leadership profile, and relationship with advisors. These factors were utilized to delineate the student profile, drawing on common elements identified in the literature pertaining to postgraduate contexts in Brazil.

Data Analysis

The characteristics of the sample and the prevalence of stress, anxiety and depression among informants were presented through frequency distributions of descriptive statistics, including the identification of these symptoms before postgraduate studies and previous diagnosis. To analyze the relationship between sociodemographic, behavioral, interpersonal relationship characteristics and the emotional states of graduate students, Chi-square test (X^2) was carried out. Effect size was measured using Cramer's V to verify the association and the strength of these associations between the variables. In addition, multiple regression using the forward selection method ($p \geq 0,05$) was applied to identify the characteristics that most influenced the model levels. All ethical aspects followed in Brazilian academia were strictly adhered to throughout the study.

FINDINGS

The results are presented based on data relating to the characterization of the sample, which is linked to the emotional states of individuals during postgraduate studies. The profile of this group of students is outlined, as well as the main triggers of stress, depression and anxiety during the course period.

Prevalence of Stress, Depression and Anxiety Among Graduate Students

This study revealed that 25.6% of the graduate students examined experience some degree of stress, with 15.7% reporting minimal stress, 9.9% moderate stress, and 74.4% indicating no stress. In terms of depression, 30.8% showed signs of some level of depression, with 14.5% exhibiting minimal depression, 14.5% moderate depression, and 1.8% experiencing severe depression. Regarding anxiety, 43.4% of students reported having some level of anxiety: 8.4% minimal, 20.2% moderate, 10.5% severe, and 4.3% extremely severe (Table 2).

Table 2. Stress, depression and anxiety among stricto sensu programs students.

DASS21 factors	Normal/Mild n (%)	Minimal n (%)	Moderate n (%)	Severe n (%)	Extremely Severe n (%)
Stress	247 (74,4)	52(15,7)	33(9,9)	-	-
Depression	230 (69,3)	48(14,5)	48(14,5)	6(1,8)	-
Anxiety	188(56,6)	28(8,4)	67(20,2)	35(10,5)	14(4,3)

Estimates from the World Health Organization (WHO) indicate that the prevalence of depression varies from 3% to 17% globally, while anxiety has affected 2.5% to 7% of the general population (World Health Organization, 2017). These data are consistent with other research suggesting that levels of stress, anxiety, and depression among graduate students tend to be higher than those of the general population (Balijon et al., 2023; Pinho et al., 2021).

Chi, Cheng and Zhang (2023) highlight in their meta-analysis that anxiety levels among graduate students in different parts of the world have increased since 2005. However, there is a downward trend in moderate and mild cases, while severe and extremely severe cases have increased. These findings are also evident in this study. This trend can be explained by the greater awareness generated around this issue, which has helped to alleviate some cases. Nevertheless, a significant upward trend persists that remains largely unacknowledged by institutions (Chi, Cheng & Zhang, 2023).

It is important to approach the interpretation of these findings with caution. While there is evidence indicating a rise in the number of cases, it is crucial to recognize that this trend may be linked to the increasing demand for graduate studies, which is often a response to the challenges faced by professionals in the job market. Data from the Organisation for Economic Cooperation and Development (OECD) highlights that the proportion of young adults in graduate studies increased from 27% in 2000 to 48% in 2021, among people aged 25 to 34 (OECD, 2022).

Considering only students who presented some level of depression, it was found that 53% of them had not been diagnosed by a specialized professional before entering the master's or doctoral courses. However, 61.8% already felt some symptoms of depression before starting the course and 38.2% had none. As for students with some degree of anxiety, 62.5% had not received a diagnosis before graduate studies, but 59.7% already had symptoms before the course and 40.3% felt nothing before entering the programs. Finally, when evaluating students experiencing stress at some level, 64.7% had not received a diagnosis from a specialist, but 65.9% already had some symptoms before entering the master's or doctorate program.

Sociodemographic aspects and emotional states in postgraduate studies

Graduate students from institutions in all regions of Brazil participated in the research, with the Northeast (57.2%) having the highest concentration, followed by the Southeast (22.9%), South (7.5%), North (6.3%) and Central-West (6.0%).

Table 3. Stress, Depression and Anxiety among Biological Sex of Graduate Students.

DASS21 factors	Normal/ Mild n (%)	Minimaln (%)	Moderaten (%)	Severen (%)	Extremely Severe n (%)
Stress	247 (74,4)	52(15,7)	33 (9,9)	-	-
Men Women	94 (28,3) 153 (46,1)	15 (4,5) 37 (11,1)	12 (3,6) 21 (6,3)		
Depression	230 (69,3)	48 (14,5)	48 (14,5)	6 (1,8)	-
Men Women	82 (24,7) 148 (44,6)	17 (5,1) 31 (9,3)	20 (6,0) 38 (8,4)	2 (0,6) 4 (1,2)	
Anxiety	188 (56,6)	34 (8,4)	67 (20,2)	35 (10,5)	14 (4,2)
Men Women	70 (21,1) 118 (35,5)	8 (2,4) 20 (6,0)	24 (7,2) 43 (13,0)	16 (4,8) 19 (5,7)	3 (0,9) 11 (3,3)

Regarding sex, 63.6% of the respondents are women and 36.4% are men. These findings are consistent with previous research that highlighted the prevalence of female students in master's and doctoral programs in several parts of the world, not only in Brazil. (Fox Tree & Vaid, 2022; Spoon *et al.*, 2023).

Although the chi-square test indicated that there is no discrepancy between the observed frequencies (stress X^2=1,573 | p<0,45), (depression X^2=0,674 | p<0,88) e (anxiety X^2=3,472 | p<0,48). Balijon et al. (2023), e Meier et al. (2018) emphasize that there is a predominance of anxiety and depression among women in society. In the context of postgraduate studies, it is posited that both male and female students exhibit comparable levels of psychological disorders, as supported by the analyzed data. This finding is consistent with the research conducted by Chi, Cheng, and Zhang (2023).

Individual and interpersonal relationship characteristics of graduate students versus emotional disorders

A multiple linear regression analysis (forward method) was performed to investigate to what extent the profile and characteristics of the postgraduate student impacted their levels of stress, depression and anxiety. The results demonstrated that there was a significant influence of some individual and relational characteristics on the DASS21 levels ($F(7, 323) = 16,364$, $p < 0,001$; R^2adjusted = 0,246). Considering that the polytomous variables were dichotomized, Table 4 presents the coefficients for all significant predictors. The results indicate that age is the variable that most impacted emotional states, explaining 12.3% of the relationship. This finding is corroborated by other studies that identify higher levels of stress, depression and anxiety among young adults (Balijon et al., 2023; Forrester, 2021; Tu et al., 2023).

It is important to highlight that the age group of 20 to 36 years, predominant in the sample, is also the most representative in graduate studies. (Forrester, 2021; Tu et al., 2023). The impact of age showed a negative variation of -0.257 SD in DASS21 levels *(B* = -0,257, *t* = -5.003, *p* < 0,001). Early diagnosis, as expected, also has a high impact (*B* = 0,134, t = 2,478, p < 0,001), as students with a previous diagnosis tend to experience an increase in their symptoms during their master's or doctoral studies. Research suggests that the first case of anxiety or depression is caused by strong triggers, but subsequent cases are triggered more easily. Given these characteristics, postgraduate studies programs are an environment conducive to worsening of the symptoms mentioned. The other variables, in turn, were related to the remaining 12.3% of the outcome (Stroud, Davila & Moyer, 2008).

The chi-square results demonstrated a statistically significant association, with a moderate effect size, between depression and the presence of children (X2 (3) = 15,038, p < 0,002; *Cramer's V* = 0,187). Analysis of standardized residuals revealed that all categories of having or not having children were associated with depression levels, except the category of severe depression (Z > 1,96). In terms of proportional odds (odds-ratio), graduate students without children are 2.33 times more likely to be classified as having moderate depression compared to those with children. This result can be explained by the profile of the sample analyzed. As highlighted by Balijon et al., (2023), single students tend to have higher rates of depression, especially in the Brazilian context in which marital status is associated with the presence of children.

Income was found to significantly influence stress, depression and anxiety levels, with an increase in income being associated with a reduction in scores for these disorders. In addition, a statistically significant association, with a moderate effect size, was identified between depression classification and financial issues (X2 (36) = 55,406, p < 0,002; *Cramer's V* = 0,210). Proportional odds analysis indicated that graduate students who receive only scholarships income are 3.8 times more likely to be classified as having moderate depression compared to those who work exclusively. It is emphasized that financial concerns play a crucial role in depression levels among graduate students.

Financial uncertainty, coupled with obligations and a lack of stimulation and preparation for activities outside of the academic environment, contribute to higher levels of distress among graduate students (Forrester, 2021). It is important to highlight that, in the Brazilian context, the permission to accumulate a scholarship with other remunerations, as established by the resolution of the Coordination for the Improvement of Higher Education Personnel (CAPES) and other institutions that promote postgraduate studies, is a recent measure that allows the student to obtain other sources of income (Ministério da Educação, 2023).

The leadership style exercised by the research advisor also plays a relevant role in stress, depression and anxiety levels. It was found that democratic leadership by the advisor is related to a 0.136 decrease in levels of stress, depression and anxiety compared to an authoritarian style. The quality of the relationship with the advisor shows a significant impact, since relationships classified as bad or very bad, when compared to good relationships, are associated with an average increase of 0.111 in the levels of stress, depression and anxiety (Table 4).

Table 4. Individual and relational characteristics of graduate students versus emotional disorders.

Predictors	Standardized coefficients	*t*	Sig.	R^2	ΔR^2
	B				
Age	-0,257	-5,003	***	0,121	0,123
Previous diagnosis	0,134	2,478	***	0,166	0,048
Income	-0,160	-3,157	***	0,194	0,029
Democratic Leadership	-0,136	-2,729	***	0,214	0,022
Previous symptom	0,151	2,727	***	0,228	0,017
Terrible Relationship (with advisors)	0,111	2,287	**	0,236	0,010
Bad Relationship (with advisors)	0,111	2,237	**	0,246	0,011

It can be observed that the leadership profile tends to influence the disparities in the average levels of stress, depression and anxiety. These findings suggest that this type of leadership is more likely to cause mental health problems among subordinates (Christensen et al., 2020).

The results are consistent with research highlighting the impact of leadership, especially the adverse effects of authoritarian leadership, which can also be reflected in the academic context (Christensen et al., 2020). The authoritarian style, characterized by unilateral decisions and excessive control, can create a work climate in which fear and tension tend to prevail, resulting in greater psychological stress (Chiang et al., 2021).

Characteristics of postgraduate studies that impact the prevalence of stress, depression and anxiety among students

In the Brazilian context, students in master's and doctoral programs commonly engage in a variety of activities. These include completing mandatory and specialized courses, developing research projects, presenting their work to a panel of evaluators for research qualification, participating in meetings with advisors and research groups, writing scientific articles, adhering to deadlines, and attending national and international events. Balancing these academic responsibilities with personal life while also securing an income to support themselves is a challenge faced by many graduate students. Given that these activities are foundational to academia, this study aimed to analyze how these demands are managed and their potential impact on the prevalence of stress, depression, and anxiety.

Comparing the frequencies of responses from students who presented some level of depression with those who did not, it was found that the relationship with advisors (not depressed = 13,0% | depressed = 20,6%), the research qualification process (not depressed = 5,2% | depressed = 8,8%), and financial uncertainties (not depressed = 9,1% | depressed = 14,7%) X^2= 13,257, p=0,039, are demands that can increase the depressive state among graduate students. On the other hand, for those who have some level of anxiety, taking the courses (not anxious = 11,2% | anxious = 16,0%) and the relationship with the advisor (not anxious = 12,8% | anxious = 18,8%) X^2= 12,025, p=0,051, are the aspects that tend to generate the most anxiety attacks.

Among the characteristics analyzed, it was found that none of the students can generate more stress among those already stressed, with excessive daily activities considered common among students. Some of the aspects found in the analysis results had already been highlighted in the literature, such as the balance between personal and academic life, in which working hours often exceed healthy limits in the job market, financial issues, and the relationship with the advisor (Damaceno et al., 2019; Forrester, 2021; Tu et al., 2023). On the other hand, aspects common to the postgraduate context also proved to have an impact on the levels of mental illness, such as the qualifications and the subjects that the teacher needs to take. This finding, however, had not been mentioned in the literature accessed.

When considering students who have already completed their postgraduate courses, it was found that 41.5% of them finished with a request for an extension of the deadline, exceeding the limits of 24 months for the final defense of a thesis (masters programs) and 48 months for the final defense of a dissertation (doctoral programs), commonly practiced in the Brazilian context. Of those who have not yet fulfilled all the commitments of the programs in which they are enrolled, 16.3% are studying with an extension of the deadline. No significant differences were seen in the levels of stress, depression, and anxiety between students who have already finished within and outside the regulatory deadline. This context is not restricted to Brazilian reality. According to Woolston (2019), 85% of graduate students spent more than 41 hours per week in their post-graduate program, yet 74% of them were unable to finish their studies on time. Such aspects seem contradictory when analyzing the hours that students dedicate to the program and the non-achievement of goals, indicating that other factors, such as those analyzed here, can strongly interfere with the postgraduation completion process.

CONCLUSIONS

The findings indicate a significant prevalence of stress, depression, and anxiety among a diverse sample of graduate students from Brazilian educational institutions. It is crucial to emphasize that these figures, particularly the notably high rates of anxiety, underscore the urgent need to enhance mental health initiatives within the academic environment. The study revealed that the relationships with advisors, the qualification process, and the demands associated with coursework adversely affect students' emotional well-being, compounded by financial uncertainties, especially in programs facing a shortage of scholarships.

Regarding the guidance process, it was observed that the teacher's leadership style can influence the mental health of students, since those who are authoritarian tend to harm the relationship more when compared to advisors who adopt a democratic style. Another important aspect that tends to affect anxiety is the deadline for completing theses and dissertations. A significant portion of the students analyzed completed their courses outside the statutory deadlines, even though they dedicated a large amount of time to the program, which indicates that intense dedication is not the main cause of this non-compliance.

Problems such as stress, anxiety and depression appear to be the real causes of this delay, which can harm the quality indicators of postgraduate programs and represent a challenge for course management, something that can also be observed in other postgraduate programs around the world. Thus, it is believed that actions aimed at alleviating these problems, through the improvement of academic practices, can be useful in reducing mental health crises in Brazilian postgraduate studies. It is suggested that these aspects be evaluated, considering areas of knowledge and the availability of resources for incentives for cutting-edge research and research grants. This is crucial, given that the reality of graduate students has changed due to the need to work to support their families.

In this sense, this study contributes to revealing that both students who do not have any type of mental disorder and those who do, before entering postgraduate studies, can suffer from disorders when experiencing negative experiences during the course, to the point of generating a mental health crisis in the academic environment. It is also worth noting that the level of stress, depression and anxiety among graduate students is high in both sexes.

Furthermore, it was found that a significant percentage of students already arrive at the programs with some emotional disorder or associated symptoms. These disorders can worsen, given the characteristics of master's and doctoral courses in the Brazilian context, generating a mental health crisis in the academic environment. Therefore, there is an urgent need to deepen the discussion on this topic and identify specific factors that increase and generate mental health problems among master's and doctoral students. In a competitive work environment with a lot of responsibility for what is produced, to know how to deal with problems of a psychological nature can be a complex task.

Documenting the presence of distress in graduate students is necessary from the moment they enter the courses, since long-term consequences can be serious. Counseling points could be organized in educational institutions to guide students and teachers on how to deal with these health issues. These results will provide a foundation for the development of actions and public policies designed to enhance the academic environment and alleviate the mental health crisis within the educational setting. To achieve this, it is crucial that public health measures are incorporated into the institutional policies of universities.

Finally, it is not known to what extent the concentration of responses obtained among students of applied social sciences can generate some type of bias related to the profile of the courses in this area of knowledge, and this is this study limitation. Although the scale used is well-established in the scientific community, interpreting symptoms of stress, depression, and anxiety based on

self-reports to assume psychological illness conditions can overestimate the results. Seeking to reduce the impact of this limitation, it was found that the literature accessed reported equally high percentages of stress, depression, and anxiety in the educational context.

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