







Stress and depression in university health students*

Estresse e depressão em estudantes universitários da saúde

How to cite this article:

Bresolin JZ, Dalmolin GL, Vasconcellos SJL, Andolhe R, Morais BX, Lanes TC. Stress and depression in university health students. Rev Rene. 2022;23:e71879. DOI: <https://doi.org/10.15253/2175-6783.20222371879>

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*Extracted from the dissertation "Sintomas comuns de depressão e estresse percebido em estudantes universitários da área da saúde", Universidade Federal de Santa Maria, 2018.

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Conflict of interest: the authors have declared that there is no conflict of interest.

EDITOR IN CHIEF: Viviane Martins da Silva

ASSOCIATE EDITOR: Renan Alves Silva

ABSTRACT

Objective: to analyze the association between stress and depression in university health students. **Methods:** cross-sectional study conducted with 792 university health students. The research instrument consisted of characterization of the students, Beck Depression Inventory version II and the Perceived Stress Scale. Absolute and relative frequency analysis, mean, standard deviation, median, interquartile range, and analytical statistics were used. **Results:** an association between depression and stress was observed ($p < 0.001$) as well as a strong correlation between them ($r = 0.731$; $p < 0.001$). In high level of stress 9.5% of the students were found and in moderate to severe intensity of common symptoms of depression, 23.6% of them. **Conclusion:** a difference was noticed in the averages between the levels of depression and stress, in that the higher the level of depression, the higher the average stress. **Contributions to practice:** stress is related to depression in university health students, who, after graduation, may enter the labor market already sick, which brings implications for interpersonal relationships, worker health and patient safety. This enables higher education institutions to reflect on the organization of practices and intervention policies for the reduction of stress and depression among students.

Descriptors: Stress, Psychological; Depressive Disorder; Students, Health Sciences; Universities.

RESUMO

Objetivo: analisar a associação entre o estresse e depressão em estudantes universitários da saúde. **Métodos:** estudo transversal realizado com 792 estudantes universitários da saúde. O instrumento de pesquisa consistiu: caracterização dos estudantes; Inventário de Depressão de Beck versão II e Escala de Estresse Percebido. Empregaram-se análise de frequência absoluta e relativa, média, desvio-padrão, mediana, intervalo interquartil, e estatística analítica. **Resultados:** observou-se associação entre a depressão e o estresse ($p < 0,001$) bem como correlação forte entre eles ($r = 0,731$; $p < 0,001$). Em alto nível de estresse encontraram-se 9,5% dos estudantes e, em moderada a grave intensidade de sintomas comuns de depressão, 23,6% dos mesmos. **Conclusão:** percebeu-se diferença nas médias entre os níveis de depressão e estresse, em que quanto maior o nível de depressão maior a média do estresse. **Contribuições para a prática:** o estresse está relacionado com a depressão em estudantes universitários da saúde, os quais, após a conclusão da graduação, podem entrar no mercado de trabalho já adoecidos, o que traz implicações para as relações interpessoais, saúde do trabalhador e segurança do paciente. Isso possibilita às instituições de ensino superior uma reflexão acerca da organização de práticas e políticas de intervenções para a redução do estresse e depressão entre os estudantes.

Descritores: Estresse Psicológico; Transtorno Depressivo; Estudantes; Ciências da Saúde; Universidades.

Introduction

Currently, it has been observed an increase in the number of occurrences of people with stress and depression whose manifestation can influence the quality of life and routine activities⁽¹⁻³⁾. The symptom of stress is understood as a manifestation resulting from an external or internal event that exceeds the aspects of physiological or psychological adaptation referring to the cognitive, emotional, and behavioral process, leaving people in situations of risk for becoming ill⁽⁴⁾.

The occurrence of stress may be related to the onset of risk behavior, favoring health problems by adopting inappropriate lifestyle habits such as excessive use of technology, irregular sleep and eating habits and lack of physical activity^(3,5). The literature points out that university students have high levels of stress, which affects their motivation, commitment to studies and attitudes towards learning⁽⁶⁾.

Furthermore, the combination of genetic elements and stress may indicate the susceptibility of people to the development of depression, which is defined as the loss of interest and pleasure to practice daily activities, also presenting changes in appetite and difficulty to concentrate⁽⁴⁾. Depression in university students in the health sciences has presented alarming prevalence with values between 34.73 and 95%. The causes of depression may be related to the chronicity of stress induced by the production of cortisol in situations of sadness, reduced interest in performing daily activities, compromised self-esteem, and sleep, as well as feelings of guilt, altered appetite, fatigue, and lack of concentration⁽⁵⁾.

The academic environment in the health area may be associated with stress and depression due to contact with pain and suffering of patients and family members, recognition of organizational difficulties and the need to fulfill a heavy workload of internship or practical classes⁽⁷⁻⁸⁾. Moreover, when entering higher education, students need to adapt to the new

routine, since they often face the distance from family and friends, which can foster symptoms of psychological distress⁽⁹⁾.

In this context, it is necessary to understand the association between stress and depression symptoms in healthcare undergraduate students, since illness during graduation can contribute negatively to the student's performance, the use of their training, quality of life and future job satisfaction, as well as have an impact on patient care. Stress in multi-professional residents impacted on well-being and, consequently, on the development of depressive symptoms and suicidal ideation⁽¹⁰⁾.

Thus, despite the growing concentration of international studies on stress and depression among university students⁽¹¹⁻¹²⁾, we realized the need to make a greater investment in this theme, considering the particularity of a university in southern Brazil that brings together several health courses, and because this population is characterized as pre-professional, due to their direct action with assistance at different levels, being essential to evaluate these problems for the development of strategies aimed at the maintenance of mental health in the institution.

Thus, the research question was guided: What is the association between stress and depression in university health students? The objective was to analyze the association between stress and depression in university health students.

Methods

This was a cross-sectional study, which followed the items of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) in its presentation. The study population was undergraduate health science students from a public university in Rio Grande do Sul, Brazil. The undergraduate courses included in the research were: Nursing, Pharmacy, Physiotherapy, Speech Therapy, Medicine, Dentistry and Occupational Therapy. All semesters

were included, totaling 2,334 students. We included students who were enrolled and regularly attending the course and were 18 years of age or older. Students withdrawn from the course for any reason during the data collection period were excluded.

For the sample calculation, we considered the values of confidence level of 95%, sampling error equivalent to 0.5 points, standard deviation (SD) of 7.32⁽¹⁾ and student population (N) of 2,334. Thus, a minimum sample size (n) of 609 participants was estimated and, considering possible losses, 20% were added under the sample, resulting in 731 students. The participants were selected based on conglomerate probability sampling, in which the semesters of the courses were divided into beginning, middle, and end (conglomerates). Classes from each of these periods were drawn to compose the clusters.

Data collection was based on an instrument that included a questionnaire to characterize the students, the Scale of Perceived Stress⁽¹³⁾ and the Beck Depression Inventory-Version II⁽¹⁴⁾. The characterization item contained sociodemographic variables (gender, age, ethnicity, origin, marital status and whether they had children), health habits (if they performed any physical activity, average time of cell phone and computer use) and academic (undergraduate courses, voluntary internship, if they had a scholarship for the financial cost of their studies during the course and means of transportation to the university).

The Perceived Stress Scale was developed in the United States⁽¹³⁾ and validated for Brazil with a Cronbach's alpha of 0.83 indicating adequate reliability and validation by confirmatory factor analysis indicating an adequate and satisfactory model⁽¹⁵⁾. It is noteworthy that the use of the term "perceived stress" is related to the use of the instrument and measurement reference of this construct as well as to the level at which people perceive situations as stressful sources. The scale is composed of 14 items that analyze how unexpected, uncontrolled, and overwhelming the participants' assessment of their life is. Each question has

a response variation from zero to four, where 0 refers to "never", one to "almost never", two refers to "sometimes", three to "almost always" and four to "always" and is configured as self-completed⁽¹³⁾.

The Beck Depression Inventory - Version II was developed in the United States⁽¹⁰⁾ and validated in Brazil, presenting a Cronbach's alpha value of 0.93 as well as model adequacy by confirmatory factor analysis⁽¹⁶⁾. The Beck Depression Inventory - Version II is composed of 21 statements about common symptoms of depression and is self-completed. Among the depressive symptoms involved in the instrument are sadness, pessimism, past failure, loss of pleasure, feelings of guilt and punishment, self-esteem, self-criticism, suicidal thoughts or desires, crying, agitation, loss of interest, indecision, devaluation, lack of energy, changes in sleep pattern, irritability, appetite changes, difficulty concentrating, tiredness or fatigue, and loss of interest in sex⁽¹⁴⁾. Each participant needs to recognize symptoms of depression in the past 15 days⁽¹⁶⁾.

In the period between April and July 2017, data collection took place in the classrooms by trained collectors with scheduling and prior authorization from the teacher responsible for the class. The most appropriate time and day for the collection with the students was scheduled with the teachers via e-mail or in person, and they were invited and oriented as to the purpose and completion of the questionnaires. Filling out the instruments took an average of 30 minutes.

The instruments were sent through a form via e-mail/online to the students of the last semesters of the undergraduate courses, because the students of the last semesters did not attend face-to-face classes at the university because they were developing their final internships and course conclusion work. For the preparation of this form, the google docs tool was used. Each student received a link to access the document, which contained: the Informed Consent Form for reading and agreement, as well as the instruments. In case of acceptance to participate in the study, the student was directed to the page to answer the instruments.

For data inclusion, the Excel® tool was used in which the data were typed in a double-independent way. For data analysis, the Predictive Analytics Software, from SPSS Inc., Statistic® Chicago, USA (PASW) version 17.0 for Windows was used.

Qualitative variables were analyzed using percentage and absolute frequency, and for quantitative variables, measures of position and dispersion as recommended by the Kolmogorov-Smirnov normality test, which showed a result of $p > 0.05$ indicating normal distribution. For quantitative variables, Pearson's coefficient of variation was used, where values $< 50\%$ indicated representativeness of the means. The analysis of the Perceived Stress Scale and the questions with a positive connotation (4, 5, 6, 7, 9, 10, 13) had their scores summed inverted as follows: 0=4, 1=3, 2=2, 3=1, and 4=0. The rest of the questions were negative and thus were summed directly. Values above the 75th percentile (42 points) were considered indicative of high stress level⁽¹³⁾.

The depression measurement scale was evaluated by summing the scores of the individual questions on the scale, providing a measure of the intensity of the depressive symptoms. The symptoms were classified according to their severity into from zero to 13 points (minimal/no depression); from 14 to 19 points (mild depression); from 20 to 28 points (moderate depression); and from 29 to 63 points (severe depression)⁽¹⁴⁾. The total mean score of the scale was also calculated.

For comparison of means between perceived stress and depression we used the t-test (for variables with two groups - for comparison of the dichotomous depression variable - Minimal/Level and Moderate/Grave - with the perceived stress of each undergraduate course) or Analysis of Variance (ANOVA) with application of Tukey's *post hoc* test (for variables with three or more groups - for comparison of the polytomous depression variable - Minimal, Mild, Moderate, and Severe - with perceived stress). Statistically significant associations were adopted with $p < 0.05$.

For comparison analysis in the courses, the depression variable was dichotomized into minimal/light and moderate/severe. Pearson's correlation coefficient was used to analyze the correlation between depression and stress, which was classified within the following values: 0.1 to 0.29 weak correlation; 0.3 to 0.49 moderate correlation and above 0.5, strong correlation⁽¹⁷⁾.

To reduce information bias, measures were adopted to train the collectors and use validated instruments consolidated in the literature. To minimize the memory bias effect, the period of the last 15 days prior to responding to the instruments was considered, as recommended by the guidelines for the application of one of them. In addition, the performance of the collectors was evaluated by means of one meeting per week, when all the collectors and the researcher discussed difficulties and facilities in the week's data collection, with each collector delivering the completed instruments. Based on the difficulties reported, strategies for approaching the participants and quality control of the instruments to obtain better results were discussed and employed.

The research project was approved by the research ethics committee of the institution under approval opinion number 1,888,749/2017 and Certificate of Submission for Ethical Consideration no. 63473317.1.0000.5346. The ethical precepts of research involving human beings recommended by Resolution 466/12 were considered and respected. The students were informed about the psychology and psycho-pedagogy services available at the institution through which they could seek help or be referred according to their needs.

Results

A total of 792 students participated in the survey (44 of these online), of which 749 (94.6%) were single, 590 (74.6%) were female, 559 (70.7%) were between 18 and 22 years old, 632 (79.8%) were white,

766 (96.8%) had no children, and 691 (87.3%) came from cities in the state of Rio Grande do Sul. Of these, 192 (24.2%) were in medicine, 143 (18.0%) in dentistry, 117 (14.8%) in nursing, 105 (13.3%) in pharmacy, 102 (12.9%) in occupational therapy, 70 (8.8%) in physical therapy, and 63 (8.0%) in speech therapy.

Most students, 661 (83.5%) did not do voluntary internships, 571 (72.2%) did not have any type of scholarship for the financial cost of their studies during the course, 412 (52.1%) used the bus as a means of transportation to go to the university and 538 (68%) did some physical activity regularly or occasionally. They used cell phones on average 6.7 hours a day (SD=4.74) and computers 2.8 hours a day (SD=1.99). Table 1 shows the association of perceived stress with levels of depression.

Table 1 – Association between perceived stress and depression levels in university health students. Santa Maria, RS, Brazil, 2018

Variables	Perceived stress			p*
	n	Mean	Standard Deviation	
Depression levels				
Low	446	1.81	0.48	
Slight	159	2.44	0.38	
Moderate	128	2.64	0.37	<0.001 [†]
Severe	59	2.94	0.44	
Total	792	2.15	0.60	

*Analysis of variance; [†]Significant association

In Table 1, the Tukey's *post hoc* test was also used to identify the difference between groups, and a difference was verified between the minimum level with mild (p<0.001), moderate (p<0.001) and severe (p<0.001), mild level with moderate (p=0.001) and severe (p<0.001), and moderate level with severe (p<0.001), noting that the higher the level of depression, the higher the mean perceived stress. Also, in the

comparison analysis by individual courses using the t-test, a higher mean of perceived stress was identified among speech therapy, nursing, pharmacy, medicine, occupational therapy, and physical therapy students with moderate/severe depression when compared to students with minimal/light depression (Table 2).

The correlation between depression and perceived stress was rated as strong (r=0.731; p<0.001).

Table 2 – Association between mean perceived stress and depression in university health students according to undergraduate courses. Santa Maria, RS, Brazil, 2018

Course	Depression Minimal/Mild		Depression Moderate/Severe		p*
	n	Mean (SD)	n	Mean (SD)	
Nursing	77	1.05 (0.22)	40	1.18 (0.38)	0.031 [†]
Pharmacy	81	1.01 (0.11)	24	1.29 (0.46)	<0.001 [†]
Physiotherapy	59	1.02 (0.13)	11	1.18 (0.40)	0.013 [†]
Speech therapy	33	1.12 (0.33)	30	1.50 (0.51)	0.001 [†]
Medicine	152	1.03 (0.16)	40	1.40 (0.50)	<0.001 [†]
Dentistry	122	1.03 (0.17)	21	1.10 (0.30)	0.190
Occupational Therapy	81	1.04 (0.19)	21	1.24 (0.43)	0.002 [†]

*t-test; [†]Significant association; SD: standard deviation

Regarding stress, we observed a mean of 30.22 (SD=8.47), with a minimum score of six and a maximum of 54 points. A total of 75 (9.5%) students were classified as having a high level of stress. The highest predominance of high perceived stress was seen in speech therapy students 239 (30.2%) and medical students 82 (10.4%). Table 3 shows the mean, standard deviation, median and interquartile range of the variables according to the responses of the Scale of Perceived Stress.

Table 3 – Mean, standard deviation, median and interquartile range of the questions of the Perceived Stress Scale. Santa Maria, RS, Brazil, 2018

Questions	Mean	Standad Deviation	Median	IIQ*
1. Have you been sad because of something that happened unexpectedly?	2.22 [†]	1.01	2.00	2.00-3.00
2. Have you felt unable to control the important things in your life?	1.80 [†]	1.19	2.00	1.00-3.00
3. Have you been feeling nervous and “stressed”?	2.72 [†]	1.01	3.00	2.00-4.00
4. Have you been dealing successfully with life’s difficult problems?	2.32 [†]	0.89	2.00	2.00-3.00
5. Do you feel that you are coping well with important changes taking place in your life?	2.21 [†]	1.00	2.00	2.00-3.00
6. Have you felt confident in your ability to solve personal problems?	2.24 [†]	1.00	2.00	2.00-3.00
7. Do you feel that things are happening according to your will?	1.96	0.99	2.00	1.00-3.00
8. Have you been feeling that you couldn’t handle all the things you have to do?	2.29 [†]	1.11	2.00	2.00-3.00
9. Have you been able to control the irritations in your life?	2.16 [†]	1.02	2.00	1.00-3.00
10. Do you feel that things are under your control?	1.56	1.01	2.00	1.00-2.00
11. Do you get irritated because things that happen are out of your control?	2.33 [†]	1.09	2.00	2.00-3.00
12. Do you find yourself thinking about the things you should do?	3.22 [†]	0.88	3.00	3.00-4.00
13. Have you been able to control the way you spend your time?	1.96	1.03	200	1.00-3.00
14. Do you feel that difficulties accumulate to the point that you can’t overcome them?	2.05	1.21	2.00	1.00-3.00

*IIQ: Interquartile range; [†]Pearson coefficient of variation (<50%)

Based on Table 3, the highest averages were found on the questions regarding thinking about things you should do, nervousness and stress, and feelings of irritability.

With regard to the common symptoms of depression, there were 536 (67.6%) in the symptoms of sadness, pessimism 487 (61.5%), past failure 542 (68.4%), loss of pleasure 439 (55.4%), feelings of punishment 628 (79.3%), self-esteem 528 (66.6%), suicidal thoughts or desires 696 (87.9%), crying 470 (59.3%), loss of interest 415 (52.4%), indecision 339 (42.8%), devaluation 574 (72.5%), appetite changes 361 (45.6%), and loss of interest in sex 589 (74.4%). The highest frequency of answers was observed in the option no change. However, in eight of them, variations in the usual behavior pattern were noticed, since the highest prevalence of answers was observed in the options indicating the occurrence of symptoms, which were related to feeling of guilt 381 (48.1%), self-criticism 385 (48.6%), agitation 378 (47.7%), lack of ener-

gy 411 (51.9%), changes in sleep pattern 388 (49.0%), irritability 350 (44.2%), difficulty to concentrate 286 (36.1%), and tiredness or fatigue 363 (45.9%).

We also highlight some less prevalent, but important, issues, such as 235 (29.7%) of the students who said they feel sad most of the time, 30 (3.8%), do not like themselves, 4 (0.5%) would like to kill themselves, and 3 (0.4%) would kill themselves if they had the opportunity. Also, in general, it was found that the intensity of the common symptoms of depression was moderate to severe in 187 (23.6%) students.

Discussion

Based on the finding of the relationship between the variables, it is cited that in another study stress was also associated with depressive symptoms due to the high demands of course activities as an aggravating factor in the quality of life of students⁽¹⁸⁾. In northwestern Ethiopia, it was verified that Health

Sciences undergraduate students were twice as likely to develop depression when compared to medical students (Odds Ratio = 2.65; 95%CI: 1.34-5.26) and four times more likely in relation to those who reported stress symptoms (Odds Ratio = 4.20; 95%CI: 1.90-9.26)⁽⁵⁾. In this sense, it is noteworthy that the dynamics of the university can foster situations that influence the health of students, modifying, for such, routines both in the diet and in the appropriate behavior of sleep and time for leisure^(3,5).

Specifically, the relationship identified between the constructs studied in the different courses may be associated with the high demand and the high number of hours required by the courses, since the students feel inexperienced and unprepared to promote resolute actions in assistance and witness situations of suffering and vulnerability of patients and their families⁽⁶⁾.

Lack of experience is an adversity found due to the students' lack of ability to develop technical procedures, lack of ability to conduct conflictive and managerial situations, and insecurity when faced with clinical reality. Still in this perspective, the personal profile may also be one of the impediments to academic performance, since fear, lack of security, anxiety and fear hinder the students' ability to communicate when these abilities are not yet better developed, which may lead them to stress and depression⁽⁶⁾.

This was also identified based on depression and elements of control over aspects of life, nervousness, and stress. In line with this, previous studies have identified correlation between stress and depression among university students ($p=0.001$)⁽¹¹⁾ and between stress and anxiety in healthcare professionals⁽¹²⁾.

It was also identified, individually, the occurrence of the constructs studied as stress. This finding is due to the student's coping with stressful factors that occur during the undergraduate course, such as financial problems, pressure from teachers and family members for good academic performance, as well as concerns about the future^(9,19).

The factors that lead to stress can happen due to the competition among students to get better grades in subjects, many hours of study, psycho-emotional challenge of working with sick people, and having to deal in some cases with death and terminality, making them more anxious and at higher risk of getting sick⁽⁷⁻⁸⁾.

Regarding the questions of the stress scale, higher averages were found regarding thoughts about what should be done, nervousness, stress, and feelings of irritability. On the other hand, a study conducted at a Peruvian university identified normal levels of stress among university health students⁽²⁰⁾. The excessive workload, academic demands, restructuring of curricula, failures, and extracurricular activities can be sources of psycho-emotional problems among students⁽⁹⁾.

The stress symptoms can worsen the health of individuals, being predictors for depression according to the literature^(5,11). This happens because stress and depression share similar mechanisms, which favors the report of altered symptoms⁽⁵⁾. In the present study, possible alterations in eight common symptoms of depression were found. Agitation, fatigue, lack of energy, irritability and lack of concentration are harmful to students because they can drive other health aggravations, such as suicide attempt and anxiety disorders^(1-2,12,19).

It is also noteworthy that some students presented depressive symptoms related to suicidal thoughts, since they would kill themselves if they had the opportunity to do so. This fact corroborates a study conducted with 197 college students in the United States, in which 6% had suicidal ideation. Even though it is a small portion of students with these thoughts, it is important that teachers and family members be aware to refer them to qualified professionals to help them face and reduce these feelings⁽¹¹⁾.

The literature points out that suicide is one of the leading causes of death among young people, of which women have greater suicidal ideation when compared to men⁽²⁾. Health students have a high risk

of suicide when compared to other areas of education, because when working with patients they feel pressured not to commit incidents. Although this study identified a prevalence of 0.4 and 0.5% of suicidal ideation symptoms, the investigation of its causes based on the students' support network is extremely important, since family and friends are essential in preventing this symptom, as well as the preparation of teachers and the university community for recognition and proper referrals, promotion of public health policies, and demystification of suicidal ideation^(2,10).

The results of this study suggest the promotion of strategies aimed at reducing stress and depression and can promote the students' well-being, with a view to making them more resilient. It is essential to offer social support, encourage students to maintain a healthy diet, have time for rest and leisure, adequate sleep and regular exercise^(2,10). Under this prism, before the practical classes, it is important that teachers provide students with information that can help them reduce fear, anxiety and stress when facing assistance, encouraging them to face their difficulties⁽⁹⁾. Finally, it is also suggested the offer of integrative and complementary practices by universities, such as relaxation techniques like yoga and meditation, psychotherapy associated with auriculotherapy, music therapy and aromatherapy, as well as short-term interventions such as treatment of psychiatric disorders with trained professionals for free.

Study limitations

The limitations were the study design, because in cross-sectional research it is impossible to infer causality, in this case, the difficulty in accessing the students from the last semesters, who were in an internship period and were accessed online, but there was a low adherence to filling out the instruments.

Contributions to practice

As a main contribution of the study, it was evi-

denced that perceived stress is related to depressive symptoms in college health students, since higher levels of stress were identified in students of nursing, pharmacy, physiotherapy, speech therapy, medicine and occupational therapy courses who presented moderate/severe depression in comparison to students of the minimal/light group. This finding signals the fact that students, after finishing the courses, may already be ill when they enter the job market, which has implications for work organization, interpersonal relationships, worker health, and patient safety. This diagnosis can enable teachers, course coordinators, and university managers to reflect and establish practices and intervention policies that promote well-being and reduce stress and depression.

Conclusion

Considering the data presented, a difference was noticed in the averages between the levels of depression and stress, in which the higher the level of depression, the higher the average stress level. Moreover, a higher level of stress was perceived among speech therapy, nursing, pharmacy, medicine, occupational therapy, and physical therapy students with moderate/severe depression when compared to students with minimal/light depression. It is important that university institutions carry out actions aimed at obtaining a better well-being for students in their academic life accompanied by a reduction of stressful situations. In this way, the student's personal and professional progress will be improved without prejudice to the performance of the course.

Authors' contribution

Conception and design, analysis, and interpretation of data: Bresolin JZ, Dalmolin GL, Vasconcellos SJL, Andolhe R, Morais BX, Lanes TC.

Writing of the article and relevant critical review of the intellectual content: Bresolin JZ, Dalmolin GL, Vasconcellos SJL, Andolhe R, Morais BX, Lanes TC.

Final approval of the version to be published, and agreement to be responsible for all aspects of the manuscript related to the accuracy or completeness of any part of the work to be investigated and resolved appropriately: Bresolin JZ, Dalmolin GL, Vasconcellos SJL, Andolhe R, Morais BX, Lanes TC.

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