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The Relationship Between Sitting Position and the Severity of Lower Back Pain in Students of the Faculty of Medicine and Health Sciences at the University of Bengkulu

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ABSTRACT

Background: Low back pain is the most common musculoskeletal complaint among medical students. Sitting for long periods of time during lectures in an improper posture can affect this condition.
Objectives: This study aimed to analyze the relationship between sitting posture and the severity of lower back pain in students of the Faculty of Medicine and Health Sciences of the University of Bengkulu.
Methods: This study was an observational study with a cross-sectional approach. A total of 120 students were selected using a stratified random sampling technique. Sitting posture was evaluated using the Questionnaire on Body Awareness of Postural Habits in Young People (Q-BAPHY), and the severity of lower back pain was evaluated using the Pain and Distress Scale (PAD). The association between variables was assessed using the Chi-square test at a significance level of $p<0.05$.
Results: The results showed that 60% of respondents had good sitting posture, while 40% had poor sitting posture. Most respondents experienced mild lower back pain (79.167%), while 20.833% experienced moderate lower back pain. Moderate lower back pain was reported by 33.3% of students with poor sitting posture, compared with 12.5% of students with good sitting posture. The analysis showed a significant association between sitting posture and the severity of lower back pain ($p=0.006$).
Conclusion: Sitting posture was significantly associated with the severity of lower back pain among students of the Faculty of Medicine and Health Sciences of the University of Bengkulu. The application of ergonomic sitting postures may help reduce the risk of lower back pain among students.

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INTRODUCTION

Low back pain (LBP) is one of the most common musculoskeletal disorders in clinical practice (1). Symptoms may include pain, muscle spasm and restricted motion in the region from the lower rib cage to the upper gluteal fold, with or without radiation to the legs (2). This problem is common among people of different ages and professions. As per the Global Burden of Disease report in 2019, LBP is the leading cause of years

lived with disability (YLD) in the world (3). This condition can diminish the productivity, work performance and quality of life of those affected (4).

Medical students are a group that is vulnerable to experiencing lower back pain (5). The results of a study at the University of Gondar, Ethiopia, show that 69.4% of medical and nursing students experience musculoskeletal disorders in at least one part of their body, with lower back pain being the most frequently reported complaint (6). This condition can occur due to the misalignment of ergonomic positions when sitting for long periods (2). Medical students have a high academic load with study times that can reach more than 7 hours each day (7). The learning process not only takes place through lectures but also through tutorials that encourage students to actively participate in discussions, group assignments, and self-study (8). The intensity of these activities causes students to sit for long periods which may lead to the development of less ergonomic sitting habits and increase the risk of lower back pain. Not a few academic activities are conducted while sitting, such as during lectures, group discussions, and self-study. This causes the back muscles to remain continuously tense and fatigued, and the blood flow supplying the muscles to be disrupted (9).

Several studies related to the severity of LBP among medical students have been conducted at various universities. As many as 49.1% of medical students at the University of North Sumatra experience LBP, with 72.1% spending more than 7 hours sitting per day and 33.3% having poor sitting posture (1). Additionally, research on medical students at Sriwijaya University shows an LBP severity rate of 59.4% (10). Another study was also conducted on medical students in Malaysia, which showed that 27.2% of respondents experienced LBP (11). These findings indicate that LBP is still frequently found among medical students, and sitting posture is one of the factors associated with the occurrence of LBP.

Although several studies have indicated a correlation between sitting posture and the severity of LBP among medical students, the research results obtained still show variation between universities. In Bengkulu Province itself, not many studies were found regarding the relationship between sitting posture and the severity of low back pain in students, especially in the medical field. Based on this, this research needs to be conducted to determine the prevalence of the relationship between sitting posture and the severity of lower back pain, especially among students of the Faculty of Medicine and Health Sciences at the University of Bengkulu.

The findings of this study are also expected to be the basis for subsequent research and contribute to the development of preventive strategies by institutions, such as ergonomics education and posture awareness programs to reduce the burden of lower back pain among medical students, who will later face substantial physical and mental burdens during their clinical education and professional careers.

METHOD

Study design

This study was designed as an observational study, with a cross-sectional approach to evaluate the variables (independent and dependent) of the study simultaneously. This method was used to evaluate the relationship between sitting position and lower back pain prevalence in medical students. The location of the study was at the Faculty of Medicine and Health Sciences, University of Bengkulu, with the time frame in May to July 2026.

Population and sample

The population of this study was all active students during the academic year 2023-2025 in the Faculty of Medicine and Health Sciences with a total of 175 respondents. The population was chosen since they are active students who are currently engaging in academic activity. The sample size was calculated using the Lemeshow formula and corrected using the finite population formula to obtain 120 respondents (12). The sampling technique used was stratified random sampling. The population was grouped based on the different cohorts.

The sample size for each group was calculated proportionally to the sample size of each cohort; 29 samples from the 2023 cohort, 41 samples from the 2024 cohort, and 50 samples from the 2025 cohort. Respondents were then chosen randomly from each group and used as data. The inclusion criteria were active students from the Faculty of Medicine and Health Sciences, University of Bengkulu with age ranges from 18-22 years old from the 2023-2025 cohorts and willing to be part of the study.

The exclusion criteria were students who had a history of spinal trauma, previously diagnosed severe musculoskeletal disorders, spinal surgery or abnormal spinal anatomy, other acute conditions that might affect posture and lower back pain, incomplete completion of the questionnaire and unwilling to participate.

Data collection

The independent variable in this study was sitting position and the dependent variable was the incidence of lower back pain. Sitting position was measured using the Questionnaire on Body Awareness of Postural Habits in Young People (Q-BAPHYP). The results were divided into 2 categories (good and poor). Poor posture (score 0-50) indicate the respondents have little awareness of their posture and frequently sit in poor ergonomic positions. Good posture (score 51-100) indicates they have a high awareness of their body posture and always sit in a good ergonomic position. This instrument was validated and reliable with a high internal consistency value (Cronbach Alpha=0.80) and reproducibility (Intraclass Correlation Coefficient range=0.59-0.74). This questionnaire was previously used in many previous studies. For example Schwertner et al., Koswara et al. and Kesumayanti et al. (1,13-15). All of them studied the relationship between sitting posture and lower back pain.

The severity of lower back pain was measured using the The Pain and Distress Scale (PAD) questionnaire. The results were divided into 3 categories (mild, moderate, severe) (16). Low (score 20-40) indicates minimal pain and distress with little effect on activities. Moderate (score 41-60) indicates actual pain with moderate interruption. High (score 61-80) indicates severe pain and distress with severe somatic interruption.

Data was collected using online distributed questionnaires. Data analysis was performed by using primary data obtained from 2 instruments, the Questionnaire on Body Awareness of Postural Habits in Young People (Q-BAPHYP) and The Pain and Distress Scale (PAD).

Data analysis

This was done to evaluate the relationship between sitting posture and lower back pain incidence in students of the Faculty of Medicine and Health Sciences, University of Bengkulu. The results were processed using IBM SPSS Statistics software. This was done using the Chi square test.

Ethical statement

Ethical considerations have been taken into account when conducting this research. Ethical consideration involved ensuring that all the participants had provided their consent before carrying out the data collection process. Participation in this study was purely voluntary, and the privacy of all the participants was guaranteed.

RESULTS

This section should provide a concise and precise description of the research results. It should provide a concise and precise description of the experimental results and their interpretation. Result can't contain any references. It may be divided by subheadings as illustrated below.

Subtitles

The results should be equipped with tables and figures. The maximum cumulative number of tables and/or figures is 6 in 1 manuscript. Tables and figure insertion must be set efficiently without duplication. One result only needs to be presented in one presentation from either figure or table, but not both. Tables and figures must be titled; both titles should be aligned left and suitable for the images and tables. Any abbreviations written in the tables or figures must be explained below the tables and figures.

Tables

Table 1 Distribution of gender, level of study, sitting position and lower back pain in students of the Faculty of Medicine and Health Sciences, University of Bengkulu.

No	Variable	Category	Group (n = 120)	
			Frequency (n)	Percentage (%)
1	Gender	Male	35	29,176
		Female	85	70,833
2	Study Level	Level 1	50	41,666
		Level 2	41	34,167
		Level 3	29	24,167
3	Sitting Position	Good	72	60,000

		Bad	48	40,000
4	Lower Back Pain	Mild	95	79,167
		Currently	25	20,833
Total			**120**	**100,000**

Based on Table 1, the majority of respondents in this study are female, totaling 84 students (70.833%), while male respondents number 35 students (29.167%). Based on the distribution of study levels, the largest proportion of respondents comes from first-year students, with 50 students (41.666%), followed by second-year students with 41 students (34.167%), and third-year students with 29 students (24.167%).

Table 2 Frequency distribution of age among students of the Faculty of Medicine and Health Sciences, University of Bengkulu.

Variable	Frequency (n)	Mean ± SD	Median	Min-Max	95% CI
Age (Years)	120	19,73 ± 1,09	20,00	18-22	19,54-19,93

Based on the results of the descriptive analysis, the average age of the respondents is 19.73 ± 1.09 years with a median of 20 years. The youngest respondent among the students is 18 years old and the oldest is 22 years old. The 95% confidence interval indicates that the average age of the population is estimated to be in the range of 19.54 to 19.93 years.

Table 3 Analysis of the relationship between sitting posture and the occurrence of lower back pain in students of the Faculty of Medicine and Health Sciences, University of Bengkulu.

Sitting Position	Moderate Low Back Pain n (%)	Mild Low Back Pain n (%)	Total n (%)	p-value
Bad	16 (33,3%)	32 (66,7%)	48 (100%)	
Good	9 (12,5%)	63 (87,5%)	72 (100%)	0,006
Total	25 (20,8%)	95 (79,2%)	120 (100%)	

The results of the statistical test using Chi-square yielded a p-value of 0.006 ($p<0.05$). Since the p-value is much smaller than the significance level $\alpha = 5\%$ (0.05), it can be concluded that there is a significant relationship between sitting posture and the severity of low back pain among students at the Faculty of Medicine and Health Sciences, University of Bengkulu.

DISCUSSION

The findings presented in Table 1 show differences in the severity of lower back pain (LBP) based on students' sitting posture. Among the 48 students with less ergonomic sitting postures, 16 (33.3%) experienced moderate LBP, while 32 (66.7%) reported mild pain. In comparison, of the 72 students with good sitting postures, 9 (12.5%) experienced moderate LBP, while 63 (87.5%) experienced mild pain. These findings indicate that moderate LBP was more common among students with less ergonomic sitting postures than among those with good sitting postures. Therefore, the distribution of LBP severity differed between the two groups.

Regarding the overall distribution of the respondents, 72 students (60.0%) had good sitting postures, while 48 (40.0%) had less ergonomic sitting postures. In terms of LBP severity, 95 students (79.17%) experienced mild pain, and 25 (20.83%) experienced moderate pain. No respondents reported severe LBP. These findings suggest that mild LBP was the most common condition among medical and health sciences students at the University of Bengkulu, although a proportion of respondents experienced moderate pain.

These findings are consistent with the study by Aggarwal and colleagues (17), which reported that musculoskeletal pain, particularly lower back pain, is commonly experienced by medical students. Academic

activities, including attending lectures, reading study materials, and completing assignments, often require students to sit for extended periods. Maintaining a poor sitting posture during these activities may place additional stress on the muscles and other structures supporting the spine, potentially contributing to lower back discomfort. Although no respondents in the present study reported severe LBP, the findings reflect only the pain severity experienced at the time of data collection and do not predict how symptoms may develop in the future.

The Chi-square test showed a statistically significant association between sitting posture and LBP severity among medical and health sciences students at the University of Bengkulu ($p = 0.006$). Since the p-value was below the significance threshold of 0.05, the null hypothesis of no association was rejected. The proportion of students experiencing moderate LBP was higher among those with less ergonomic sitting postures than among those with good sitting postures. This finding suggests that sitting posture is associated with the distribution of LBP severity in the study population. However, because the study used a cross-sectional design, the association does not establish a causal relationship between sitting posture and LBP severity.

The findings can also be discussed in relation to previous studies by Abdu et al., Rahmayana and Syakurah, and Vujcic et al. (18,19,20), which examined the relationship between postural factors and LBP among students. From a physiological perspective, maintaining an uncomfortable or inefficient sitting posture for prolonged periods may increase the mechanical load on the muscles and supporting tissues of the spine. Over time, this additional load may contribute to muscle fatigue and lower back discomfort. Nevertheless, although this mechanism provides a plausible explanation for the observed association, it does not confirm that poor sitting posture directly caused LBP among the respondents in this study.

These findings emphasize the importance of maintaining proper sitting posture and supporting musculoskeletal health among students. Adopting ergonomic sitting positions, taking regular stretching breaks, and engaging in physical activity may help support lower back health. These measures are consistent with general approaches to LBP management that emphasize education and non-pharmacological interventions, as described in the World Health Organization's recommendations (21). However, their effectiveness was not evaluated in the present study, and further research would be needed to assess their impact on LBP among medical students.

Several limitations should be considered when interpreting these findings. First, the cross-sectional design limits the ability to establish a temporal or causal relationship between sitting posture and LBP severity. Second, data collected through questionnaires may be subject to information bias, as responses depend on participants' understanding and self-reporting. Third, other factors that may influence LBP severity, including sitting duration, body mass index (BMI), physical activity, and stress levels, were not controlled for in this study. These factors may have contributed to the observed findings and should be considered in future research.

CONCLUSION

The study examines the connection between posture when sitting and the severity of lower back pain amongst the students of the Faculty of Medicine and Health Sciences at the University of Bengkulu, and stresses the need to apply ergonomic principles in order to reduce both the risk and the severity of lower back pain. The instruments employed in the study have been validated, namely the Questionnaire on Body Awareness of Postural Habits in Young People (QBAPHYP) for assessing sitting posture and the Pain and Distress Scale (PAD) for measuring the level of pain.

The research shows that most of the students had a good sitting posture, even though some still had poor sitting posture. Moreover, the majority of the respondents suffered from mild lower back pain, while a small number had moderate lower back pain. These results show that there is a connection between sitting posture and the severity of lower back pain amongst students. Yet the severity of lower back pain might also be affected by other factors. This highlights the important role that educational institutions should play in encouraging students to adopt correct sitting posture, in raising awareness of ergonomics, and in promoting their musculoskeletal health. As a result, efforts to support musculoskeletal health and to reduce the risk of lower back pain could include introducing ergonomics education programs, limiting the amount of time spent sitting continuously, carrying out regular stretching, and increasing physical activity.

It would be advisable to carry out further research and look at other variables, for example sitting for long periods, body mass index, level of physical activity, and level of psychological stress, so as to obtain a more complete view of the factors associated with the severity of lower back pain among students. Since the severity of pain can be affected by a number of interacting factors, including those mentioned, adding these variables is likely to lead to a more detailed understanding of the relationships between them. (22)

CONFLICT OF INTEREST

The researcher stated that there is no conflict of financial or non-financial interests that can affect the implementation, analysis, and reporting of research results. When in later found a potential conflict of interest, the researcher will report it to related institutions and the Health Research Ethics Committee in accordance with the applicable provisions to get further instructions.

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DATA AVAILABILITY

The data supporting the findings of this study are not publicly available to protect the privacy and confidentiality of the participants. However, relevant datasets are available from the corresponding author upon reasonable request for academic purposes.

SUPPLEMENTAL DATA

All relevant data supporting the findings of this study have been fully presented within the main text of the manuscript. No supplementary materials are associated with this publication.

AUTHOR CONTRIBUTIONS

All authors contributed to the conceptualization of the study. **Kezia Wiliandury**: Investigation, Resources, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization, Project administration. **Cahya Kholifah Putri**: Investigation, Resources, Data Curation, Writing – Original Draft, Writing – Review & Editing, Project administration. **Nadiah Sherenhaque Yuda**: Investigation, Resources, Data Curation, Writing – Original Draft, Writing – Review & Editing, Project administration. **Happy Eskalahuni Putri Aji**: Methodology, Investigation, Resources, Data Curation, Writing – Original Draft, Writing – Review & Editing. **Zayyan Allaya Cheda Triodya**: Methodology, Software, Investigation, Resources, Data Curation, Writing – Review & Editing. **Meisa Nazthasia**: Validation, Formal analysis, Supervision.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

DECLARATION OF USING AI IN THE WRITING PROCESS

During the preparation of this work, the authors used *ChatGPT, Gemini, and Claude* to assist in grammar checking, refining sentence structure, and improving the overall readability of the manuscript based on the

research findings. After using these tools, the authors reviewed, edited, and verified the content as necessary and take full responsibility for the final content of the published article.

LIST OF ABBREVIATIONS

Q-BAPHYP: Questionnaire on Body Awareness of Postural Habits in Young People; LBP: Low Back Pain; PAD: The Pain And Distress Scale; YLD: Years Lived with Dissability; IBM: International Business Machines; SPSS: Statistical Package for the Social Sciences

ETHICAL APPROVAL

Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Concent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard. This declaration of ethics applies during the period June 20, 2026 until June 20, 2027.

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