

Original Article

The Relationship Between The Duration Of Gadget Use And Sitting Position
To The Risk Of Low Back Pain (Lbp) Incidence In Students In Bogor

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Abstract

Introduction: Low back pain in adolescents is a serious health problem that is receiving increasing attention worldwide. The condition is quite common, with approximately 46.7% in 15-year-olds. This problem not only affects the physical body, but can also interfere with daily activities, including school activities, sports, and sleep quality. If not managed properly, adolescent LBP has the potential to develop into a chronic condition in adulthood.

Objective: to analyze the relationship between the duration of gadget use and sitting position on the incidence of low back pain in students of SMAN 1 Parung, Bogor Regency.

Method: a quantitative design with a cross-sectional approach was used. This study was conducted on January 23, 2025 with a sample of 267 students selected using a stratified random sampling technique.

Results: univariate analysis of frequency distribution was performed. Bivariate analysis using the Spearman Rank (Rho) test found no significant relationship between the duration of gadget use and the incidence of LBP, with a p-value of $0.505 > 0.05$. The analysis of the relationship between sitting position and the incidence of LBP found a relationship with a coefficient value of -0.174 and a p-value of $0.004 < 0.05$.

Conclusion: It was found that there is no relationship between the duration of gadget use and the incidence of low back pain in students of SMAN 1 Parung, Bogor Regency, with a p-value of $0.505 > 0.05$. It was found that there is a relationship between sitting position and the incidence of low back pain among students of SMAN 1 Parung, Bogor Regency, with a p-value of $0.004 < 0.05$.

Keywords: Gadgets, Low Back Pain, Sitting Position, Students.

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Introduction

Low back pain (LBP) is a symptom characterized by pain in the lumbosacral region (lower back) caused by various factors, including sitting position, in which the body's weight rests on the buttocks in contact with a horizontal surface ([Purnawinadi & Sitanggang, 2022](#)). It is also a pathological condition affecting the bones, nerves, tendons, ligaments, and intervertebral discs of the spine ([Setiyowati & Hartati, 2022](#)). LBP is not a disease but rather a collection of symptoms, similar to other symptoms such as headache or dizziness. LBP can be caused by many factors ([Maher et al., 2017](#)). Low Back Pain (LBP) is a set of symptoms caused by various disorders, whether the cause is already known or not yet identified. This pain is localized between the twelfth rib (costa XII) and the gluteal fold. In addition, the pain often radiates to one or both legs and may be accompanied by neurological symptoms in the lower body. This condition often coincides with other problems such as psychological, social, and biophysical disturbances, all of which can affect the process of pain transmission and an individual's pain experience ([Cahya et al., 2021](#)).

LBP is divided into three categories: acute, subacute, and chronic. The distinguishing factor is the duration of the pain experienced. Generally, acute LBP lasts less than 6 weeks, subacute LBP lasts between 6 weeks and 3 months, and chronic LBP generally lasts more than 3 months. In addition, LBP is classified into specific and non-specific LBP ([Agustina & Khiong, 2023](#)). Low back pain involves various types of pain, including nociceptive pain as well as neuropathic (radicular) pain that radiates to the lower body, and sometimes nociplastic pain occurs due to increased pain sensitivity ([Knezevic et al., 2021](#)). A gadget is a communication device with many functions achieved through its various features. Gadgets are considered more complete than other electronic communication devices because of their distinct functions and characteristics. Their development has expanded widely because they can access various information as needed ([Marcello, 2024](#)). With gadgets, the public is greatly assisted in carrying out various activities that were previously difficult to do ([Fitriana et al., 2020](#)).

Students are an input component in the education system, which is then processed through the educational process so that they become quality individuals in accordance with the goals of national education ([Hidayat, 2019](#)). Students, or learners, are anyone who is learning, ranging from kindergarten and elementary school pupils to high school students, university students, and trainees at government or private educational institutions ([Firmansyah & Kardina, 2020](#)). Along with the development of technology and the advancement of the times, gadgets have become an important part of daily life. Students, in particular, are highly dependent on and required to use gadgets for learning, especially because they need internet access. Gadgets also serve as a source of entertainment through social media applications. Global gadget use continues to increase from year to year. In 2019, it was recorded that 4.12 billion people were actively using gadgets worldwide ([Batara et al., 2021](#)).

Excessive gadget use combined with a non-ergonomic sitting position while using it can have a negative impact on health. Prolonged gadget use can cause muscle fatigue due to a static position over an extended period, causing the muscles to become tense ([Haq et al., 2023](#)), resulting in symptoms of neck, waist, and lower back pain ([Multazam & Irawan, 2022](#)). Based on the results of the 2018 Basic Health Research (Riskesdas), the prevalence of musculoskeletal disease in Indonesia was 11.9%, and based on symptoms, it was 24.7%. The exact number of people experiencing LBP is not well known, but it is estimated to be around 7.6 to 37%. The prevalence of joint problems based on diagnoses by health workers in West Java Province was 8.86%, and the prevalence in Bogor Regency was 6.82% ([Badan Penelitian dan Pengembangan Kesehatan, 2020](#)).

LBP in adolescents is a fairly serious health problem that is receiving increasing attention worldwide. This condition is quite common, with around 37% of adolescents reporting experiencing this complaint at least once a month. The prevalence also increases with age, from 27.4% at age 11 to nearly 46.7% at age 15. This problem not only affects the physical body but can also disrupt daily activities, including school activities, sports, and sleep quality. If not properly managed, LBP in adolescents has the potential to develop into a chronic condition in adulthood ([Fernando & Roepajadi, 2021](#)).

Based on data from the School Health Unit (UKS) of SMAN 1 Parung, the rate of LBP complaints among students shows a significant number of cases. Of the total student population,

approximately 35 students reported experiencing LBP in the last 3 months. Based on the results of a preliminary questionnaire survey conducted at SMAN 1 Parung, Bogor Regency, 7 out of 10 students complained of back pain. This was caused by poor sitting posture and prolonged gadget use. Seven students said they felt back pain when using gadgets for more than 1 hour combined with a static sitting position. The pain would persist if they did not change their sitting position, and they sometimes needed to take a break from gadget use to relieve the pain. Four students said the pain they felt sometimes interfered with their activities. Meanwhile, 3 out of 10 students had no complaints of back pain while using gadgets in a sitting position because they had exercise habits, maintained good posture while sitting, and stretched after sitting for long periods. With the increasing use of gadgets among adolescents, coupled with data on LBP complaints among students at SMAN 1 Parung, Bogor Regency, the authors were interested in exploring whether there is a relationship between the duration of gadget use and sitting position on the incidence of low back pain among students at SMAN 1 Parung, Bogor Regency.

Methods

This study used a quantitative research design with a cross-sectional approach. This design was used to examine the relationship between the duration of gadget use and sitting position on the risk of low back pain (LBP) incidence among students at SMAN 1 Parung, Bogor Regency. This study was conducted at SMAN 1 Parung, Bogor Regency, on January 23-24, 2025. The population in this study consisted of grade X and XI students at SMAN 1 Parung, Bogor Regency, totaling 860 respondents. Sampling in this study was carried out using a probability sampling technique with a stratified random sampling method. The sample size in this study was 267 respondents, who were students at SMAN 1 Parung, Bogor Regency. The data analysis technique used in this study was statistical analysis using SPSS 22 software. Data analysis in this study used univariate and bivariate analysis.

Results and Discussion

Univariate Analysis

Table 1. Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Age	15–16 years	188	70.4
	17–18 years	79	29.6
Sex	Male	96	36.0
	Female	171	64.0

Based on [Table 1](#), a total of 267 respondents participated in this study. Most respondents were 15–16 years old (188 respondents; 70.4%), while 79 respondents (29.6%) were aged 17–18 years. Regarding sex, the majority of respondents were female (171 respondents; 64.0%), whereas 96 respondents (36.0%) were male.

Table 2. Distribution of Research Variables

Variable	Category	Frequency (n)	Percentage (%)
Duration of Gadget Use	<2 hours/day	31	11.6
	2–3 hours/day	80	30.0
	>3 hours/day	156	58.4
Sitting Position	Non-ergonomic	8	3.0
	Less ergonomic	212	79.4
	Ergonomic	47	17.6
Low Back Pain (LBP)	Mild	58	21.7
	Moderate	95	35.6

Severe	89	33.3
Very severe	25	9.4

Based on [Table 2](#), the distribution of the research variables shows that the majority of respondents used gadgets for more than 3 hours per day (156 respondents; 58.4%), followed by 2–3 hours per day (80 respondents; 30.0%), while only 31 respondents (11.6%) used gadgets for less than 2 hours per day. Regarding sitting position, most respondents had a less ergonomic sitting position (212 respondents; 79.4%), followed by an ergonomic sitting position (47 respondents; 17.6%), while only 8 respondents (3.0%) had a non-ergonomic sitting position. Regarding the incidence of low back pain (LBP), the largest proportion of respondents experienced moderate LBP (95 respondents; 35.6%), followed by severe LBP (89 respondents; 33.3%), mild LBP (58 respondents; 21.7%), and very severe LBP (25 respondents; 9.4%).

Table 3. Normality test

Variable	p-value	Description
Duration of Gadget Use	0.000	Not Normal
Sitting Position	0.000	Not Normal
Incidence of Low Back Pain	0.000	Not Normal

Based on [Table 3](#), the normality test was conducted using the Kolmogorov-Smirnov test, and it can be concluded that the data were not normally distributed, with a significance value of $0.000 < 0.05$ for all variables. Therefore, the bivariate statistical test was performed using the Spearman Rank (Rho) test.

Bivariate Analysis

Table 4. Relationship between duration of gadget use and incidence of LBP

Duration of Gadget Use	Mild	Moderate	Severe	Very Severe	Total	p-value
<2 hours/day	10	10	7	4	31	0.505
2-3 hours/day	15	30	30	5	80	
>3 hours/day	33	55	52	16	156	
Total	58	95	89	25	267	

Based on [Table 4](#), the Spearman Rank (Rho) correlation test between the duration of gadget use and the incidence of LBP produced a coefficient value of 0.041 with a p-value of 0.505 ($p > 0.05$). This indicates that there is no relationship between the duration of gadget use and the incidence of LBP among students; therefore, H_0 fails to be rejected, and H_0 is accepted. From the data distribution, it was found that among respondents with a high duration of gadget use, 33 respondents experienced mild LBP, 55 respondents experienced moderate LBP, 52 respondents experienced severe LBP, and 16 respondents experienced very severe LBP. Among respondents with a moderate duration of gadget use, 15 respondents experienced mild LBP, 30 respondents experienced moderate LBP, 30 respondents experienced severe LBP, and 5 respondents experienced very severe LBP. Meanwhile, among respondents with a low duration of gadget use, 10 respondents experienced mild LBP, 10 respondents experienced moderate LBP, 7 respondents experienced severe LBP, and 4 respondents experienced very severe LBP.

Table 5. Relationship between sitting position and incidence of LBP

Sitting Position	Mild	Moderate	Severe	Very Severe	Total	p-value
Non-ergonomic	0	0	6	2	8	0.004
Less ergonomic	44	77	70	21	212	
Ergonomic	14	18	13	2	47	
Total	58	95	89	25	267	

Based on Table 5, the Spearman Rank (Rho) correlation test between sitting position and the incidence of LBP produced a coefficient value of -0.174 with a p-value of 0.004 ($p < 0.05$). This indicates that there is a relationship between sitting position and the incidence of LBP among students; therefore, H_{a2} is accepted, and H_{o2} is rejected. Based on the data obtained from the questionnaire distributed to students at SMAN 1 Parung, Bogor Regency, among respondents with an ergonomic sitting position, 14 respondents experienced mild LBP, 18 respondents experienced moderate LBP, 13 respondents experienced severe LBP, and 2 respondents experienced very severe LBP. Among respondents with a less ergonomic sitting position, 44 respondents experienced mild LBP, 77 respondents experienced moderate LBP, 70 respondents experienced severe LBP, and 21 respondents experienced very severe LBP. Furthermore, among respondents with a non-ergonomic sitting position, 0 respondents experienced mild LBP, 0 respondents experienced moderate LBP, 6 respondents experienced severe LBP, and 2 respondents experienced very severe LBP.

Conclusion

- 1) The characteristics of respondents at SMAN 1 Parung, Bogor Regency were identified: of the 267 respondents, most were 15-16 years old, totaling 188 respondents (70.4%). Based on sex, most respondents were female, totaling 171 respondents (64%).
- 2) Respondents were identified based on the duration of daily gadget use; most respondents fell into the high category, totaling 156 respondents (58.4%).
- 3) Respondents were identified based on sitting position; almost all respondents fell into the less ergonomic category, totaling 212 respondents (79.4%).
- 4) Respondents were identified based on the incidence of low back pain; nearly half fell into the moderate category, totaling 95 respondents (35.6%).
- 5) It was found that there is no relationship between the duration of gadget use and the incidence of low back pain among students at SMAN 1 Parung, Bogor Regency, with a p-value of $0.505 > 0.05$; therefore, H_{o1} fails to be rejected, and H_{o1} is accepted.
- 6) It was found that there is a relationship between sitting position and the incidence of low back pain among students at SMAN 1 Parung, Bogor Regency, with a p-value of $0.004 < 0.05$; therefore, H_{a2} is accepted, and H_{o2} is rejected.

Suggestions

1) For Respondents

Students are advised to pay more attention to ergonomic sitting posture, such as sitting with an upright back, relaxed shoulders, and feet resting flat on the floor or a suitable footrest. Avoid slouching or remaining in one position for too long without stretching. In addition, it is important for students to limit excessive gadget use. It is recommended to take a break every 30-60 minutes by standing up, walking briefly, or doing light stretching to reduce tension in the back and neck muscles. Using a desk and chair suited to body height can also help reduce the risk of back pain. If possible, use a stand or holder to adjust the height of the gadget screen so that it is level with the eyes, avoiding prolonged head-down positions.

2) For Future Researchers

Future researchers are advised to expand this research by adding other variables that may influence the incidence of low back pain (LBP) in students, such as ergonomic factors (desk height,

chair, gadget screen position), physical activity, sleep patterns, and academic stress levels. These factors could provide a more comprehensive picture of the causes of LBP in students.

3) For STIKes Widya Dharma Husada

The results of this study are expected to provide information and serve as a library reference for students who wish to further research the relationship between the duration of gadget use, sitting position, and the incidence of low back pain (LBP). STIKes Widya Dharma Husada is advised to hold health seminars or outreach programs on ergonomics, wise gadget use, and back pain prevention for students. It is also recommended to provide ergonomic learning facilities, such as desks and chairs suited to body posture, and to encourage the adoption of good sitting habits on campus.

4) For the Nursing Field

Nurses are advised to play an active role in educating the public, particularly students, about the importance of correct sitting posture, ergonomic gadget use, and back pain prevention through stretching exercises and physical activity. Health campaigns on ergonomics in learning and work can be conducted through seminars, workshops, or social media to reach more individuals who are vulnerable to LBP.

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