BrJP. 2026, v.9:e202672 • https://doi.org/10.63231/2595-0118.202672-en

BrJP
Brazilian Journal of Pain

ORIGINAL ARTICLE

Unveiling the prevalence of migraine and its risk factors among medical students in the interior of Goiás, Brazil

Desvendando a prevalência de migrânea e seus fatores de risco entre estudantes de medicina no interior de Goiás, Brasil

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Submitted on:
May 10, 2025.
Accepted for publication on:
March 23, 2026.
Conflict of interests:
none.
Sponsoring sources:
This study was supported by University of Rio Verde (UniRV).
Ethics statement:
none.
Data availability:
The data that support the findings of this study are available from the corresponding author upon reasonable request.
The study was carried out at Universidade de Rio Verde – UniRV, Rio Verde, GO, Brasil.

Associate editor in charge:
Lia Rachel Chaves do Amaral Pelloso

Editor in charge:
Juliana Barcellos de Souza

ABSTRACT

BACKGROUND AND OBJECTIVES: Migraine is an important public health issue due to its high prevalence and negative impact on quality of life, especially among young adults and university students exposed to high levels of stress and sleep deprivation. In this context, it is important to research its occurrence and associated factors in specific populations, such as medical students. The objective of this study was to estimate the prevalence of migraine and identify associated factors among medical students. The study was conducted at a university in the inland region of the state of Goiás, Brazil, and involved 320 students aged 18 to 30 years, selected by systematic random sampling.

METHODS: The prevalence of migraine was assessed using the ID-Migraine questionnaire, and the impact of the condition was measured using the Headache Impact Test-6 (HIT-6). Additionally, physical activity was evaluated according to WHO recommendations, and variables such as gender, academic period, associated diseases, and musculoskeletal pain complaints were collected. Statistical analysis included bivariate and multivariate logistic regression to identify associated factors.

RESULTS: The prevalence of migraine was 25.9%. Factors such as being in the earlier periods of the course (OR=2.61; 95% CI: 1.16–5.89; p=0.022), presence of associated diseases (OR=11.86; 95% CI: 3.61–38.93; p<0.001), complaints of musculoskeletal pain (OR = 5.01; 95% CI: 1.72–14.60; p=0.003), and lack of regular physical activity (OR=2.29; 95% CI: 0.99–5.24; p=0.050) were associated with migraine. Perception of having migraine (OR=9.92; 95% CI: 4.03–24.37; p<0.001) and the impact of pain on daily activities (OR=8.62; 95% CI: 3.43–21.64; p<0.001) were also determined as important.

CONCLUSION: Regular physical activity was associated with lower occurrence of migraine, while comorbidities and musculoskeletal pain were associated with higher occurrence. This study highlights the high prevalence of migraine among medical students and the importance of early identification of associated factors for appropriate management.

KEYWORDS: Activities of daily living, Headache disorder, Migraine disorders, Physical exercise, Student medical.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A migrânea constitui um importante problema de saúde pública, devido à sua alta prevalência e impacto negativo na qualidade de vida, especialmente entre adultos jovens e estudantes universitários expostos a elevados níveis de estresse e privação de sono. Nesse contexto, torna-se relevante investigar sua ocorrência e fatores associados em populações específicas, como acadêmicos de medicina. O objetivo deste estudo foi estimar a prevalência de migrânea e identificar fatores associados entre acadêmicos de medicina. Conduzido em uma universidade do interior de Goiás, Brasil, o estudo envolveu 320 alunos, com idades entre 18 e 30 anos, selecionados por amostragem aleatória sistemática.

MÉTODOS: A prevalência de migrânea foi avaliada por meio do questionário *ID-Migraine*, e o impacto da condição foi mensurado utilizando o *Headache Impact Test-6* (HIT-6). Além disso, considerou-se a prática de atividade física conforme as recomendações da OMS, e variáveis como sexo, período acadêmico, doenças associadas e queixas de dores musculoesqueléticas foram coletadas. A análise estatística incluiu regressão logística bivariada e multivariada para identificar fatores associados.

RESULTADOS: A prevalência de migrânea foi de 25,9%. Fatores como estar nos primeiros períodos do curso (OR=2,61; IC 95%: 1,16-5,89; p=0,022), presença de doenças associadas (OR=11,86; IC 95%: 3,61-38,93; p<0,001), queixa de dores musculoesqueléticas (OR=5,01; IC 95%: 1,72-14,60; p=0,003) e ausência de atividade física regular (OR=2,29; IC 95%: 0,99-5,24; p=0,050) foram fatores de risco significativos para migrânea. A percepção de ter migrânea (OR=9,92; IC 95%: 4,03-24,37; p<0,001) e o impacto das dores nas atividades diárias (OR=8,62; IC 95%: 3,43-21,64; p<0,001) também foram determinantes importantes.

CONCLUSÃO: A atividade física regular foi um fator protetor, enquanto as comorbidades e dores musculoesqueléticas aumentaram o risco. Este estudo destacou alta prevalência de migrânea entre acadêmicos de medicina e a importância da identificação precoce dos fatores associados para um manejo eficaz.

DESCRITORES: Atividades cotidianas, Cefaleia, Estudantes de Medicina, Exercício físico, Transtornos de enxaqueca.

HIGHLIGHTS

- High prevalence of migraine (25.9%) among medical students, highlighting its significant impact on this population
- Significant associated factors include the early stages of the course, presence of comorbidities, musculoskeletal pain, and lack of physical activity
- Regular physical activity was found to have a protective effect, underscoring the importance of health promotion strategies in the academic setting

INTRODUCTION

Migraine is a chronic neurological disorder characterized by recurrent moderate to severe headache episodes, often accompanied by symptoms such as nausea, vomiting, photophobia, and phonophobia[1]. Its pathophysiology involves dysfunctions in the trigeminovascular system, pain modulation, and cortical activity. It is believed that neuronal hyperexcitability, especially in the occipital cortex, triggers episodes of cortical spreading depression, a phenomenon characterized by a wave of neuronal depolarization followed by inhibition of brain activity. This process activates the trigeminovascular system, leading to the release of inflammatory neuropeptides, such as CGRP, which promote vasodilation and sensitization of the trigeminal nerve, resulting in the characteristic pain of migraine[2].

It is a highly prevalent condition in the global population and is considered one of the leading causes of disability, significantly impacting quality of life and professional and academic performance[3]. Epidemiological studies estimate that migraine affects about 14% of the global population, with higher prevalence in women due to hormonal influences, such as variations in estrogen levels[4]. Additionally, there is an unequal distribution across different socioeconomic contexts, being more frequent in low- and middle-income countries, where access to diagnosis and treatment is more limited[5,6]. Migraine is also one of the leading causes of years lived with disability, interfering with productivity and quality of life for those affected[7]. Among university students, the prevalence can exceed 30%, with even higher rates among medical students, a group exposed to intense stress and sleep deprivation[8].

In this context, migraine is particularly common among university students, especially those studying medicine, due to the heavy workload, intense cognitive demands, and irregular sleep patterns[9]. Academic stress, combined with performance pressure and lack of emotional support, is one of the main triggering factors for migraine attacks in this population[10]. Additionally, lifestyle habits such as inadequate sleep patterns, irregular eating habits, and excessive caffeine consumption may contribute to an increased frequency and severity of migraine attacks[11].

The assessment of migraine in the present study is based on internationally validated instruments: the ID-Migraine and the Headache Impact Test-6 (HIT-6). The ID-Migraine is a widely used screening questionnaire for identifying migraine in the general population, demonstrating high sensitivity and specificity[12]. Meanwhile, the HIT-6 assesses the impact of headaches on quality of life, considering cognitive, emotional, and social aspects[13].

Migraine is a prevalent and disabling neurological disorder that disproportionately affects young adults, including university students, with substantial consequences for their mental health and academic performance. Migraines were reported to have prevalence rates ranging from 9% to nearly 28% with significant implications for academic performance and mental health, including anxiety and depression[14,15]. From an epidemiological perspective, migraine is highly prevalent among university students, often exceeding rates observed in the general population, with estimates ranging from 15% to 30% and potentially higher in academically demanding fields such as medicine[8]. Among medical students, who are routinely exposed to elevated stress levels and irregular sleep patterns, the burden of migraine is particularly significant, contributing to reduced concentration, increased absenteeism, poorer academic performance, and greater vulnerability to anxiety and depression[16,17]. Although studies have investigated migraine in different academic contexts, there is a lack of research addressing this condition in institutions located outside major urban centers, where access to specialized healthcare services may be more limited.

Given the high prevalence and disabling nature of migraine among young adults, particularly medical students, who are exposed to elevated stress levels and irregular sleep patterns, this study aimed to estimate the prevalence of migraine and identify associated psychosocial, behavioral, and structural factors. Understanding these determinants is essential for developing effective prevention and intervention strategies that support mental health, improve academic performance, and reduce the burden of migraine in this vulnerable population. Specifically, this study aimed to estimate the prevalence of migraine and identify associated factors among medical students at a university in the interior of Goiás, Brazil.

METHODS

This cross-sectional epidemiological study was conducted at a university in the inland region of Goiás and involved students from the School of Medicine at the University of Rio Verde (UniRV); see STROBE checklist in supplementary document. It is part of a larger project titled *Impact of Migraine on the Daily Life of Medical Students and Its Relationship with Quality of Life*, approved by the Research Ethics Committee (CEP) of UniRV (Approval No. 1.582.829, CAAE: 56393116.6.0000.5077).

The target population comprised 783 students enrolled between the first and fourth semesters of the medicine program across the Rio Verde, Aparecida de Goiânia, and *Goianésia* campuses. The sample size was calculated using the formula for proportions in finite populations, considering a 95% confidence level, a 5% margin of error, and an expected migraine prevalence of 50%. Applying the total population size (n=783), the critical value Z=1.96, p=0.50, and e=0.05, the estimated sample size was approximately 258 students. The final sample was expanded to 320 students to enhance representativeness and minimize losses.

The Formula 1 used was as follows:

$$n = \frac{N.Z^2.p.(1-p)}{\left(e^2.(N-1)\right)+\left(Z^2.p.(1-p)\right)} \quad (1)$$

Participants were selected through systematic random sampling. Before each evaluation, students were seated at desks, facilitating the method. The selection interval was determined by dividing the population by the sample size (approximately 1.43), and spacing two students apart. The first participant was randomly chosen from the first two students, ensuring a homogeneous sample distribution.

Data collection occurred in April 2022, before the second module evaluation. Participants completed a standardized, pre-tested, self-administered questionnaire covering gender, academic semester, associated diseases, use of pharmacological drugs, musculoskeletal pain, self-reported migraine and physical activity per WHO guidelines (150 min/week). Physical activity was assessed by self-report through questions on the weekly frequency and duration of activities performed. Based on this information, total weekly time was estimated, and participants who reported at least 150 minutes of physical activity per week were classified as physically active.

Migraine presence was assessed using the validated ID-Migraine questionnaire, widely used in clinical and population studies. It includes three questions on photophobia, nausea, and headache-related functional impact over the past three months, evaluating light sensitivity, nausea or vomiting, and daily activity limitations due to headaches. The ID-Migraine is validated for the Brazilian population, demonstrating excellent sensitivity and specificity for migraine diagnosis. Its validation in Brazil confirmed its effectiveness in the national context, showing good agreement with clinical diagnosis[12].

The presence of migraine was defined as a positive score on the ID-Migraine, meaning an affirmative response to at least two of the three questions. This criterion exhibits high sensitivity (81% to 92%) and specificity (63% to 84%) when compared to the clinical diagnosis based on the International Classification of Headache Disorders (ICHD-3). For statistical analysis, the variable was categorized dichotomously: migraine present (yes) for participants who answered "yes" to at least two of the three questions and migraine absent (no) for those who answered "yes" to only one or none of the questions.

The impact of migraine was assessed using the Headache Impact Test (HIT-6), a tool that measures the interference of headaches with well-being and daily activities, considering the frequency and severity of episodes[13]. Additionally, the domains of functional capacity, pain, and general health status were evaluated using the SF-36 questionnaire[18]. Age and weekly work hours were collected. Students aged 18–30 were included; incomplete responses were excluded.

Statistical analysis

Data entry was performed using EpiData 3.1 software, with double data entry to minimize errors. Validation and analysis were conducted using Stata 15.0, while the initial organization of the data took place in Microsoft Excel 2013. The statistical analysis included descriptive statistics, with absolute and relative frequencies, and bivariate and multivariate logistic regression to identify factors associated with migraine. Initially, each independent variable was analyzed separately in the bivariate regression, and those with $p<0.2$ were selected for the multivariate model. The final model was built using the forward method, considering variables with $p<0.05$. Estimates were expressed as odds ratios (OR) and 95% confidence intervals (CI95%).

RESULTS

A total of 320 questionnaires were applied, of which 317 were valid for analysis, as three were excluded due to corrections, such as incomplete responses and the presence of inconsistent answers that made it impossible to accurately interpret the collected information. The sample was predominantly composed of women (78.2%), with most participants distributed between the 3rd and 4th semesters (50.2%). The majority of students did not have associated diseases (82.3%) and did not use pharmacological drugs regularly (56.5%). Regarding pain complaints, 57.4% reported general pain, and 45.4% engaged in regular physical activity (Table 1).

Regarding migraine, 25.9% of participants reported having the condition, and 17.0% had associated aura. In terms of impact on daily activities, 59.3% of participants reported little to no impact, while 40.7% indicated substantial or severe impact, according to the HIT-6 scale.

The mean age of the participants was 21.3±4.4 years, and the average weekly work hours were 41.5±23.7 hours. In terms of quality of life, the functional capacity domain presented a mean of 90.2±14.8, the pain domain was 70.1±23.1, and the general health status presented a mean of 72.4±17.9.

The prevalence of migraine found, through the application of the ID-Migraine questionnaire, a validated tool for the Brazilian population[12], was 25.9% among the medical students analyzed in this study.

The multivariate analysis identified several significant risk factors for the presence of migraine among the students (Table 2). Regarding the course period, students from the 1st/2nd semesters had a significantly higher probability of having migraine, with an odds ratio (OR) of 2.61 (95% CI: 1.16-5.89; $p = 0.022$), compared to students from the 3rd/4th semesters.

Additionally, the presence of associated diseases was an important factor. Students with associated diseases showed a significantly higher risk, with an OR of 11.86 (95% CI: 3.61-38.93; $p<0.001$), indicating a strong association with migraine. Another significant factor was the complaint of general pain. Those who reported pain had an OR of 5.01 (95% CI: 1.72-14.60; $p=0.003$), suggesting a direct relationship with the migraine condition.

Regarding physical activity, the results indicated that the absence of regular physical activity was also a risk factor. Students who did not engage in regular physical activity had an OR of 2.29 (95% CI: 0.99-5.24; $p=0.050$), showing that the lack of regular exercise increased the probability of migraine.

The perception of having migraines was another important aspect. Those who believed they had migraine showed a very strong association, with an OR of 9.92 (95% CI: 4.03-24.37; $p<0.001$), indicating that this perception is a relevant factor for the presence of the condition. Finally, the impact of headaches on daily activities, as measured by HIT-6, was also significantly associated with migraine. Students who reported substantial or severe impact on their daily activities had an OR of 8.62 (95% CI: 3.43-21.64; $p<0.001$).

Table 1. Presentation of demographic, behavioral, and health variables and the univariate analysis of possible risk factors for the presence of migraine among medical students in Goiás, Brazil (n = 317).

Variables	Total		Presence of migraine		
	F	%	n/%	OR (95% CI)	p-value
Gender					
Female	248	78.2	62/25.0%	1	0.504
Male	69	21.8	20/29.0%	1.22 (0.68-2.22)	
Period					
1st / 2nd	158	49.8	35/33.7%	1.79 (1.06-3.01)	0.028*
3rd / 4th	159	50.2	47/22.1%	1	
Associated diseases					
No	261	82.3	51/19.5%	1	0.001*
Yes	56	17.7	31/55.4%	5.11 (2.78-9.39)	
Pharmacological drugs in use					
No	179	56.5	31/17.3%	1	< 0.001*
Yes	138	43.5	51/37.0%	2.80 (1.67-4.70)	
Complaint of general pain					
No	135	42.6	11/8.1%	1	< 0.001*
Yes	182	57.4	71/39.0%	7.21 (3.64-14.30)	
Regular physical activity					
Yes	144	45.4	27/18.8%	1	0.009*
No	173	54.6	55/31.8%	2.02 (1.19-3.42)	
Do you think you have Migraines?					
No	187	59.0	11/5.9%	1	< 0.001*
Yes	130	41.0	71/54.6%	19.25 (9.56-38.78)	
With Aura					
No	263	83.0	28/10.6%	1	0.997
Yes	54	17.0	54/100.0%	-	
Without Aura					
No	289	91.2	54/18.7%	1	0.998
Yes	28	8.8	28/100.0%	-	
HIT-6					
Little or no impact/some/moderate	188	59.3	12/6.4%	1	
Substantial/severe impact	129	40.7	70/54.3%	17.40 (8.82-37.3)	< 0.001*
Age	21,3±4,4	20.0 (20.8-21.8)	21.5±5.1	1.01 (0.96-1.07)	0.684
Weekly working hours	41,5±23,7	35.0 (38.9-44.1)	43.8±24.4	1.00 (0.99-1.01)	0.304
Functional capacity domain	90,2±14,8	100.0 (88.6-91.9)	84.3±20.6	0.97 (0.95-0.98)	< 0.001*
Pain domain	70,1±23,1	74.0 (67.5-72.6)	64.4±25.3	0.99 (0.97-0.99)	0.010*
General health status domain	72,4±17,9	72.0 (70.4-74.5)	65.5±19.6	0.97 (0.96-0.98)	< 0.001*

OR: Odds ratio; CI95%: confidence interval; HIT-6: Headache Impact Test; *Statistically significant association.

Table 2. Multivariate analysis of possible risk factors for the presence of migraine among medical students in Goiás, Brazil (n = 317).

Variables	Presence of migraine			
	OR (95% CI)[1]	p-value	OR (95% CI)[2]	p-value
Period				
1st / 2nd	2.72 (1.16-6.40)	0.022*	2.61 (1.16-5.89)	0.022*
3rd / 4th	1		1	
Associated diseases				
No	1	< 0.001*		< 0.001*
Yes	11.95 (3.51-40.69)		11.86 (3.61-38.93)	
Pharmacological drugs in use				
No	1	0.191	1	0.165
Yes	1.77 (0.75-4.16)		1.78 (0.79-4.02)	
Complaint of general pain				
No	1	0.003*	1	0.003*
Yes	5.19 (1.74-15.49)		5.01 (1.72-14.60)	
Regular physical activity				
Yes	1	0.047*	1	0.050
No	2.41 (1.01-5.75)		2.29 (0.99-5.24)	
Do you think you have Migraines?				
No	1	< 0.001*	1	< 0.001*
Yes	10.26 (4.02-26.19)		9.92 (4.03-24.37)	
HIT-6				
Little or no impact/some/moderate	1	< 0.001*	1	<0.001*
Substantial/severe impact	9.40 (3.68-24.01)		8.62 (3.43-21.64)	
Functional capacity domain	1.00 (0.97-1.03)	0.833	-	-
Pain domain	1.00 (0.99-1.03)	0.391	-	-
General health status domain	0.98 (0.95-1.00)	0.059	0.98 (0.96-1.00)	0.089

OR; Odds ratio; CI95%; confidence interval; [1]First round of the multivariate analysis (crude analysis); [2]Second round of the multivariate analysis (adjusted analysis); HIT-6: Headache Impact Test; SF-36: Medical Outcomes Short-Form Health Survey; *Statistically significant association.

DISCUSSION

The prevalence of migraine observed in this study was 25.9% among the medical students analyzed. This result aligns with data from previous studies, which indicate a high prevalence of migraine among university students, especially those in the health field. For example, a study conducted in the United States found a migraine rate of 27% among medical students[18] and a study in Brazil revealed a prevalence of 23.5%[8]. Furthermore, a 2019 study conducted with Chinese medical students reported an alarming prevalence of 42.3%, which exceeds the national average of the country[14]. In 2017, another study published in Headache: The Journal of the American Headache Society revealed that 38.2% of medical students also reported suffering from migraines[18]. These findings suggest that common factors, such as the intense study load, sleep deprivation, and academic stress, play an important role in the development of migraine among university students from different countries and contexts.

The present study identified significant risk factors for migraine, with the highest likelihood of occurrence among students in the early periods of the medical course, with an OR of 2.61 (95% CI: 1.16-5.89; p=0.022). This finding is consistent with previous studies suggesting that the transition to higher education, coupled with the adaptation to new academic demands, can act as a trigger for the onset of migraine symptoms[19]. The start of university life is often marked by an increased study load, new responsibilities, and a high-pressure environment, factors that contribute to higher stress levels and changes in sleep patterns.

The emotional and physical overload of these early periods can be particularly impactful, as many students are still in the process of adapting to this new lifestyle[20]. The relationship between these factors and migraine is substantial, as chronic stress and sleep disruptions are known to play significant roles in the aggravation or onset of headache crises[10].

Biologically, the plausibility of the findings can be explained by the activation of the hypothalamic-pituitary-adrenal (HPA) axis, a neuroendocrine system crucial in the stress response. The HPA axis regulates the release of hormones such as cortisol, which, when elevated, can affect neuronal activity and the vascular processes involved in migraine attacks. Continuous stress can result in dysfunction in the regulation of this response, amplifying the inflammatory and neurovascular processes underlying migraine[21].

Additionally, chronic stress is often associated with changes in the sleep cycle, a factor that can also exacerbate migraine[22]. These complex interactions between psychological and biological factors help explain why students in the early stages of their courses, exposed to these changes and pressures, are more susceptible to developing or intensifying migraine symptoms.

The presence of associated diseases was also identified as a significant risk factor for migraine, with an OR of 11.86 (95% CI: 3.61-38.93; p<0.001). This result is consistent with existing literature, which indicates a strong correlation between migraine and comorbidities, such as anxiety disorders, depression, and metabolic diseases like diabetes and hypertension[23,24]. The coexistence of these conditions with migraine can increase the risk of more frequent and intense attacks, reflecting the complexity of this interaction.

From a biological plausibility standpoint, this relationship can be explained by central sensitization, a neurophysiological phenomenon in which the central nervous system becomes more sensitive to pain[25]. Additionally, comorbid conditions like psychiatric disorders and metabolic diseases have been associated with neuroinflammatory changes that intensify pain perception and exacerbate the frequency and severity of migraine attacks[26,27]. These conditions can influence the underlying mechanisms of migraine, making individuals more vulnerable to the effects of environmental and emotional triggers, which justifies the increased risk of attacks in the presence of these associated diseases.

Another significant factor identified in this study was the complaint of general pain, with an OR of 5.01 (95% CI: 1.72-14.60; p= 0.003). This finding is consistent with the literature, which suggests a strong association between musculoskeletal pain conditions, such as cervical and lumbar pain, and an increased risk of developing migraines[28]. The relationship between these two conditions can be explained by the interconnection of nociceptive pathways, which involve the trigeminovascular system, responsible for pain modulation in various parts of the body[27].

When activated by painful stimuli in different regions, such as the cervical and lumbar spine, these nociceptive pathways can converge and amplify the response in the trigeminal system, exacerbating pain perception in individuals prone to migraines. This phenomenon can lead to the intensification of attacks and increased sensitivity to pain, creating a vicious pain cycle that contributes to the persistence and severity of migraines[29].

Regular physical activity was identified as a protective factor against migraines, as the lack of physical activity increased the likelihood of migraine attacks (OR=2.29; 95% CI: 0.99-5.24; p=0.050). This finding is supported by previous studies, which suggest that regular physical exercise can help reduce both the frequency and intensity of migraine attacks. This occurs, in part, due to the release of endorphins, natural chemicals in the body that promote a sense of well-being and have analgesic effects, as well as the modulation of the endocannabinoid system[30,31].

The endocannabinoid system plays a crucial role in analgesia and the control of neurogenic inflammation, which is often associated with migraines[32]. Physical activity activates this system, helping to reduce inflammatory processes and promoting pain relief. Additionally, physical exercise has been linked to improved stress regulation, a factor known to be one of the main triggers for migraine attacks[30,33]. Therefore, incorporating regular physical activity into the routine of individuals with migraines may be an effective strategy for managing and preventing attacks.

The perception of having migraines was strongly associated with the diagnosis, with an OR of 9.92 (95% CI: 4.03-24.37; p<0.001), which reinforces the importance of self-assessment in the early identification of the condition and the pursuit of appropriate treatment. This finding highlights that awareness of one's symptoms can be a determining factor for adherence to preventive and therapeutic strategies, which, in turn, can mitigate the effects of migraines on quality of life[34].

The literature suggests that individuals who recognize their migraine symptoms encourage timely medical care, facilitating diagnosis and management. Accurate self-perception enables proactive control of triggers like stress, sleep deprivation, and diet while supporting preventive and medicinal therapies. Early recognition reduces attack intensity and frequency, improving quality of life and minimizing academic and professional impact[35,36].

Finally, the impact of headaches on daily activities, as assessed by the HIT-6, was a significant factor, with an OR of 8.62 (95% CI: 3.43-21.64; p<0.001). This result is consistent with studies that show individuals with migraines, especially students, experience significant impairment in academic performance, productivity, and overall well-being[14]. The explanation for this impact can be attributed to the activation of the trigeminovascular system, which is directly related to pain perception and the modulation of cognitive function[2,27].

Neurophysiological changes from migraine affect cognition, mood, and concentration, impairing academic and professional performance. Persistent pain, photophobia, and phonophobia hinder focus and information retention, impacting quality of life and daily functioning[1-3,37]. Therefore, effective migraine control, including therapeutic interventions and lifestyle modifications, could be crucial in improving overall performance and reducing the impact of attacks on individuals' daily lives.

This study has some limitations. Its cross-sectional design prevents causal inference between associated factors and migraine, limiting the understanding of temporal relationships. Self-reported questionnaires (ID-Migraine and HIT-6) may introduce information bias. Additionally, the study was conducted at a single university in Goiás, limiting generalizability. Despite this, the use of validated questionnaires enhances methodological rigor, and a multivariate approach provides deeper insights into migraine-associated factors. Moreover, addressing this underexplored topic among medical students in universities in inland regions expands knowledge of its prevalence and risk factors in this context.

Future studies could explore longitudinal approaches to assess causal relationships between risk factors and migraine. Larger samples from diverse institutions may improve result representativeness. Additionally, incorporating clinical and neurological assessments could validate self-reported data and enhance understanding of migraine's pathophysiological mechanisms in medical students.

Limitations

This study has some limitations that should be considered when interpreting the results. First, it did not include physical assessments performed by a specialized team, which could have enriched the characterization of the participants. The sample was restricted to a single medical school, which limits the generalization of the findings to other regional contexts. Furthermore, the assessment of sleep patterns was self-reported and did not include validated instruments or objective measures. Finally, this is a cross-sectional study, which does not allow for causal inferences or monitoring of the clinical

progress of the participants. These aspects are being addressed in further studies to deepen the understanding of the factors associated with the occurrence of migraine in healthcare students.

CONCLUSION

The prevalence of migraine among medical students in this study was 25.9%, consistent with the existing literature. Academic stress, study load, and sleep deprivation were associated with this condition. Migraine was more frequent in the early semesters, with younger students showing a higher occurrence, possibly related to the academic adaptation process. Self-reported comorbidities and musculoskeletal pain were strongly associated with migraine, highlighting interactions that may worsen symptoms. On the other hand, regular physical activity was associated with a lower occurrence of migraine. HIT-6 assessments reinforced the importance of early diagnosis and targeted interventions. This study highlights the need for appropriate management strategies to reduce the impact of migraine on students' well-being and academic performance.

In summary, this study highlighted the high prevalence of migraine among medical students and pointed to several factors, such as stress, comorbid conditions, musculoskeletal pain, and lack of regular physical activity, which were associated with the occurrence of migraine. The identification of these factors and the adoption of management strategies are important to minimize the impact of migraine on students' well-being and academic performance.

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SUPPLEMENTARY MATERIAL

Supplementary material accompanies this paper.
STROBE checklist
This material is available as part of the online article from https://doi.org/10.63231/2595-0118.202672-en