

The Association between Knowledge and Attitude of Ergonomic Sitting Position to Sitting Posture and Duration among Medical Students

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Abstract

Introduction: Medical students may spend more time sitting and learning. However, ignorance of the ergonomic sitting position and long sitting duration can lead them to an incorrect sitting position and high sedentary activity. Thus, this study investigated the association between knowledge and attitude towards ergonomic sitting position to sitting duration and posture among medical students.

Methods: This cross-sectional study involved 30 students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia. Data were obtained using a questionnaire. Questionnaires were distributed to participants and consisted of 2 parts, the first part included personal data, while the second part contained knowledge, attitude, and practice (sitting duration and posture). Fisher's exact test and Fisher-Freeman-Halton were applied. The confidence interval was 95%, and the significance level (alpha) was 0.05.

Results: 23.3% of the participants have good knowledge about ergonomics sitting position, 40% have adequate knowledge, and 56.7% have a positive attitude towards ergonomics sitting position. 60% of the participants spent sitting time more than 8 hours a day, and 43.3% of the participants had a straight sitting posture. Fisher's test showed no significant association between ergonomic knowledge and chair sitting duration ($p= 0.933$) and ergonomic attitude and chair sitting duration ($p= 0.711$). Fisher-Freeman-Halton exact test showed no significant association between ergonomic knowledge and sitting posture on a chair ($p= 0.699$) and ergonomics attitude and chair sitting posture ($p= 1.000$).

Conclusions: There was no association between knowledge of ergonomics sitting position with sitting duration and sitting posture and attitude of ergonomics sitting position with sitting duration and sitting posture.

Keywords: knowledge – attitude - sitting duration - sitting posture - sitting ergonomics

INTRODUCTION

Ergonomics is the science of human interaction and systems (environment and work).¹ Ergonomics focuses on the quality and quantity of work and the health and safety aspects.^{1,2} In recent years, ergonomics has become more interesting and studied. Ergonomics guides humans in how to position, move, and work correctly. Correct sitting position guidelines have been established, which include sitting duration and sitting posture. Understanding the ergonomics guidelines could help prevent musculoskeletal problems.³ However, people sometimes do not give appropriate attention to ergonomics, leading to musculoskeletal problems.⁴

Several studies have been done in the ergonomics field. Research done by Aaron et al. showed that ergonomics awareness and knowledge of surgeons at work is low, so ergonomics is an important subject to learn for those who work similarly.⁵ Several doctors suggested that ergonomics, which is the pre-clinical phase, should be studied at the beginning of a doctor's career.⁵ Doctors also showed a positive attitude toward ergonomics; for example, 85.7% of otolaryngologists have shown an interest in learning the principles of ergonomics.⁶ Learning ergonomics is also recommended by several studies involving dentists.^{7,8} It was reported that the knowledge, attitude, and practice of dentistry increased after learning ergonomics. Therefore, the

study of ergonomics should be continued and developed.⁷

University students spent 5-8 hours sitting in a day.⁹ The list of activities university students do in a sitting position varies from listening to class, eating, and studying. University students taking medicine courses have long class hours followed by long study hours, usually done sitting.¹⁰ Sitting for a long duration is categorized as a sedentary activity and affects health especially musculoskeletal health.¹¹ Sitting posture that is not appropriate might affect the development of several musculoskeletal conditions such as low back pain.¹² Hence sitting in an unergonomic posture and a long duration of time are risk factors for musculoskeletal conditions.¹³

According to Bloom, knowledge and attitude are part of the practice. Hence, changes in practice are affected by changes in knowledge and attitude.¹⁴ Medical students spend much time sitting, and knowing ergonomic principles about ergonomically sitting practices helps decrease the chance of musculoskeletal conditions. This research aims to find the association between knowledge and attitude of sitting ergonomics to chair sitting duration and posture of medical students.

METHODS

Study design and Sample

This was an analytical cross-sectional study involving 30 students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia. This study was conducted in October-December 2022. The sample size was calculated with a 95% Confidence Interval, 5% margin of error, and prevalence of sitting duration from previous studies.^{15,16} Using an appropriate formula, the sample size obtained was 30.

The inclusion criteria were students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, and those that spend the most time learning at home while sitting on a chair. Exclusion criteria were medical students who spend most of their time learning at home while sitting on the floor or bed and those with chronic musculoskeletal conditions.

Ethical approval was gained from the Ethical Review Committee of the School of Medicine and Health Science, Atma Jaya Catholic University of Indonesia (NO:11/10/KEP-FKIKUAI/2022).

Data Collection

The data was obtained using a questionnaire delivered using Google Forms. The validity and reliability of the questionnaire were tested, in which the questionnaire was first

given to 20 participants. Validity was checked using Pearson's association, and reliability was checked using Cronbach's alpha. Pearson's association score for the questionnaire was >0.361 , and Cronbach's alpha was >0.6 . The sampling technique used was convenience sampling, and sampling was random. The questionnaire consists of two parts: 1) personal data and 2) knowledge, attitude, and practice (sitting duration and posture). The first part asked about the student's name, batch, student id, age, sex, musculoskeletal history, and whether they have previously learned ergonomics. Informed consent was also provided in the very first part of the questionnaire. The second part of the questionnaire consists of 6 knowledge questions, three attitude questions, and three practice questions. The knowledge part of the questionnaire included six right or wrong questions on the Guttman scale. The attitude part of the questionnaire included three 5-point Likert scale questions with the choice of very disagree, disagree, neutral, agree, and very agreeable. The practice part of the questionnaire included sitting duration, types of seats, and most likely sitting posture. The sitting duration was divided into ≤ 8 hours and > 8 hours. This category was based on a previous study. Sitting posture was divided into slumped, straight, and forward-leaning.¹⁷ Students were asked to select their daily sitting duration and type of seats and choose

their most likely sitting posture from the three choices.

Statistical Analysis

Data were sorted in Microsoft Excel and analyzed in SPSS (Statistical Package for The Social Sciences). Univariate and bivariate statistical analysis was done. The statistical tests used for the categorical data were Fisher's exact test and Fisher-Freeman-Halton's exact test, in which the confidence interval is 95% and the significance level (alpha) is 0.05.

RESULTS

The age of participants ranges from 17-23 years. The results indicated that 83.3% of the participants had yet to study ergonomics, while only 16.7% had. 23.3% of the participants had good knowledge about the ergonomics of sitting position, 70% had adequate knowledge about sitting ergonomics, and 6.7% had poor knowledge about the ergonomics of sitting position.

56.7% of the participants have a positive attitude about ergonomics sitting position, and 43.3% have a negative attitude (ergonomics is not essential, ergonomics needs not to be included in the curriculum, and participants are not interested in ergonomics). As much as 40% of the participants have a sitting duration of less or equal to 8 hours, and as much as 60%

have a sitting duration of more than 8 hours. As many as 43.3% of the participants have slumped sitting posture, 43.3% have a straight sitting posture, and 13.3% have a forward-leaning sitting posture. (Table 1)

Table 1. Characteristics of participants

	Frequency (n)	Percentage (%)
Studied ergonomics before		
Yes	5	16.7
No	25	83.3
Knowledge		
Good	7	23.3
Adequate	21	70
Poor	2	6.7
Attitude		
Positive	17	56.7
Negative	13	43.3
Sitting Duration		
≤ 8 hours	12	40
> 8 hours	18	60
Sitting Posture		
Slumped	13	43.3
Straight	13	43.3
Forward	4	13.3
Leaning		

A p-value of 0.933 was obtained when using the Fisher's exact test statistic; because the p-value was >0.05, the conclusion was that there was no association between the level of knowledge of sitting ergonomics and the duration of sitting in a chair (Table 2)

Table 2. Association between ergonomics knowledge and chair sitting duration

Knowledge	Sitting Duration				p-value
	≤ 8 hours		> 8 hours		
	n	%	n	%	
Good	3	25	4	22.2	0.933
Adequate	8	66.7	13	72.2	
Poor	1	8.3	1	5.6	
Total	12	100%	18	100%	-

A p-value of 0.699 was obtained when using the Fisher-Freeman-Halton exact test statistic because the p-value was > 0.05; the conclusion was that there was no association between the

level of knowledge of sitting ergonomics and sitting posture in a chair. (Table 3)

A p-value of 0.711 was obtained using Fisher's exact test statistic because the p-value was > 0.05. The conclusion was that there was no association between sitting ergonomics and the duration of sitting in a chair. (Table 4)

A p-value of 1,000 was obtained when using the Fisher-Freeman-Halton exact test statistic because the p-value was > 0.05. The conclusion was that there was no association between sitting ergonomics and sitting posture in a chair. (Table 5)

Table 3. Association between ergonomics knowledge and chair sitting posture

Knowledge	Sitting Posture						p-value
	Slumped		Straight		Forward Leaning		
	n	%	n	%	n	%	
Good	3	23.1	4	30.8	0	0	0.699
Adequate	9	69.2	8	61.6	4	100	
Poor	1	7.7	1	7.6	0	0	
Total	13	100%	13	100%	4	100%	-

Table 4. Association between ergonomics attitude and chair sitting duration

Attitude	Sitting duration				p-value
	≤ 8 hours		> 8 hours		
	n	%	n	%	
Positive	6	50	11	61	0.711
Negative	6	50	7	39	
Total	12	100%	18	100%	

Table 5. Association between ergonomics attitude and chair sitting posture

Attitude	Sitting Posture						p-value
	Slumped		Straight		Forward Leaning		
	n	%	n	%	n	%	
Positive	7	54	8	62	2	50	1.000
Negative	6	46	5	38	2	50	
Total	13	100%	13	100%	4	100%	-

DISCUSSION

A study on ergonomics sitting position has been conducted. An unergonomic or incorrect sitting position is linked with musculoskeletal complaints. This study attempted to reveal the association between knowledge and attitudes of ergonomic sitting position on sitting posture and duration habits. Our study found no association between knowledge of ergonomics sitting position with sitting duration and sitting posture and attitude of ergonomics sitting position with sitting duration and sitting posture.

Our findings indicate that most students had adequate knowledge and positive attitude toward ergonomic sitting positions though only a few students had received adequate information about the ergonomic sitting position. We assumed they obtained their knowledge and attitude from their logical thinking ability due to exposure to medical science. Basic medical science from anatomy or physiology might help address them in choosing the 'correct' answers in the questionnaire logically.

This study demonstrated that adequate knowledge and a positive attitude toward ergonomic sitting positions only sometimes led to good behavior in sitting. Even though participants have sufficient knowledge and positive attitudes on ergonomics sitting position, they may not practice or apply ergonomics behavior in their daily activities. This result meets with a previous study conducted by Jasmine M et al., in which not all participants with sufficient knowledge performed their activity or position according to ergonomic principles.¹⁸ This can be explained because behavior is influenced by factors other than knowledge, such as genetics, personal habits, household facilities, family habits and culture, and environmental factors.

Most of the participants had sitting time >8 hours per day. The percentage of participants with a positive attitude with a sitting time of more than 8 hours was more than those with a negative attitude. Medical students need more time to study than their peers.¹⁹ In this study, there was no relationship between sitting ergonomic attitudes and sitting habitual

behavior. This is in line with the research of Kousar et al., where there is no relationship between attitudes and behavior regarding body posture.²⁰ Thus, having a positive ergonomic attitude does not necessarily mean having good ergonomics behavior.

Our study has some limitations. First, this study involved a small number of participants. The small sample size will influence the significance of the results. Second, the questionnaire has a low score for validity and reliability. This can lead to bias in the answers from participants. Third, due to the pandemic, participants' answers could not be explored to be clarified and verified.

CONCLUSION

This study concluded that there was no association between knowledge and attitude of ergonomics sitting position and sitting duration and position in medical students. However, these results should be interpreted with caution due to limitations. We recommend using a larger sample size and a more valid and reliable questionnaire to examine the association between knowledge and attitude on ergonomic sitting position sitting habits.

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CONFLICT OF INTEREST

There is no conflict of interest.

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