

GRADUATE SCHOOL STRESSORS: AN INTEGRATIVE LITERATURE REVIEW*

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ABSTRACT: Objective: To identify the scientific evidence related to the stressors faced by Master's and PhD students during their graduate program. Methodology: This was an integrative literature review conducted in October 2017 in the Virtual Library of Healthy, Web of Science, Psychology Information and PubMed databases. The review included primary articles on the topic published in English, Portuguese, and Spanish. Results: Twelve studies were analyzed, yielding three categories of stressors: personal, academic, and interpersonal relationships. Of these categories, emphasis goes to high academic workload, income, reconciling graduate studies with family and work, and the student-advisor relationship. Conclusion: The challenge for graduate students lies in reconciling the stress experienced at this time of life, academic activities, and nonacademic activities. Graduate programs need to develop high-quality scientific production that does not result in the loss of health of those involved in the process.

DESCRIPTORS: Students; Education, Graduate; Stress, Psychological; Health, Mental; Review.

ESTRESSORES DA PÓS-GRADUAÇÃO: REVISÃO INTEGRATIVA DA LITERATURA

RESUMO: Objetivo: identificar evidências científicas relacionadas aos estressores enfrentados por estudantes de mestrado e doutorado durante a sua formação. Metodologia: revisão integrativa da literatura, realizada em outubro de 2017, na Biblioteca Virtual em Saúde, *Web of Science*, *Psychology Information* e *PubMed*. Foram incluídos artigos primários, publicados em inglês, português e espanhol e que contemplassem o tema. Resultados: os resultados compuseram 12 estudos, dos quais emergiram três categorias de estressores: individuais, acadêmicos e de relações interpessoais. Dessa categorias, os estressores que se destacaram foram alta carga de atividades acadêmicas, renda, conflito pós-graduação-família-trabalho e relação aluno-orientador. Conclusão: o desafio para o pós-graduando é conciliar o estresse vivido nesse momento da vida, as atividades acadêmicas e não acadêmicas. Os programas de pós-graduação necessitam desenvolver produção científica de qualidade, que não resulte no adoecimento dos envolvidos nesse processo.

DESCRITORES: Estudantes; Educação de pós-graduação; Estresse psicológico; Saúde mental; Revisão.

ESTRESORES EN EL POSGRADO: REVISIÓN INTEGRATIVA DE LA LITERATURA

RESUMEN: Objetivo: Identificar evidencias científicas relacionadas a los estresores enfrentados por los estudiantes de maestría y doctorado durante su formación. Metodología: Revisión integrativa de literatura, realizada en octubre de 2017, en la Biblioteca Virtual em Saúde, *Web of Science*, *Psychology Information* y *PubMed*. Fueron incluidos artículos primarios, publicados en inglés, portugués y español, enfocados en el tema. Resultados: Los resultados entregaron 12 estudios, de los cuales emergieron tres categorías de estresores: individuales, académicos y de relaciones interpersonales. De dichas categorías, los estresores que tomaron mayor relevancia fueron la alta carga de actividades académicas, ingresos, conflicto posgrado-familia-trabajo y relación alumno-tutor. Conclusión: El desafío para el estudiante de posgrado es conciliar el estrés vivido en ese momento de su vida, las actividades académicas y no académicas. Los programas de posgrado necesitan desarrollar producción científica de calidad que no se vea afectada por padecimientos de los involucrados en ese proceso.

DESCRIPTORES: Estudiantes; Educación de Posgrado; Estrés Psicológico; Salud Mental; Revisión.

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● INTRODUCTION

Master's and PhD students often describe graduate school as a highly stressful period⁽¹⁾, with an estimated 38.9% to 90.6% perceiving some type of stressor during their program⁽²⁾. Stress consists of the interaction between individuals and the environment that exceeds the resources of individuals and threatens their well-being⁽³⁾. Causes of stress among researchers in training are called academic stressors, and exposure to these stressors have been associated with various negative results⁽²⁾, such as diminished academic performance⁽⁴⁾ and increased risk of mental illness⁽⁵⁻⁶⁾.

The negative health effects of the interaction of individuals with stressors depend on a person's adaptive ability. This, in turn, is influenced by biological characteristics, psychosocial resources, learned coping patterns, and the nature of the stressor, such as its quantity and frequency⁽⁷⁾.

Studies about stressors in academia have pointed to other harmful effects beyond those related to the mental health of students. Stress experienced by especially by new researchers or researchers in training⁽⁸⁾ can affect the quality of scientific production⁽⁸⁻⁹⁾.

The activities of graduate students are the main source of scientific advancement, considering the rigor and innovation required of their work⁽⁵⁾, and high stress levels have been shown to be counterproductive to this type of production⁽⁹⁾. Therefore, it is essential to identify stressors to better understand their relationship with the health-illness process of graduate students. Furthermore, such data can underpin the actions of political and academic managers to create healthy and productive environments.

Despite the relevance of the theme, the evidence showing that graduate environments are sources of stress⁽¹⁻²⁾ and the repercussion of stress on scientific production, an exploratory review of the literature did not find any articles that describing these stressors as part of the graduate training process. Existing studies are limited to identifying stressors in only one particular course/program or country, which restricts their generalizability when trying to understand this phenomenon.

Thus, the identification of the stressors present in the daily life of graduate students allows for people responsible for programs to create proposals to reduce academic stress, helping to diminish negative psychological symptoms and build multimodal strategies to cope with stressors that emerge during graduate school. In light of the above, the aim of the present study was to identify the stressors faced by Master's and PhD students during graduate school.

● METHOD

This was an integrative literature review carried out according to the following steps: defining the research question; applying inclusion and exclusion criteria to articles; collecting information from the selected studies; and assessing, interpreting, synthesizing and presenting the review⁽¹⁰⁾. The research question was: What are the stressors faced by Master's and PhD students during graduate school?

Searches were conducted in the Virtual Library of Health (VLH), Web of Science (interface with the CAPES portal), Psychology Information – PsycINFO (interface with CAPES portal), and the US National Library of Medicine (PubMed). The articles were retrieved in October 2017 by two researchers at different times to assess the homogeneity of the selected studies.

The selection of studies involved a combination of Health Sciences Descriptors - DeCS (Graduate Education and Psychological), terms from the PsycINFO (Stress and Postgraduate Students) database, Medical Subject Headings – MeSH (Education, Graduate and Stress, Psychological), and keywords (student stressors, PhD student and doctoral student), according to the specificities of each search location, to ensure that the results were precise and wide-reaching, as shown in Table 1.

Table 1 - Cross-searches conducted in the Virtual Library of Health, the Web of Science, PsycINFO, and PubMed. Goiânia, Goiás, Brazil, 2017

Location	Cross-searches
BVS	(tw:(Educação de Pós-Graduação)) AND (tw:(Estresse Psicológico))
PsycINFO	Any Field: {Stress} AND Any Field: {Postgraduate Students}
PubMed	("Education, Graduate"[Mesh] AND "Stress, Psychological"[Mesh]) ("Stress, Psychological"[Mesh]) AND ((phd student) OR doctoral student)
Web of Science	Tópico: (Education, Graduate) AND Tópico: (Stress, Psychological) Tópico: ("student stressors") AND Tópico: ("phd student") OR Tópico: ("doctoral student")

Quantitative and qualitative observational and experimental studies that presented the terms "Master's and/or PhD student stressors" in the title or abstract were included, in Portuguese, English and/or Spanish, with no specified year of publication, including articles published up to the month of the online search, October 2017.

To compose the sample, the articles had to meet the following topic adequacy criteria: 1) include only graduate students (Master's or PhD), or, if different samples were considered, the study had to provide separate information about graduate students and 2) contain information about stressors among Master's and PhD students. Articles that provided only a global measurement or diagnosis of stress, literature review studies, position papers, and case reports were excluded.

The data from the articles were extracted according to a form developed by the authors, covering the following topics: origin of article (author, year, periodical and country), objective and target audience (object of the study), methodological design and instrument/strategy for identifying stressors (methodology), and identified stressors (stressors). The forms were completed by each author independently. Next, consensus about the construction of the summary box and the categorization of the results was reached after 12 meetings.

● RESULTS

Initially, the search yielded 1,581 articles by cross-searching for the terms in the databases used in this study. After applying the inclusion criteria for language and type of article, 1,347 manuscripts were left. These were recorded in a single EndNote® file, and by using this software, double entries were excluded, a result of the indexation of periodicals in more than one of the studied databases (n=1,270).

The articles that addressed the study topic in the title or abstract were set aside to be read in full (n=34). After reading the texts, topic adequacy criteria were verified, which resulted in 15 studies, and of these, three were excluded from the final sample for being position papers (n=2) and for presenting only the prevalence of stress diagnosis (n=1) (Figure 1).

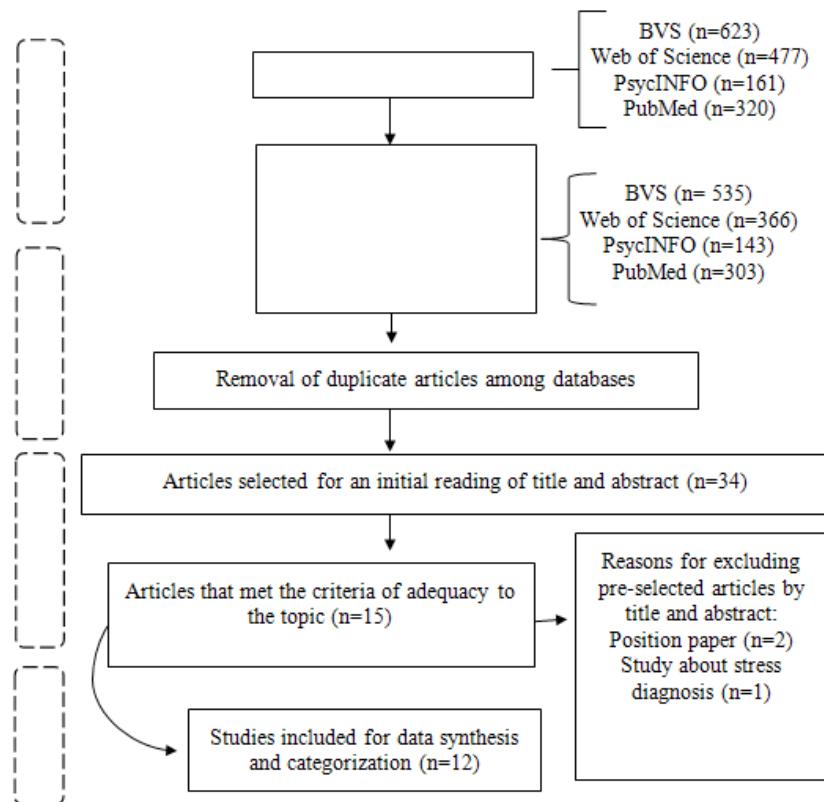


Figure 1 - Flowchart of the selection of articles included in the study about stressors faced by Master's and PhD students during graduate school, based on pre-established criteria. Goiânia, Goiás, Brazil, 2017

Twelve studies composed the sample, published between 1994 and 2016. Eight studies (66.7%) adopted a cross-sectional quantitative design⁽¹¹⁻¹⁸⁾ and four (33.3%), a qualitative approach⁽¹⁹⁻²²⁾. Most of the studies, six (50%), investigated stressors using previously validated questionnaires^(11,14-18), followed by questionnaires created by the authors^(12-13,22), interview scripts^(19,21), and audio-diaries⁽²⁰⁾. Most studies, five (41.7%)^(12,14,16-18), were carried out with psychology graduate students, and half of the studies were about students in the United States^(12,14-17,22) (Chart 1).

Chart 1 - Characteristics of the studies that analyzed stressors among graduate students. Goiânia, Goiás, Brazil, 2017 (continues)

Author/periodical / country	Object of study	Methodology	Stressors
Brown K, Anderson-Johnson P, McPherson A ⁽¹¹⁾ Nurse Education in Practice Jamaica	Levels and sources of academic-related stress and their relationship with sociodemographic variables, year of program and specialty with first- and second-year nursing graduate students.	Cross-sectional study that used a self-perceived stress scale with 45 items.	<ul style="list-style-type: none"> Preparation for final examinations. Prospect of final examinations. Overload of graduate school activities Graduate-level standard of writing Cost of program

Devonport T, Lane A ⁽²⁰⁾ Journal of Hospitality, Leisure, Sport & Tourism Education England	Identifying stressors and coping strategies used by two male last-year social science PhD students and their respective female partners.	Qualitative case study that used audio diaries.	<ul style="list-style-type: none"> • Difficulty prioritizing PhD commitments • Uncertainty about professional future post-academia • Reduced family income to prioritize PhD activities
Faro A ⁽¹³⁾ <i>Psicologia: Reflexão e Crítica</i> Brazil	The relationships between stressors, stress, coping and subjective well-being among graduate students in Brazil.	Cross-sectional study (survey) that used a questionnaire created by the author covering 15 graduate-related concerns.	<ul style="list-style-type: none"> • Reconciling the challenges of graduate school and personal life • Insufficient financial resources due to time spent on studies • Meeting deadlines of graduate school activities • Student-advisor relationship, in terms of amount and usefulness of meetings • Overload relative to productivity, demands from self and advisor • Expectation relative to performance in program activities
Divaris K, Polychronopoulou A, Taoufik K, Katsaros C, Eliades T ⁽¹⁸⁾ European journal of dental education: official journal of the Association for Dental Education in Europe Greece	Perceived stress levels and burnout and the impact of perceived stress on the dental practice of graduate students/residents in the first two years of a Master's and PhD level residency program.	Cross-sectional study using the Graduate Dental Environment Stress questionnaire (GDES).	<ul style="list-style-type: none"> • Lack of leisure time • Financial problems • Insecurity about professional future • Neglect of personal life
El-Ghoroury N, Galper D, Sawaqdeh A, Bufka L ⁽¹²⁾ Training and Education in Professional Psychology United States, District of Columbia and Puerto Rico	Stressors, coping strategies, and barriers to well-being in the last year of a Master's degree psychology program and the 2 nd and 5 th years of a PhD degree psychology program.	Cross-sectional study using two questionnaires constructed by the authors: 1) 15 concerns about graduate school; 2) Structured questionnaire with 22 items encompassing major and minor life events, main academic and intrapersonal stressors experienced by psychology graduate students.	<ul style="list-style-type: none"> • Pressure of academic responsibilities • Cost of program • Anxiety • Imbalance between clinical work and academic life

<p>Jungbluth C, MacFarlane I, Veach P, LeRoy B⁽¹⁵⁾</p> <p>Journal of Genetic Counseling</p> <p>United States and Canada</p>	<p>Genetic counseling graduate students' experience of anxiety, types of stressors, and their advice about stress management</p>	<p>Cross-sectional study that used the adapted questionnaire on well-being in academic environments.</p>	<ul style="list-style-type: none"> • Lack of time to interact with family and friends • Relationship with advisor/ supervisor that involves situations of humiliation and abuse • Conflict and competition among peers • Burden of emotions related to contact with patients • Lack of confidence, moral conflicts, and expecting too much from oneself • Difficulty in reconciling the development of thesis project with other academic, professional and personal activities • Imbalance between the amount of financial resources available and the amount of debt • Uncertainty about possible employment after completing research • Lack of time to interact with non-academic people and contexts
<p>Bujdoso Y, Cohn A⁽¹⁹⁾</p> <p><i>Revista de Saúde Pública</i></p> <p>Brazil, São Paulo</p>	<p>The relationship between the main signs of stress, coping and stressors among Master's degree nursing students and the process of reconciling writing their dissertation with professional insertion.</p>	<p>Qualitative study, with semi-structured interview scripts.</p>	<ul style="list-style-type: none"> • Difficulty in reconciling Master's program, healthcare work, home and personal life • Difficulty managing deadlines
<p>Pfeifer T, Kranz P, Scoggins A⁽²²⁾</p> <p>Occupational Therapy International</p> <p>United States, Texas</p>	<p>Perceived stress of first- and second-year master's occupational therapy students enrolled in a Texas university.</p>	<p>Mixed-methods, with qualitative steps and descriptive statistics carried out using an instrument created by the authors, based on the literature.</p>	<ul style="list-style-type: none"> • Difficulty managing time to balance studies, family, and work • Difficulty managing academic workload • Confused about course and course expectations
<p>McKinzie C, Altamura V, Burgoon E, Bishop C⁽¹⁶⁾</p> <p>Psychological reports</p> <p>United States, New York</p>	<p>How stress relates to daily habits, self-esteem and mood among graduate psychology students.</p>	<p>Analytical cross- sectional study that used the Student Stress Scale (Insel & Roth, 1991).</p>	<ul style="list-style-type: none"> • Few hours of sleep • Negative mood
<p>Meis L, Veloso A, Lanne s D, Carmo M, Meis C⁽²¹⁾</p> <p>Brazilian Journal of Medical and Biological Research</p> <p>Brazil, Rio de Janeiro</p>	<p>Interviews with graduate students and professors of a biochemical department to analyze science in Brazil.</p>	<p>Qualitative study, open-ended interviews and 124 semi-structured interviews using an instrument created by the authors.</p>	<ul style="list-style-type: none"> • Overload of academic activities • Competition among academic peers • Difficulties in funding research • Uncertainty about academic career • Academic evaluations

Nelson N, Dell'Oliver C, Koch C, Buckler R ⁽¹⁷⁾ Psychological reports United States, Chicago	The study verified the interaction between stress, distress, psychological health, social support and coping styles and academic success of PhD students in clinical psychology.	Cross-sectional study (survey) that used the Demographic/ Stress Questionnaire to assess the stressors of graduate school.	<ul style="list-style-type: none"> Academic coursework and writing dissertation Personal financial situation Expectations related to healthcare practice Daily hassles Time management Contact with patients
Hudson S, O'Regan J ⁽¹⁴⁾ Journal of clinical psychology United States, Minnesota	Whether factors such as gender; year in the program; income level; relationship status; age; number of children; number of hours, spent working each week were related with stress experienced by graduate psychology students.	Cross-sectional study that administered the Psychology Student Stress Questionnaire (Cahir & Morris, 1991).	<p>In this study, two sets of sociodemographic characteristics were listed as stressors:</p> <ul style="list-style-type: none"> Having children and not having a stable relationship during graduate school Women who work full-time and do not have a stable relationship

The stressors shown in Chart 1 were then distributed into three categories, namely: individual characteristics as stressors during graduate school; academic activities as stressors in graduate school, and interpersonal relationships as stressors during graduate school.

Eleven articles (91.6%) pointed to the individual characteristics of students that contributed to stress in the graduate context. These stressors included financial difficulties^(11-13,17-18,21), insecurity about professional future^(15,18,20-21), being female⁽¹⁴⁾, few hours of sleep⁽¹⁵⁻¹⁶⁾, negative feelings⁽¹⁶⁾, and anxiety⁽¹²⁾. In more than half of the studies assessed in this review, insufficient financial resources were the most relevant individual stressor^(11-13,17-19), mentioned by 26.2% to 63.9% of the studied samples^(11-13,23). Regarding the other stressors in this category, the studies did not establish their frequency, but presented strong associations with a diagnosis of stress^(16,18) and trait anxiety⁽¹⁵⁾.

In terms of academic activities, four (33.3%) articles showed that moments that require intense use of students' cognitive abilities culminated in significant stress^(11,13,15,17). Examples of such moments include preparing for course evaluation activities, prospect of final graduate exam, graduate-level writing requirement⁽¹¹⁾, expected performance in course activities⁽¹³⁾, course demands and writing dissertation⁽¹⁷⁾, and academic workload⁽¹⁵⁾. Between 68.1% and 73.7% of the assessed students⁽¹¹⁻¹²⁾ were affected by these stressors.

In the academic activity category, stressors linked to the high amount or number of assignments, more than what students can handle, were mentioned by seven (58.3%) articles. This includes difficulty managing academic workload⁽²²⁾, meeting deadlines for graduate activities^(13,19), prioritizing PhD commitments⁽²⁰⁾, and coping with overload related to academic activities^(13,21) and pressure of academic responsibilities, reported by 68.1% of students⁽¹²⁾.

The category "interpersonal relationship stressors" was constructed by four (33.3%) articles and included conflict situations in the academic context, such as difficulties with peers or advisors^(15,21,24). This stressor was found among 12.3% to 23.7%⁽²⁴⁾ of students. In the extra-academic context, difficulties with friends,^(15,24) this category included the challenge of reconciling graduate school with time for family and friends^(15,24), mentioned by 65.2% of students⁽¹³⁾.

● DISCUSSION

The present systematic search in the main databases in the health area identified the main stressors faced by graduate students during their training: amount of academic work greater than student's ability to complete, financial problems, conflict reconciling graduate studies and family and work, and difficulties in relationship with advisor. The present review presents some categories of action so that

healthpolicymakers, graduate programs, and students themselves can implement measures to reduce or mitigate the presence of stress in the academic context.

Having more work than they could complete was the main stressor presented among graduate students under the category "Academic activities as stressors in graduate school". Failed task managementappeared in different studies as difficulties in coordinating graduate activities with personal, family and professional needs^(12-13,15,17-20,22).

Although the ability to complete academic assignments canbe related to individual factors, such as lack of/flawed planning, it is also necessary to consider the role of external aspects,such as the intensity of academic commitments⁽²¹⁾. Thus, challenges related to the management of academic activities can be considered a reflection of the tendency of institutions to prioritize productivity⁽⁹⁾, demanding more time from graduate students to be engaged in academic work^(11-13,16).

In addition to being a relevant stressor among students, evaluation practices that privilege quantity over quality and the social impact of scientific productions can impairimagination and innovation in research⁽⁸⁾. The detrimental effects of this contemporary publication culture include plagiarism and other questionableresearch practices⁽⁹⁾.

A collective shift in the perspective of graduate student work is necessary, from focusing mainly on quantitative scientific output to considering the qualitative aspects of scientific training⁽⁹⁾. Furthermore, programs must discuss and help students plan their academic life during their time at the programstill in the first academic year, strengthening support networks, with integrative courses and research groups, workshops^(12,15,18) on how to plan academic life^(15,17), and support services that provide specialized care.

Complementarily, the conflict between graduate studies, family and work and relationship with advisorwere the main stressors identified in the category "interpersonal relationships as stressors during graduate school". Students often expressed having difficulties reconciling graduate school with their family, friends, and personal life^(13,15,19,22), which includes self-care⁽¹⁸⁾. Furthermore, the competition fostered in the academic context is marked by conflict^(15,21) and hinders joint collaboration and teamwork, known strategies for coping with academic stressors⁽¹²⁾.

In this context, the role of the student-advisor relationshipis also important, as it can either enhance⁽¹³⁾ or minimize stress⁽¹⁾. Whether advisors provide contact numbers⁽²³⁾ and support for learning⁽²⁴⁻²⁵⁾ has been shown to contribute to the positive or negative nature of this relationship. Additionally, the type of leadership exercised by advisors⁽⁵⁾ and abuse and/or humiliation is considered stressors by students⁽¹⁵⁾.

The importance of understanding the network of relationships of individuals stems from the observation that the "self" is fundamentally constituted through a relational process⁽²⁶⁾. Moreover, the role of interpersonal relationships influences the ability of people to handle stressors, as they can either provide social support⁽²⁷⁾, help to develop positive responses to stressors,or promote stress through conflict and competition^(15,21).

Graduate programs can implement and foster some strategies to strengthen interpersonal relationships among students, as these can foster strategies for coping with stress⁽²⁸⁾. Among them, emphasis goes to promoting mutual support among students,strengthening research groups, sharing experiences, forming relationships among different levels of graduate, and developing leadership among professors.

Another point highlighted in this review was financial resources, underthe "individual characteristics as stressors in graduate school" category.Income was a major stressor among graduate students in Brazil⁽²³⁻²⁴⁾, England⁽²⁰⁾, the United States^(12,17), Greece⁽¹⁸⁾, Jamaica⁽¹¹⁾ and Iran⁽¹⁾.

In a Brazilian study, income was a more significantstressor when compared to the results of the other countries. This finding can be associated with the insufficient number and value of scholarships offered in Brazil to students⁽²⁴⁾. The way scholarships are distributed and research funded in Brazil can also explain why having employment, a direct source of income, appeared as a mitigating factor of the stress experienced by Brazilian graduate students⁽²⁴⁾.

In contrast, employment can also cause stress due to attempts to coordinate work with academic activities^(12,19,22), but this effect is not a rule. For nursing students, for example, healthcare work was more

stressful than graduate school, and the academic environment represented an escape and source of support for dealing with care-related stress.

In sum, the categories of stressors constructed in this study include the main aspects that can negatively influence the academic life and health of graduate students. A recent literature review created similar categories, describing the personal factors, relational factors, and institutional factors that influence adaptation to graduate school. This finding allows for the inference that the relationship between students and graduate school is multicausal, influenced by at least three factors: individual, academic, and interpersonal relationships.

In this context, despite the limitations related to the search strategy, which may not have identified all of the published studies, the current review identified relevant stressors and adds to the scope of knowledge about academic evidence-based research in the literature.

● FINAL CONSIDERATIONS

The studies included in this review show that graduate students are exposed to stressors related to individual characteristics, academic activities, and interpersonal relationships during their studies.

The high amount of academic activities constituted the most relevant academic stressor, presenting a correlation with the other stressors. Lack of financial resources was listed as a relevant individual stressor and was more significant in Brazil. Interpersonal relationship stressors included conflict between graduate studies, family and work, and relationships with advisors.

Productive and challenging stress that leads students to meet academic demands is positive and inherent to the graduate training process. However, it is necessary to establish strategies that help students adapt and minimize harm to mental health and life outside academia. The path towards building a healthier environment involves searching for feasible and doable research, in which quality is more valued than quantity. In addition, there is also the need to discuss how graduate programs can act to construct this environment.

The great challenge for graduate students is reconciling the stress experienced at this time of life, graduate school activities and social demands. Graduate programs must balance evaluation processes with quality scientific production, so that this process does not result in the loss of health of those involved.

The success of scientific research and discoveries, sought by countries across the world, does not lie in astronomic figures and investments, but in simply ensuring conditions for thinking of the authors involved in the process of constructing science. Graduate education should be understood as the source of intellectual work that drives social goods, and the greatest value during this process is that related to human capital. Without this understanding, the risk of hindering scientific advancements and the benefits of science to society persists.

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