Prevalence and associated factors with neck and low back pain in undergraduate students in a Brazilian University during the Covid-19 pandemic

Prevalência e fatores associados à cervicalgia e lombalgia em estudantes de graduação de uma universidade brasileira durante a pandemia de Covid-19

Prevalencia y factores asociados al dolor de cuello y lumbalgia en estudiantes de pregrado de una universidad brasileña durante la pandemia de Covid-19

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ABSTRACT

Objective: To analyze the prevalence and factors associated with neck and low back pain in undergraduate students, Brazil, during remote activities during the Covid-19 pandemic. **Methods:** This is a descriptive and cross-sectional observational study carried out at a Brazilian university. Inclusion criteria: undergraduate students, of both genders, aged between 18 and 30 years who correctly answered a questionnaire and signed the consent form. Users were investigated for the presence of pain in one of these regions. Statistical analysis was performed using the IBM SPSS (Version 19.0.). The study was approved by the Research Ethics Committee. **Results:** A total of 412 individual responses were collected, 23 people did not report pain, 155 people reported neck pain and 234 reported low back pain. Symptoms caused by variables such as low back pain and neck pain, such as being female and remaining in a sitting position with the neck prostrate facing screens, as well as their effects on the activities carried out. **Conclusion:** Remote activities during the pandemic have been shown to have a negative impact on undergraduate students. Therefore, future research is needed to investigate these findings.

Keywords: Neck pain, Low back pain, Pandemics, COVID-19.

RESUMO

Objetivo: Analisar a prevalência e os fatores associados à dor cervical e lombar em estudantes de graduação de uma universidade brasileira, durante as atividades remotas no período da pandemia da Covid-19. **Métodos:** Trata-se de estudo observacional descritivo e transversal realizado em uma universidade brasileira. Critérios de inclusão: alunos de graduação, de ambos os sexos, com idade entre 18 e 30 anos que responderam corretamente a um questionário e assinaram o termo de consentimento. Os usuários foram investigados quanto à presença de dor em uma dessas regiões. A análise estatística foi realizada com auxílio do software IBM SPSS (Version 19.0.). O estudo foi aprovado por Comitê de Ética em

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Pesquisa. **Resultados:** Foram coletadas 412 respostas individuais, 23 pessoas não referiram presença de dor, 155 pessoas relataram dor na cervical e 234 referiram dor lombar. Os achados demonstraram associações de variáveis com a lombalgia e a cervicalgia, como ser do sexo feminino e manter-se na posição sentada com a cervical prostrada de frente para telas, bem como seus impactos nas atividades diárias. **Conclusão:** Demonstrou-se que atividades remotas durante a pandemia tiveram um impacto negativo entre os estudantes de graduação. Logo, pesquisas futuras são necessárias para investigar esses achados.

Palavras-chave: Cervicalgia, Lombalgia, Pandemias, COVID-19.

RESUMEN

Objetivo: Analizar la prevalencia y los factores asociados al dolor de cuello y espalda baja en estudiantes de graduación, Brasil, durante actividades remotas durante la pandemia de Covid-19. **Métodos:** Se trata de estudio observacional descriptivo y transversal realizado en una universidad brasileña. Criterios de inclusión: Estudiantes de la graduación, ambos sexos, con edad entre 18 y 30 años, que respondieron correctamente un cuestionario y firmaron el consentimiento informado. Los usuarios fueron investigados por la presencia de dolor en una de estas regiones. El análisis estadístico se realizó utilizando el software IBM SPSS (Versión 19.0.). El estudio fue aprobado por el Comité de Ética en Investigación. **Resultados:** Se recogieron un total de 412 respuestas individuales, 23 personas no informaron dolor, 155 personas informaron dolor de cuello y 234 informaron dolor lumbar. Síntomas provocados por variables como lumbalgia y cervicalgia, como ser mujer y permanecer en posición sentada con el cuello postrado frente a las pantallas, así como sus efectos en las actividades realizadas. **Conclusión:** Se ha demostrado que las actividades remotas durante la pandemia tienen un impacto negativo en los estudiantes de pregrado. Por lo tanto, se necesita investigación futura para investigar estos hallazgos.

Palabras clave: Dolor de cuello, Lumbalgia, Pandemias, COVID-19.

INTRODUCTION

In 2020, due to the Pandemic caused by the new Coronavirus, a state of emergency was declared in Brazil. In this context, common activities such as work, leisure, and classes in schools and universities were replaced by remote activities (SOUZA KC, et al., 2021). At the University where the research was carried out, the Emergency Period of Remote Teaching was also instituted. Therefore, the students had to perform their academic activities at home and, in general, without the proper conditions to do it.

Likewise, while spending much time using laptops and smartphones to study and support leisure activities, they adopt incorrect postures, leading to musculoskeletal alteration and pain, especially to the neck and the spine. In this context, different studies conducted among university students highlighted a high percentage of them stating musculoskeletal pain, especially at the neck and low back. In addition, inactive students commonly reported mild/moderate pain, while physically active students referred to severe pain with a higher frequency over the month than inactive ones (ROGGIO, F, et al., 2021).

Musculoskeletal pain can cause a lot of stress and troubles in the academic performance of students (RODRÍGUEZ RL, et al., 2020). The low back and neck regions were the ones with the highest percentage of musculoskeletal pain reported during quarantine, and back pain can negatively affect student's life (SAGÁT P, et al., 2020; OGUNLANA MO, et al., 2021). A study made in Brazil also found that students reduced their practice of physical activities and developed a sedentary behavior due to the numerous changes in the students' routine in the period of social isolation, leading to a general musculoskeletal overload (CAROMANO FA, et al., 2015). Neck pain is considered by the World Health Organization the fourth leading cause of limitation to the general population and the eighth in relation to young population (VITTA A et al., 2021). It is known that several factors can be related to the onset of neck pain such as specific body positions, work activities, repetitive movements, long computer use periods, smoking, female

sex, and age (GOTTARDE LAF, et al., 2019). the pain in neck can cause concentration problems, disabilities, sleep disturbances and several limitations.

Low back pain is the most common example of musculoskeletal disorders (OGUNLANA MO, et al., 2021) and it's defined as discomfort in the lower region of the spine that can present whether by a combination of mechanical, circulatory, hormonal, psychosocial factors that limit physical, emotional and cognitive aptitude in college students (MORAIS ML, et al., 2018). In addition, specific body positions, sports or daily life, repetitive movements, long-term exposure to devices, technological, physical and sociodemographic factors were presented as factors at risk for musculoskeletal pain, promoting a reduction in the quality of life. That pain impairs performance in studies and affects the future ability to work and the health of university students (LEIRÓS-RODRÍGUEZ R, et al., 2020).

Neck and low back pain are highly prevalent musculoskeletal pains. Some of the risk factors associated with the condition are age, biological sex, genetics, level of physical activity and lifestyle. A study showed that neck pain is more common in women than in men (HIDALGO B, et al., 2017). Low back pain is the biggest cause of disability in recent years. Risk factors include age, biological sex, physical stress, psychosomatic illness, and general poor health. As with neck pain, low back pain is more frequent in female individuals. Recent research points out that the reduction of sleep hours also leads to the emergence of musculoskeletal pain. Other factors such as increased exposure to computer screens, tablets and cell phones, inadequate sleep habits and inappropriate posture to study were present in the scenario of social isolation and were risk factors for the development of neck and low back pain (ABBAS J, et al., 2021).

In this perspective, it was considered important to carry out this study with the objectives of analyzing the prevalence and factors associated with neck pain and low back pain in undergraduate students at the University of Brasília, during the Covid-19 pandemic.

METHODS

This is a descriptive observational and cross-sectional study approved by the Ethics and Research Committee of the university (CAAE: 40739820.0.0000.8093 / n. 4.572.801). Study sample was composed by undergraduate students at a Brazilian university and included young adults that were regular students at the university during the Covid pandemic, aged between 18 and 30 years, answered the electronic questionnaire correctly, according to the instructions given and agreed to sign the consent form.

The study questionnaire to be responded by the participants was delivered via *Google Forms*[TM]. It was opened on September 13th, 2021, and the answers were accepted until December, 4th of the same year. The self-administered questionnaire allowed only one answer per person and was based on the Back Pain and Body Posture Instruments for adults - BackPEI-A, Oswestry Disability Questionnaire - ODQ, International Physical Activity Questionnaire - IPAQ and the Copenhagen Neck Disability Functional Scale (CANDOTTI CT, et al. 2018; MEGAN D and KEATING J, 2005; NETTO MB, ROSSATO LR, 2019; BADARÓ FAR, et al., 2014). The questions investigated age, gender, university course and campus, present or previous occurrence of pain, pain intensity and quality, posture, sleep habits, and behavior in functional and daily living activities.

The first section of the questionnaire referred to the participant's e-mail and agreement with the consent form, information on study habits, hours in front of electronics, activity practice physical and anthropometric measurements (BMI). At the end of this section, the participant was asked about the most impacting pain at that moment, if low back or neck pain. Depending on the answer, the person was directed to the second section that could refer to neck or low back pain. In the third section, the participants indicated how the pain was and the limitations of activities of daily living, resulting from the pain. After finishing the questionnaire, the participant was able to send the answers and received a copy of it. After all participants answered the questionnaire, data of biological sex, age, change of positions during the day, adequate and inadequate posture while studying, place of study, number of hours in front of the computer, tablet and/or cell phone, practice of physical exercises and frequency, BMI (Index of Body Mass) and hours of sleep were analyzed.

The study´s sample size was calculated using the Epi-Info mobile program version 1.4.3. Considering a finite population of 40,000 students, an unknown prevalence of 50%, confidence level equal to 90%, and a sampling error of 5%. The minimum sample size necessary was 269 subjects. Considering probable loss of responses, 20% drop-out was added, resulting in a minimum sample of 323 individuals. Descriptive statistics and the Chi-Square test (p < 0.05) were used to analyze the collected data with the Statistical Package for the Social Science program (SPSS- version 19.0.). The Chi-Square test aims to analyze whether there was an association between two variables. The SPSS program automatically calculates the Fisher Exact Test value when the expected frequency does not match that required for the Chi-Square test. In all analyses, significance levels were set at $p \leq 0.05$.

RESULTS

A total of 412 responses were collected. Twenty-three students reported no neck or low back pain, 155 students referred to the presence of neck pain, and 234 students claimed to have had low back pain.

Relations between pain and sex and gender

The distribution of the relationship between neck and low back pain with the variables biological sex and age is available in **Table 1**.

Table 1 - Distribution of absolute and relative frequencies of the sociodemographic variables gender and age of undergraduate students at a Brazilian university according to low back pain and the association test.

Variable	Neck pain		p value º	Low Back pain		p value º
	Yes n (%)	No n (%)		Yes n (%)	No n (%)	
Sex						
Woman	118 (76,1%)	12 (52,2%)	**0.016***	186 (79,5%)	12 (52,2%)	**0.003***
Man	37 (23,9%)	11 (47,9%)		48 (29,5%)	11 (47,8%)	
Age (years)						
Female						
18- 21	80 (67,7%)	8 (34,8%)	**0.734**	127 (68,3%)	8 (66,7%	**0.622**
22- 25	32 (27,1%)	3 (13%		51 (27,4%)	3 (25%)	
26- 30	6 (5,1%)	1 (4,4%)		8 (4,3%)	1 (8,3%)	
Male						
18-21	19 (51,3%)	5 (21,8%)	**0.228**	26 (54,2%)	5 (45,4%)	**0.408**
22-25	17 (49,9%)	4 (17,4%)		19 (39,6%)	4 (36,4%)	
26-30	1 (2,7%)	2 (8,7%)		3 (6,2%)	2 (18,2%)	

Note: º Chi-Square test or Fisher's Exact Test * significant association (p<0,05).
Source: Amorim A, et al., 2023.

Results showed that the prevalence of students with neck pain was 37.62%, considering the 155 students who had neck pain and the 23 ones who did not. As for the prevalence by gender, it was possible to conclude a higher prevalence of neck pain in females when compared to males. Regarding age, the age group from 18 to 21 years old had higher rates of pain when compared to the other age groups. The punctual prevalence of neck pain, which means students who had neck pain at evaluation time was 76.1%, and the prevalence of neck pain per period, which is those who had neck pain at some point during the pandemic was 23.8%. Using the Chi-Square test, an association was found between neck pain and female sex (p = 0.016) with female gender presenting a higher percentage (76,1%). Using Fisher's exact test, there were no significant associations between neck pain in females and age (p = 0.734) or between neck pain in males and age (p = 0.228) in favor of the Null Hypothesis (H0).

About the prevalence of students with low back pain, data showed that 91% of them related pain, considering the 234 people who had low back pain and the 23 ones who did not. As for the prevalence by gender, it was possible to conclude a higher prevalence of low back pain in females. Regarding age, the age

group from 18 to 21 years old had higher rates of pain when compared to the other age groups. The punctual prevalence of low back pain, which means students who had low back pain at the time of answering the questionnaire, was 39.7%.

The prevalence of low back pain per period, which is those who had low back pain at some point during the pandemic, was 60.2%. Using Fisher's exact test, no association was found between low back pain and age in males (p=0.408), as well as in female students there was no association between age and the presence of low back pain (p=0.622). Regarding the association of the variable gender with the presence of low back pain, it was possible, through the chi-square test, to find an association between female and male genders with the presence of low back pain (p < 0.003), with female gender presenting a higher percentage.

Relations between pain and posture and Daily Life Activities

The distribution of the relations between pain and posture and Daily Life Activities is available in **Table 2**.

Table 2 - Distribution of absolute and relative frequencies of variants of sleep, posture, functional activities, and activities of daily living of undergraduate students at a Brazilian university according to low back pain and the association test.

Variable	Neck pain		p value ^{0}	Low Back pain		p value ^{0}
	Yes n (%)	No n (%)		Yes n (%)	No n (%)	
Prevalent Position						
Sitting	142 (88,2%)	19(11,8%)	0.285	212 (91,8%)	19 (8,2%)	0.264
Lying	9 (75%)	3 (25%)		15 (83,3%)	3 (16,7%)	
Standing	3 (75%)	1 (25%)		7 (87,5%)	1 (12,5%)	
Sitting and Standing	1 (100%)	0 (0,0%)		0 (0,0%)	0 (0,0%)	
Hours of sleep						
2-3 hours	2 (100%)	0 (0,0%)	0.381	0 (0,0%)	0 (0,0%)	0.882
4-5 hours	19 (82,6%)	4 (17,4%)		39 (90,7%)	4 (9,3%)	
6-8 hours	125(88,7%)	16(11,4%)		169 (91,4%)	16 (8,6%)	
More than 8 hours	9 (75%)	3 (25%)		26 (89,7%)	3 (10,3%)	
Hours on cell phone/tablet						
1-2 hours	12 (85,7%)	2 (14,3%)	0.629	15 (88,2%)	2 (11,8%)	0.572
3-4 hours	49 (84,5%)	9 (15,5%)		64 (87,7%)	9 (12,3%)	
5-8 hours	40 (85,1%)	7 (14,9%)		87 (92,6%)	7 (7,4%)	
More than 8 hours	54 (91,5%)	5 (8,4%)		68 (93,1%)	5 (6,9%)	
Hours on the computer						
1-2 hours	2 (50%)	2 (50%)	0.197	10 (83,3%)	2 (16,7%)	0.668
3-4 hours	28 (84,8%)	5 (15,2%)		44 (93,6%)	3 (6,4%)	
5-8 hours	70 (88,6%)	9 (11,4%)		109 (91%)	11 (9%)	
More than 8 hours	55 (88,7%)	7 (11,3%)		71 (91%)	7 (9%)	

Note: ^{0} Chi-Square test or Fisher's Exact Test * significant association (p<0,05).
Source: Amorim A, et al., 2023.

By using the Fisher's exact method, no associations were found between body position during the day (p=0.285), hours of sleep (p=0.381), study location (p=0.897), study posture (p=0.547), hours on the cell phone/tablet (p=0.629), hours on the computer (p=0.197) and pain. However, an association between neck pain and positioning of the head when using the computer, was found (p=0.006). Regarding the sleeping hours, among the participants who slept from 2 to 3 hours a day (1.12% of total), 100% of them had neck pain. Among the participants who slept between 4 and 5 hours a day (12.9% of total), 82.6% of them had neck pain. Among the participants who slept from 6 to 8 hours a day (79.2% of total), 88.7% of them had neck pain. Among the participants who slept more than 8 hours a day (6.7% of total), 75% of them had neck pain. It was found that most participants with neck pain: i. spent between 5 and 8 hours and more than 8

hours a day in front of computer and cell phone or tablets, respectively; ii. used to spend most of the day sitting; iii. 25.3% reported difficulty performing household chores, 11% had difficulty walking, 2.2% had difficulty lifting light objects, 24.2% had difficulty lifting heavy objects, 13.2% had difficulty performing personal care, and 71.4% had difficulty of concentrating; iv. 15.6% had difficulty performing household chores, 4.7% had difficulty walking, 6.2% had difficulty lifting light objects, 18.7% had difficulty lifting heavy objects, 7.8% had difficulty performing personal care, and 50% had difficulty concentrating. When considering low back pain, no significant associations were found with position during the day (p=0.264), hours of sleep (p=0.882), study location (p=0.477), adequate posture for study (p=0.088), hours on the cell phone/tablet (p=0.572), hours on the computer (p=0.668), study habits (p=288). Regarding to the sleeping hours, 11.3% of participants slept for more than 8 hours.

Of these, 89.7% felt low back pain, 16.7% slept 4 to 5 hours a day, of these, 90.7% had low back pain, 71.9% slept for 6 to 8 hours, of which 91.4% felt low back pain. Additionally, it was found that the majority of people with low back pain: i. spent between 5 and 8 hours in the day using the computer; ii. spent between 5 and 8 hours a day using cell phones and tablets; iii. used to spend most of the day sitting; iv. 0.70% were unable to walk, 10.6% had difficulty walking, 42.5% were able to walk, but they felt pain; v. 0.70% were unable to perform personal care, 9.2% felt pain when taking care of themselves slowly and 28.4% were able to take care of themselves but felt pain, 5.3% needed help, but they managed to perform most of the care, and 20.4% managed to take care of themselves, but felt a lot of pain; vi. 1.4% were unable to lift or carry anything, 2.8% were able to lift only light objects and 19.1% were prevented from lifting heavy objects from the floor, but were able to lift them when conveniently positioned, for example, on a table, 3.2% were able to lift only light objects, 3.2% were unable to lift heavy objects, but were able to lift light to moderate weight objects when conveniently positioned, and 20% were unable to lift heavy objects from the floor, but managed to lift them when conveniently positioned, for example on a table; vii. 5.6% were completely prevented from performing tasks, 2.1% were prevented from performing them completely; viii. 9.7% felt difficulty in locomotion due to the pain.

Relations between pain and anthropometric measurements and physical activity

The distribution of the relations between pain and anthropometric measurements and physical activity is available in **Table 3**.

Table 3 - Distribution of variables of frequency of physical activity and Body Mass Index divided between the presence and absence of pain.

Variable	Neck pain		p value [0]	Low Back pain		p value [0]
	Yes n (%)	No n (%)		Yes n (%)	No n (%)	
Frequency of physical activity						
0	39 (25,1%)	4 (1,5%)	0.27	89 (34,6%)	4 (1,5%)	0.10
1-2x	59 (38%)	5 (1,9%)		60 (23,3%)	5 (1,9%)	
3-4x	31 (20%)	8 (3,1%)		49 (19%)	8 (3,1%)	
5x or more	26 (16,7%)	6 (2,3%)		36 (14%)	6 (2,3%)	
Body mass index (BMI)						
Underweight	19 (12,2%)	1 (0,3%)	0.74	20 (7,8%)	1 (0,3%)	0.81
Normal range	95 (61,3%)	16 (6,2%)		142 (55,2%)	16 (6,2%)	
Pre-obese	30 (19,3%)	4 (1,5%)		52 (20,2%)	4 (1,5%)	
Class I obesity	9 (5,8%)	2 (0,7%)		11 (4,2%)	2 (0,7%)	
Class II obesity	2 (1,3%)	0 (0%)		7 (2,7%)	0 (0%)	
Class III obesity	0 (0%)	0 (0%)		2 (0,7%)	0 (0%)	

Note: [0] Chi-Square test or Fisher's Exact Test * significant association (p<0,05).
Source: Amorim A, et al., 2023.

Regarding the Body Mass Index (BMI) of the 155 respondents to the neck pain questions and the 23 ones who had no pain the prevalence of pain was highest in those with normal weight, followed by those with pre obesity, underweight, class I obesity, and class II obesity, respectively. Using Fisher's exact method, no significant association was found between BMI and the occurrence of neck pain (p = 0.74). About physical

activity practice, the prevalence of pain was highest in students who practiced 1-2x a week, followed by none once a week, 3-4x a week and lastly 5x or more, respectively. No association was found between neck pain and the frequency of physical activity (p = 0.27).

On the other hand, in relation to the Body Mass Index (BMI), considering the 234 people who had low back pain and the 23 ones who did not the prevalence of pain was higher in those with normal weight, followed by pre-obesity, low weight, obesity grade I, grade II obesity and grade III obesity, respectively. Using Fisher's exact method, no association was found between Body Mass Index (BMI) and the occurrence of low back pain (p=0.810). Regarding the practice of physical activity, the prevalence of pain was higher in students who did not practice any exercise during the week, followed by those who practiced 1-2x a week, 3-4x a week and, finally, 5x or more a week, respectively. Using Fisher's exact method, it was not possible to find an association between the frequency of physical activity and the occurrence of low back pain (p = 0.102).

DISCUSSION

Initially, we aimed to analyze the prevalence and factors associated with neck pain and low back pain in undergraduate students at a Brazilian university during the Covid-19 pandemic. Our study presented some limitations that should be considered. First of all the small sample collected and second, the use of a self-administered questionnaire, which may lead to a risk of recall bias, despite we were able to find relevant results that agreed with the available literature. About the relations between neck and low back pain and prevalence, biological sex and age, it was found a similar prevalence of neck pain in students with another that found that 72.2% of university students in Italy had neck pain, during the pandemic, as they had their study hours increased, as a result of their classes being through electronic devices (ROGGIO F, et al., 2021).

In addition, undergraduate students have a high prevalence of pain in the neck (48-78%) and upper limbs even without the pandemic (BEHERA P, et al., 2020). According to a previous study, being a female increases the risk of neck pain (CHAN LLY, et al., 2020). However, another study stated that no studies included in a systematic review could confirm that age or female sex were significant risk factors for the development of neck pain (KIM R, et al., 2018).

Our study, on the other hand, presented some limitations as the use of a self-administered questionnaire. Additionally, in another study it was found that the prevalence of low back pain was 54% of university students, evidencing the existence and relevance of musculoskeletal pain triggered due to inappropriate ergonomic positions and even long periods of study (MORAIS BX, et al., 2019). Another previous study showed a high prevalence of low back pain of 58%, in medical university students, emphasizing that extracurricular and psychosocial factors, such as stress, can lead to low back pain (BOSZCZOWSKI N, et al., 2021).

From the collected data in relation to low back pain and biological sex in this study, it's possible to verify that was presented similar results to those found in the literature, with a higher prevalence of low back pain in females. It is important to consider the fact that this study was carried out in a single educational institution, not allowing comparison with other universities. Regarding the relations between neck and low back pain and posture and daily activities we found several difficulties faced by the students such as lack of suitable places for studying and use of electronic devices for long periods of time.

As a result, the related cases of neck pain brought important limitations regarding the performance of daily activities. Like our study, another one investigated the prevalence and risk factors of musculoskeletal pain among students at a university and found ergonomic risks related to prolonged sitting and repetitive movements. However, it was not possible to find a direct association between use of cell phone and neck pain. The lack of a significant association between the variables investigated may be due to several reasons. It is possible that the population recruited was not sensitive enough, the questions of the self-administered questionnaire and it may not have contemplated all the important aspects. In addition, there is divergence in

the literature regarding risk factors for neck pain, a study attested that some risk factors may be not directly associated with neck pain in students, and therefore, perhaps, posture and lifestyle habits are not directly linked to that type of pain (AL-HADIDI F, et al., 2019).

In relation to low back pain, no significant associations between electronics devices and low back pain were found. However, static postures associated with the use of electronic devices added to prolonged time in the same position could become an important risk factor for the development of low back pain (BENTO TPF, et al., 2020). Another limitation presented was the use of a self-administered questionnaire, which increases the risk of recall bias. However, it needs to be considered that there are a lot of studies that defend the idea that posture it's not associated with low back pain, and taking that in account, future research should be developed to assess the association of these factors with the presence of low back pain in undergraduate students. About the relations between neck and low back pain and Anthropometric measurements and physical activity our research has shown that, regardless of the frequency in which the students at the university perform physical activity, there is no association with the occurrence of neck pain. The same was found for the association with measures anthropometric. Our findings are consistent with the findings of a systematic review in which no study showed neck pain associated with BMI and physical exercises (JAHRE H, et al., 2021).

However, the studies included in this review were classified as being at high risk of bias and the quality of the evidence being very low. Although, a systematic review, concluded that BMI can be a potent risk factor for the occurrence of neck pain (KIM R, et al., 2018). New studies should be carried out with a high methodological quality and a larger sample size. A study found that the emergence of non-specific low back pain may be associated with high levels of physical activity, but this association should be examined with care, as the practice of well-oriented and constant physical activity favors a good posture and decreases the risk of low back pain (GRAUP S, et al., 2014).

Was Reported that "the lowest level of risk of low back pain detected in young people who practice physical activities is due to the type of physical exercises of low intensity and the sporadic frequency of this practice, promoting positive adaptations in the spine (SCHWERTNER DS, et al., 2019). The body composition in obese adults tends to have a greater chance of presenting low back pain when compared to people who have a normal body mass index (GOTTARDE LAP, et al., 2021). In this present study however, it was not possible to find an association between pain, level of physical activity and anthropometric measurements, that can be a result of a small sample number or bias on the questions.

CONCLUSION

This study found important information about the association of variables with neck and low back pain such as being female and sitting with the head to low facing the computer, and its impact in daily activities such as performing house chores and carrying objects, which show how important, and necessary is the concern regarding the impacts that neck and low back pain can cause. There was no association between the practice of physical activity and BMI with the occurrence of neck and low back pain in students at the University of Brasília, however, further studies are needed to assess the issue.

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