Stress level affects health and academic performance of undergraduate students in health sciences area courses

O nível de estresse afeta a saúde e o desempenho acadêmico de estudantes de graduação em cursos da área de ciências da saúde

El nivel de estrés afecta la salud y el rendimiento académico de los estudiantes de pregrado en carreras de ciencias de la salud

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Abstract
University students represent a group that is at high risk of stress and even suicide. The present study aimed to investigate the profiles and stress levels of undergraduate students enrolled in health sciences courses at a Brazilian university, and how their health and academic performance are affected. A total of 431 students participated, of which 30% were not stressed, 2.5% were in the alert phase, 38.7% were in the resistance phase, and 28.8% were almost exhausted. Stress levels were related to gender (p = 0.0005), course (p = 0.004), and semester; higher levels of stress negatively influenced students' academic performance (p = 0.019), socialization (p = 0.020), relationship with the university (p = 0.019), learning (p < 0.0001), sleep (p < 0.0001), and perceived health (p < 0.001). The present study provides evidence regarding the stress levels of health sciences undergraduate students in Brazil, as well as its negative effect on health status and academic performance. It is suggested that further studies should be conducted specially to investigating strategies for students' stress control in the university environment.
Keywords: Emotional distress; Undergraduate; University.

Resumo
Os estudantes universitários representam um grupo com alto risco de estresse e até suicídio. O presente estudo teve como objetivo investigar os perfis e níveis de estresse de estudantes de graduação matriculados em cursos de ciências da saúde de uma universidade brasileira e como sua saúde e desempenho acadêmico são afetados. Participaram 431

alunos, dos quais 30% não estavam estressados, 2,5% estavam na fase de alerta, 38,7% estavam na fase de resistência e 28,8% estavam quase exaustos. Os níveis de estresse foram relacionados ao sexo (p = 0,0005), curso (p = 0,004) e semestre; maiores níveis de estresse influenciaram negativamente o desempenho acadêmico dos alunos (p = 0,019), a socialização (p = 0,020), o relacionamento com a universidade (p = 0,019), o aprendizado (p < 0,0001), o sono (p < 0,0001) e a percepção de saúde (p < 0,001). O presente estudo fornece evidências sobre os níveis de estresse de estudantes de graduação em ciências da saúde no Brasil, bem como seu efeito negativo sobre o estado de saúde e o desempenho acadêmico. Sugere-se que mais estudos sejam realizados especialmente para investigar estratégias de controle do estresse dos estudantes no ambiente universitário.

Palavras-chave: Sofrimento emocional; Estudante universitário; Universidade.

Resumen

Los estudiantes universitarios representan un grupo que está en alto riesgo de estrés e incluso de suicidio. El presente estudio tuvo como objetivo investigar los perfiles y niveles de estrés de estudiantes de pregrado matriculados en cursos de ciencias de la salud en una universidad brasileña, y cómo se ven afectados su salud y su rendimiento académico. Participaron un total de 431 alumnos, de los cuales el 30% no estaban estresados, el 2,5% estaban en fase de alerta, el 38,7% en fase de resistencia y el 28,8% casi agotados. Los niveles de estrés se relacionaron con el género (p = 0,0005), el curso (p = 0,004) y el semestre; niveles más altos de estrés influyeron negativamente en el rendimiento académico de los estudiantes (p = 0,019), la socialización (p = 0,020), la relación con la universidad (p = 0,019), el aprendizaje (p < 0,0001), el sueño (p < 0,0001) y la salud percibida (p < 0,001). El presente estudio aporta evidencias sobre los niveles de estrés de los estudiantes de licenciatura en ciencias de la salud en Brasil, así como su efecto negativo sobre el estado de salud y el rendimiento académico. Se sugiere que se realicen más estudios especialmente para investigar estrategias para el control del estrés de los estudiantes en el ámbito universitario.

Palabras clave: Angustia emocional; De licenciatura; Universidad.

1. Introduction

University students' stress is a topic relevant to the academic community, but the approach to this theme is quite recent (Sandt 2020). Higher levels of stress are associated with less resilience and adaptation to the university environment, with academic stress having a negative impact on learning ability (Kennett et al., 2020). There are reports of suicidal behavior among students pursuing higher education (Tang et al., 2018), with university students representing a group that is at high risk for suicide (Russell et al. 2019). According to the World Health Organization (2019), as recently as 2016 suicide was the second leading cause of death globally in the last few years among people aged 15 to 29 years old, with the first being traffic accidents. Research on undergraduate students enrolled in health courses in Brazil, such as physical therapy, psychology, nursing, and medicine, have shown noticeable levels of stress related to patient responsibilities during internships (Murakami et al. 2019), but how stress affects students' health and academic performance must be further clarified.

Thus, the aim of the present study was to investigate the profiles of students from the school life sciences (which includes courses related to health), as well as their stress levels and the related impact on students' well-being and academic life.

2. Methodology

2.1 Study design and ethical considerations

This transversal and observational study, conducted within a cohort investigation (Amirkhan, Bowers, and Logan 2020) of a population of university students' (n = 431), their experienced stress levels, and how these reflect on their well-being and academic engagement.

The study was carried out between March 2019 and March 2020, at a private university located in the city of Curitiba, in southern Brazil. Initially, researchers invited students from the first to third and seventh to ninth semesters of veterinary medicine, psychology, and physical therapy courses to participate in the research, based on a visit to and explanation provided in the classroom. After clarifying the details of the study, students who showed interest in participating received a questionnaire and an instrument to assess their degree of stress (printed out by the researcher), to be filled out on the spot. This

also contained an informed consent form to be signed for their participation. As inclusion criteria, the following students were considered: those who were interested in participating in the study, regardless of gender, age, and race; attending their initial or final semesters of veterinary medicine, psychology, or physical therapy courses; regularly enrolled at the university; and consented to the use of their information within the scope of the study. Students who did not provide consent for participation were excluded.

This research was approved by the Research Ethics Committee of the Pontifical Catholic University of Paraná under number: 297140 on November 8, 2018.

2.2 Student profiles

A questionnaire was developed for the present study to collect information regarding the target population. Questions were asked on the following: course-related issues (course, level, and whether they were enrolled in morning classes, night classes, or full time); demographic information (age, gender, with whom they live); study-related information (if students changed residences to attend the university, if they had a scholarship, their time of studying, how they perceived their academic performance, if they worked, and if stress interfered with their academic performance); and their degree of difficulty with socialization, housing, transportation, time to study, sleep, security, and family problems.

2.3 Lipp's Adults Stress Symptoms Inventory (LSSI)

The questionnaire also assessed students' stress levels using the Lipp's Adults Stress Symptoms Inventory (LSSI; Lipp 2009). The LSSI comprises a list of physical (knot in the stomach, feeling of constant physical exhaustion, and insomnia) and psychological (sudden enthusiasm, excessive irritability, and emotional hypersensitivity) symptoms, divided into three main phases: 1) the respondent should first indicate which symptoms were experienced in the past 24 hours; 2) then, which symptoms were experienced in the past week; 3) and, finally, which symptoms were experienced in the last month. The LSSI identifies whether the respondent is under stress, at what stage of the process they are in (alertness, resistance, and near-exhaustion), and whether their symptoms are more typical of the physical or psychological dimension (Lipp 2009).

The questionnaire and the LSSI were distributed in the classroom after explanation and acceptance by the students. As the data collection was conducted in class, students had 20 minutes to complete the two materials.

The LSSI was adapted with material suitable for this purpose. All data were compiled in an Excel spreadsheet for further analysis.

2.4 Statistical analysis

The results were presented in the form of a descriptive analysis, in percentages for specific questions, and in relation to the number of respondents. The differences between the analyzed variables were studied using the Chi Square test. All analyses were performed using the GraphPad Prism for Windows version 5.0 (San Diego, CA, USA); the value of statistical significance was set at $p < 0.05$.

3. Results and Discussion

3.1 Student profiles

The total number of student respondents was 431 (male, 21.6%; female, 78.4%). Of these, 83.3% attended morning classes, 13.8% night classes, and 2.9% studied full time. Their ages ranged between 17 and 57 years, with a mean and standard deviation of 20.6 ± 5.4 years (Table 1).
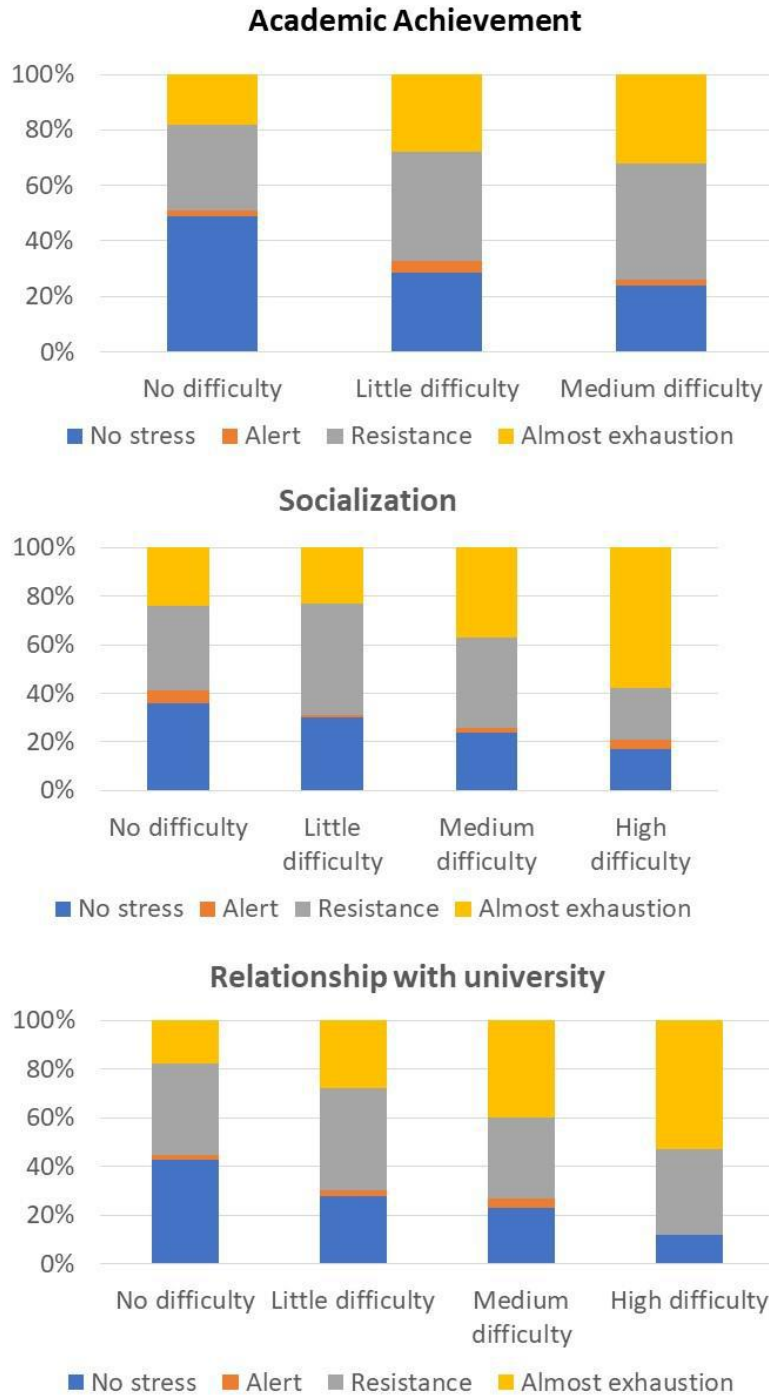
Evaluation of students' stress levels

Among all students, 30% were not stressed, 2.5% were in the alert phase, 38.7% were in the resistance phase, and 28.8% were almost exhausted. Figures 1, 2, and 3 show the variables that were significantly related to stress ($p < 0.05$) in the unifactorial analyses and the proportion according to the level of stress (no stress, alert, resistance, and almost exhaustion).

Figure 1 - Graphic distribution of stress levels in academics and in relation with the course, level, and sex.
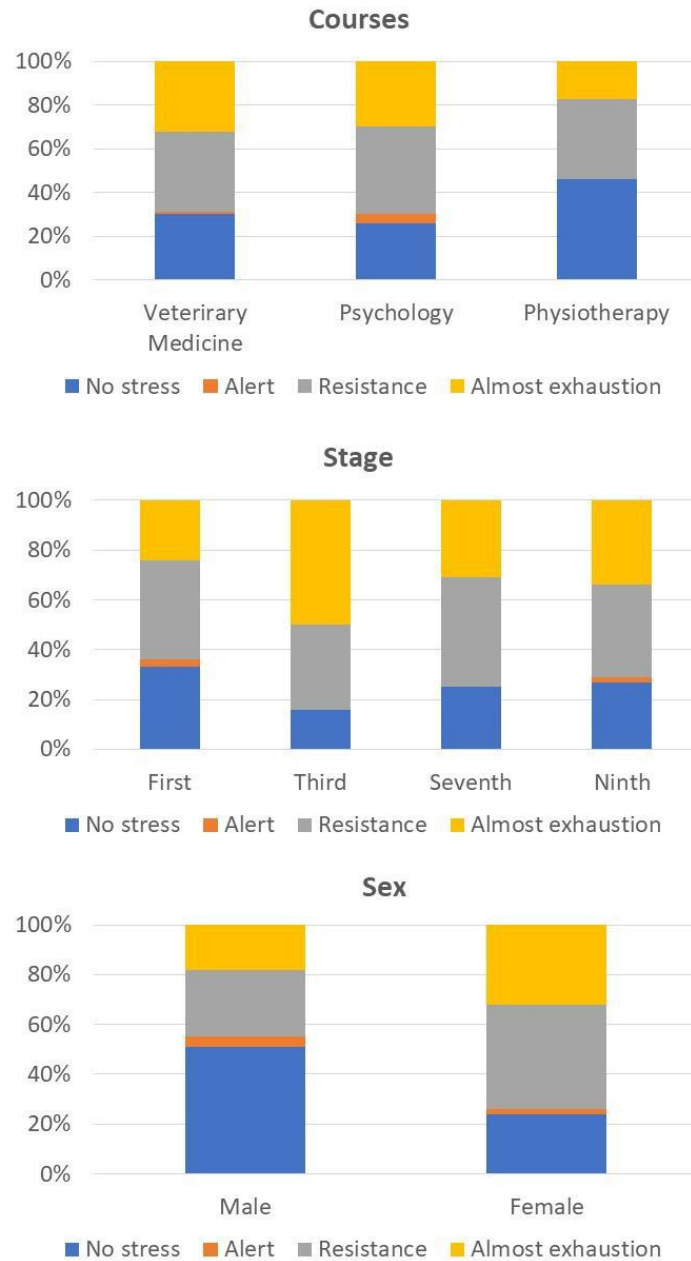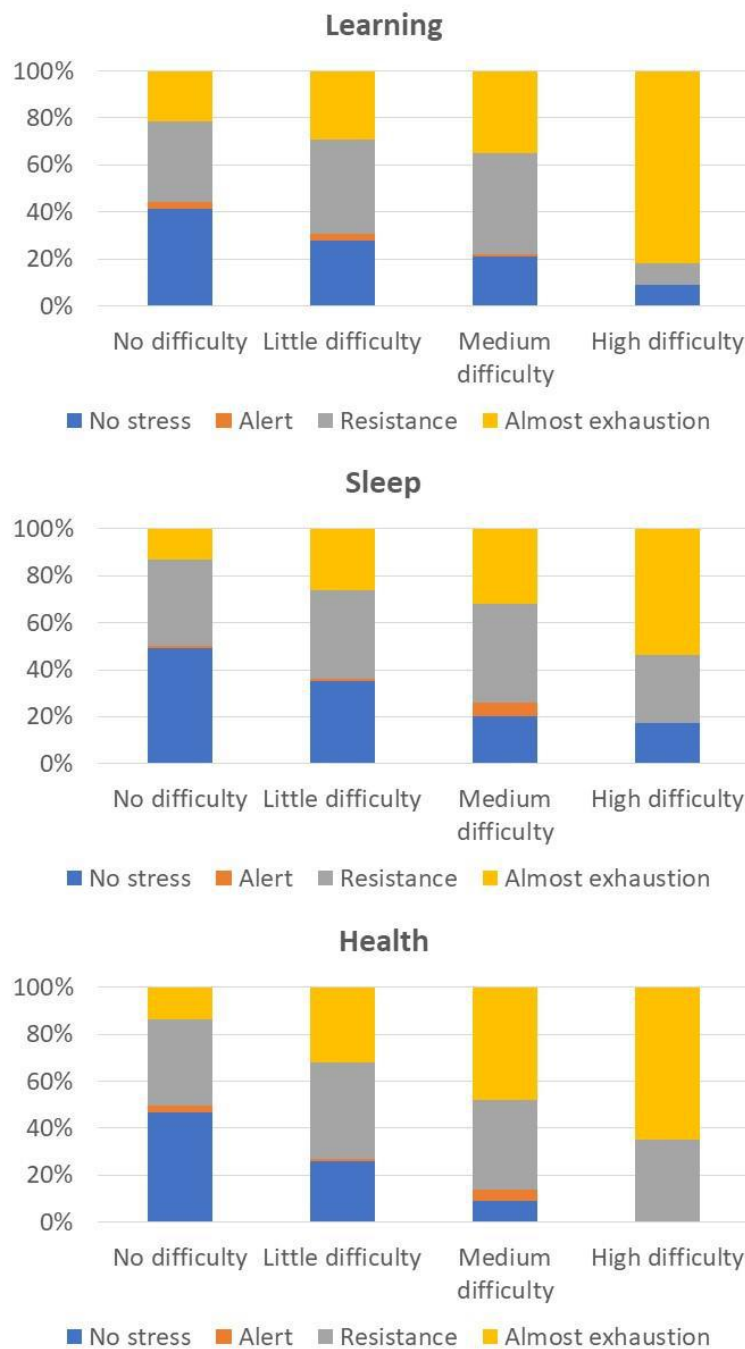

Source: Authors (2021).

Figure 2 - Graphic distribution of stress levels in academics and in relation with academic achievement, socialization, and relationship with the university.

Source: Authors (2021).

Figure 3 - Graphic distribution of stress levels in academics and in relation with learning, sleep, and health.

Source: Authors (2021).

The majority (70%) of psychology and veterinary medicine students were found to be stressed, at the resistance and near-exhaustion levels, and presented higher stress levels than physical therapy students ($p = 0.004$ and $p = 0.030$, respectively). Considering the three courses, students in the third year showed higher levels of stress compared to those in the first ($p = 0.0003$) and ninth ($p = 0.046$) semesters. There were no differences between the stress levels of students in the first, seventh, and ninth semesters. Female students experienced a higher degree of stress ($p = 0.0005$), with 74% being at resistance or near-exhaustion levels; 51% of male students were at zero level of stress.

Regarding students' perceptions of their academic performance, those who considered themselves to be doing very well were shown to have a lower level of stress compared to those who felt they were performing badly and could do better (p < 0.0001 and p = 0.003, respectively). There were only five students who considered themselves to be performing very badly and demonstrated the highest level of stress.

As for socialization, those who considered themselves as having great difficulty in socializing had higher levels of stress compared to those who had no difficulty (p = 0.020), or little difficulty (p = 0.005) socializing. When asked about the degree of difficulty with regard to their relationship with the university, there was a difference in stress levels between those who acknowledged having medium or high difficulty and those who had none (p = 0.019 and p = 0.024 respectively).

With regard to learning, those who acknowledged having more difficulty in learning had higher levels of stress when compared to others (p < 0.0001); moreover, those who had medium difficulty had higher levels of stress compared to those who did not have any difficulty (p = 0.007).

As for sleep, students who acknowledged having medium and higher levels of difficulty with sleep had more stress in comparison with those who did not acknowledge having sleep difficulties (p < 0.0001). As for perceptions of their own health, students who reported having health issues had higher levels of stress compared to others (p < 0.001); those who acknowledged having little or medium difficulty with health, had higher levels of stress compared to those who did not perceive themselves as having health difficulties (p < 0.001).

The logistic regression analysis revealed that the following factors were significantly related with stress levels: sex (p<0.000), academic performance (p<0.005), sleep (0.001) and health (p<0.000) (Table 1). Interrelationship amongst variables was further demonstrated using a cluster analysis (Figure 4).

Table 1 – Parameters considered to have significant associations with stress levels according to the logistic regression.

Effect	Model Fit Criteria - Log -2 likelihood of the reduced model	Chi-square	Degrees of Freedom	p
Course	763,164	11,348	6	0,078
Sex	782,383	30,567	3	0,000
Period	752,05	0,233	3	0,972
Academic achievement	780,356	28,54	12	0,005
Socialization	765,076	13,259	9	0,151
Relationship with university	760,212	8,396	9	0,495
Learning	756,843	5,026	9	0,832
Sleep	779,648	27,832	9	0,001
Health	790,325	38,509	9	0,000

Source: Authors (2021).

Figure 4 - Cluster analysis by variables, Ward method, with quadratic Euclidean distance.
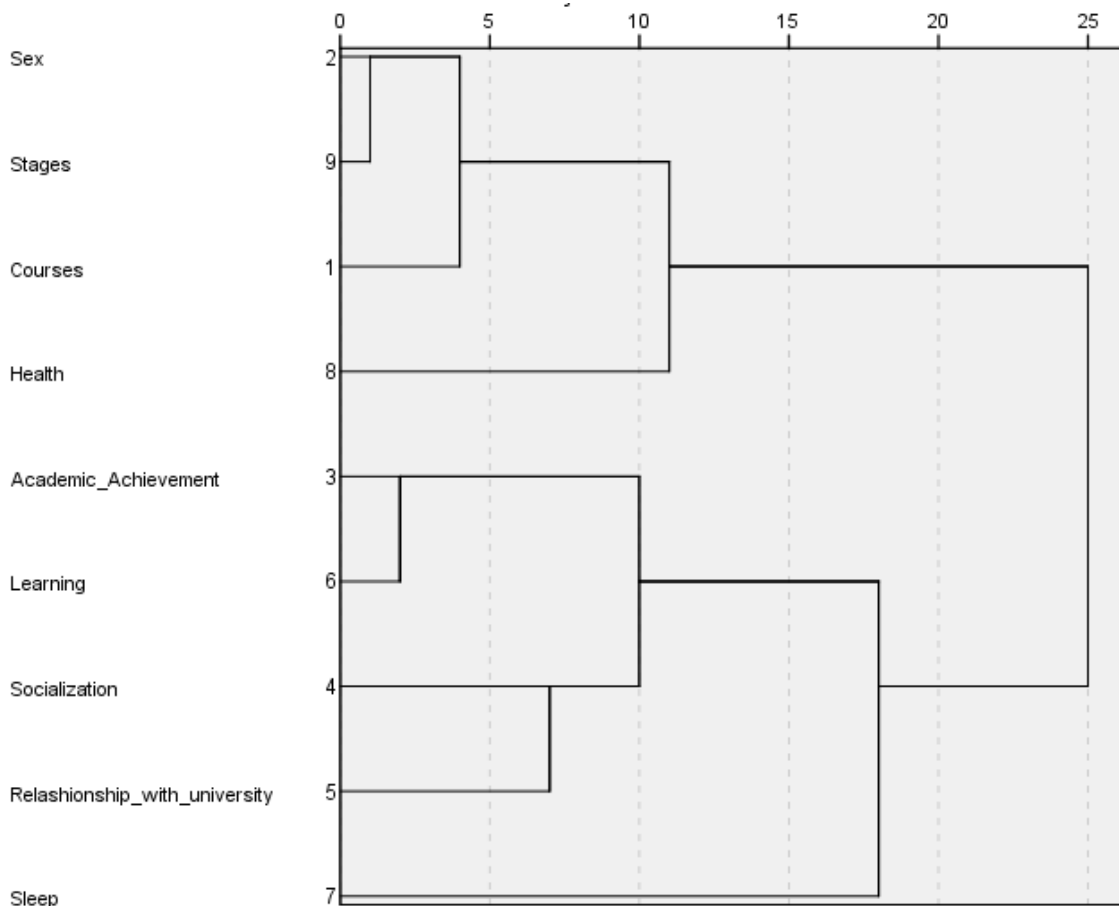
Source: Authors (2021).

4. Discussion

This study aimed to investigate the figure profiles of higher education students in health courses, examine their stress levels. Differences were found in stress levels in relation to gender, course, and semester, influencing students' perceived health, relationship with the university, and academic life.

In the present study, stress showed to interfere with academic performance, which contributes to the risk of university students dropping out, while also being among the main risk factors for suicide in this population. The identification of these signs (stress and suicidal behavior) can contribute to bringing these students closer to university support centers seeking for help (Chen et al. 2020; Lew et al. 2019; Weber et al., 1997).

Most university students are quite young, as observed in this study's target population, and it has been shown that young age, lack of a family environment, and academic demands can lead to sleep deprivation and other manifestations of stress (Lima et al. 2016). These situational factors influence academic performance and can lead to dropouts and increased incidence of mental illness, leading to depression, panic disorders, and even suicide attempts (Hoying et al. 2020). The American College Health Association (2018) recently reported that among 88,178 university students who responded to a health and wellness survey, 28% stated that stress adversely affected their academic performance. According to the perceptions of the interviewed students, their academic performance was lower, while their studying difficulties and stress levels were higher, thus influencing their relationship with the university.

Overload and concern with academic activities often leads to poor sleep quality, which is related to students' stress levels and academic performance. Health science students are found to suffer more than students of other areas, while

adjusting time for academic activities, hence being more prone to poor sleep quality and high stress (Ahrberg et al. 2012; Almojali et al. 2017); the present study is in line with these previous findings.

Moreover, stress is one of the most influential factors in reducing students' ability to adapt to the university environment and their evasion from university (Amirkhanet al., 2020; Wintre & Yaffe 2000). Therefore, student adherence to the course and permanence at their university, with quality and well-being, can be linked to a welcoming, receptive, and stimulating environment. Thus, we believe that creating AAA programs can improve university students' well-being, thereby resulting in their academic success (Delgado et al., 2017; Stupnisky et al. 2013).

The sample of students investigated in the present study represented individuals from the initial to the final years of their course of study. Most of them were female; the higher prevalence of female students in the sample is not unique to the target university but is the case in most Brazilian educational institutions. The National Qualification Plan of the Ministry of Labor and Social Security reports that women have a predominant presence in schools, universities, and qualification courses. In Brazil, data from the Statistical Synopsis of Higher Education (2018) showed that among a total of 8,296,663 students enrolled in higher education institutions, 57% were female and 43% male.

Among the courses included in the research, morning classes were predominant, especially because courses in veterinary medicine and physical therapy are conducted only during the day. The student data highlighted that a large number had moved to the city in which the university is located, leaving their hometown; many lived with other people, or even alone, without their family members. This age group can be considered young, as university students are usually between 17 and 24 years of age (Ragan, Li, and Matos-Díaz 2011). This population is known to be susceptible, and in increasing numbers, to psychological problems, resulting in poor academic performance, anxiety and depression, avoidance of courses, and even suicide attempts. In a study conducted with 714 students from a university in midwestern Brazil, Santos et al. (2019) observed that 9.9% of the students had suicidal thoughts within the 30 days prior to data collection, while 42% reported experiencing depressive symptoms.

Study's main limitation, to our knowledge, was the limited number of student participants and included courses. The chosen courses were from the university's school of life sciences and were related to health sciences. However, future research could be extended to more students, as well as to courses from different academic areas.

5. Conclusion

The present study demonstrated university students' stress levels and the related implications in the areas of perceived health, academic performance, and students' relationships with the institution for courses in the university's health sciences department. Further studies are suggested on the investigation of students of different areas, as well as on the use of methodologies to reduce stress to improve academic life.

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