

Original Research Article

Correlation between sleep quality and physical fitness among medical students of Udayana University

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ABSTRACT

Background: The development of era has caused many declines in the quality of human health for all people, especially students. Sedentary behavior plays an important role in affecting sleep quality for a student. Sleep quality has a lot of correlations with various aspects, such as physical fitness. Good quality sleep will give an opportunity for the body to restore muscular strength, prolong the life of body cells, increase well-being, and leading to good physical fitness as well. Objective of the study was to find out the correlation between sleep quality and physical fitness among medical students of Udayana University.

Methods: This research was an observational study with a cross-sectional method using the PSQI (Pittsburgh Sleep Quality Index) questionnaires and HST (Harvard Step Test) to 50 respondents.

Results: Fisher's Exact Test results showed no relationship ($p > 0.05$) between sleep quality and physical fitness in medical students. This condition can be influenced by several other factors such as genetic factors, physical activity, nutritional status as seen from the percentage of fat, lifestyle, and psychological conditions.

Conclusions: There is no correlation between sleep quality and physical fitness among medical student of Udayana University. Further research is needed related to other factors that affect medical student's physical fitness.

Keywords: Harvard step test, Medical student, Physical fitness, Pittsburgh sleep quality index, Sleep quality

INTRODUCTION

Nowadays, the development of era has caused many declines in the quality of human health which is influenced by many things, including lifestyle, environment, and so on, including current technology which triggers sedentary activity in all people, especially students. In general, behaviors that affect someone's health begin since early adulthood and it would be dangerous if that period is filled with sedentary activities. College students have been dominated by sedentary behaviors, proven with 57% male college students and 61% female college students are reported behaving sedentarily and do not do any physical activities in 7 full days.¹ Sedentary behavior plays an important role in having a good sleep for a college student. Healthy sleep

requires adequate duration, good quality, proper and regular time, and the absence of disturbance or abnormalities. Sleep quality is the measurement that studied frequently in terms of health.^{2,3} This can be described as a level of one's satisfaction with sleep and is correlated with many aspects, such as environmental factors, bedtime, psychological conditions, pharmacological interventions, sleep disorder, and many more. Good quality sleep can be seen from the latency of sleep, the amount and time of awakenings, and sleep efficiency.⁴⁻⁶ Many factors are related to sleep quality, such as physical fitness, stress, diet, lifestyle, and so on. Among these factors, sleep quality is known to have a relation with physical fitness. Physical fitness is one of the indicators of health that plays a very important role.⁷⁻¹⁰ Components of physical fitness related to health including cardiorespiratory endurance, muscular strength,

muscular endurance, body composition, and flexibility. The status of each component can be improved through practice and it is all related to daily activities.^{11,12}

Bad quality sleep will lead to vulnerability to sickness and getting various physical disorders. Then it will continue to be easily tired, weak, even not vigorous, restless, and anxious. This will affect the physical fitness level of the person. It can be seen from the physical condition in the form of drooping eyelids, gloomy face, weakness in the body, and lack of enthusiasm for work. With good quality sleep, the body will be given an opportunity to form new strength, prolong the life of body cells, increase freshness and strength, leading to high physical fitness as well.^{2,13-15}

College students are the young generation who will be the next generation, especially as medical students. A good adaptation is needed in the transition period from a high school student to a new college student, which will affect the lifestyle including sleep quality and physical fitness. Based on the importance of sleep quality for physical fitness of college student, more in-depth research is needed to determine the quality of sleep in students which is associated with physical fitness.

METHODS

This research is an observational study with cross-sectional method to find out the correlation between sleep quality and physical fitness among medical students of Udayana University class of 2019. The research was conducted at the residence of each respondent which will be monitored through Google Form and Zoom Cloud Meetings from August 2020 to November 2020. The sampling technique used was simple randomize sampling with the inclusion criteria in this study were active student of the Bachelor of Medicine and Professional Doctor Study Program, Faculty of Medicine, Udayana University class of 2019, willing to be respondents, had a normal BMI range, and were in good health. While the exclusion criteria in this study were the students who had a history of or were experiencing heart, lung, or circulation diseases, as well as fractures, dislocations, mobility limitations, or other diseases that caused them from being able to carry out the research.

An adjustment for the proportion of the sexes was done, namely 50% male and 50% female from the entire sample. The variables in this research were sleep quality and physical fitness. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. Meanwhile, physical fitness was assessed by the Harvard Step Test (HST). The data obtained will be processed using SPSS version 20 and analyzed descriptively for data on gender, age, sleep quality, and physical fitness. Then, analytically using Fisher's Exact Test to determine the relationship between sleep quality and physical fitness.

RESULTS

The total number of respondents who filled out the PSQI questionnaire and do the Harvard Step Test were 77 respondents, of which only 50 respondents were analyzed until the end. The remaining 27 people dropped out due to inappropriate filling of questionnaire or test procedures. Based on descriptive analysis, it was found that 25 respondents (50%) were male and 25 respondents (50%) were female (Table 1).

Table 1: Gender of respondents.

Gender	n	Percentage
Female	25	50
Male	25	50
Total	50	100

The analysis for the age of the respondent showed diverse result. Respondent's ages ranged from 17 to 22 years with the highest percentage at 19 years old (80%) and the lowest percentage at 17, 20, and 22 years old (2%) (Table 2).

Table 2: Age of respondents.

Age (years)	N	Percentage
17	1	2
18	7	14
19	40	80
20	1	2
22	1	2
Total	50	100

The sleep quality of respondents will be categorized into good and bad based on the PSQI questionnaire score. The analysis showed that out of 50 respondents, 25 respondents (50%) had bad sleep quality and 25 respondents (50%) had good sleep quality (Table 3).

Table 3: Sleep quality of respondents.

Sleep quality	N	Percentage
Bad	25	50
Good	25	50
Total	50	100

Physical fitness of the respondents will be categorized as low, moderate, and high based on the result of the Harvard Step Test. Respondents who have low physical fitness are 4 respondents (8%), moderate are 22 respondents (44%), and high are 24 people (48%) (Table 4).

The result of the cross-tabulation of sleep quality and physical fitness showed that among respondents with bad sleep quality, there were 4 respondents (16%) with low physical fitness, 11 respondents (44%) with moderate physical fitness, and 10 respondents (40%) with high

physical fitness. Meanwhile, among students with good sleep quality, there were 11 respondents (44%) with moderate physical fitness, 14 respondents (56%) with high physical fitness, and there were no people with low physical fitness. Based on the Fisher's Exact Test, the p value was 0.137 which showed insignificant result statistically. The correlation test is not needed because there was no significant relationship between both variables (Table 5).

Table 5: Cross-tabulation of sleep quality and physical fitness.

		Physical fitness				P
		Low	Moderate	High	Total	
Sleep quality	Bad	4	11	10	25	0,137
	Good	0	11	14	25	
Total		4	22	24	50	

DISCUSSION

The result of this study based on bivariate analysis using Fisher's Exact Test showed no significant relationship between sleep quality and physical fitness in college students. The similar result was obtained by Anggraini¹⁶ in her research at the Faculty of Medicine, Islamic University of Indonesia, which observed the relationship between sleep duration and physical fitness levels in college students class of 2013. Anggraini used a non-probability sampling method with consecutive sampling design. The instrument used was the PSQI questionnaire for sleep quality and the Harvard Step Test for physical fitness. Involving 52 respondents, she found that there was no significant relationship between the two variables ($p=0.382$) after using the Chi-Square Test. However, the result of this study is different from Safaringga and Herpandika which states that there is a significant relationship between physical fitness and sleep quality in college students.¹⁴ By using a random sampling method, researchers used the PSQI questionnaire and Multistage Fitness Test. Finally, the study concluded that good physical fitness can fulfil a person's sleep quality, and vice versa ($p=0.011$; $r=0.408$).

Previous research on sleep quality and physical fitness in Sleman by Putra¹³ also observed a significant relationship ($p=0.007$; r count= 0.470 $>$ r table= 0.349) between two variables. Putra used purposive random sampling method to get a total sample of 32 respondents, then used the PSQI questionnaire and Multistage Fitness Test as research instruments. As a result, it is known that sleep quality can affect physical fitness. This statement is also in accordance with the research of Egi et al in her research on the relationship between sleep disturbance and physical fitness of young women in Malang. Sleep disturbance is a component of sleep quality that plays a role in determining whether a person's sleep is good or bad.² In her study, the total sampling method was used and the research instruments consist of PSQI questionnaire and Harvard Step Test. Sleep disturbance

Table 4: Physical fitness of respondents.

Physical Fitness	n	Percentage
Low	4	8
Moderate	22	44
High	24	48
Total	50	100

was proven to have a significant relationship ($p=0.00$) with physical fitness.

Many factors that caused differences in the result of research with previous studies. One of them is the differences in the sampling method and instrument used in measuring physical fitness in the study. The test instrument used in this study is the Harvard Step Test, which has weaknesses, especially in biomechanical differences in each individual. For example, people with more body height will spend less energy on doing this test. Weight can also be an influencing factor and it will take a lot of time when doing this test on many people.¹⁷ Furthermore, there are certain factors in this study that can affect the results, including genetic factors, physical activity, nutritional status as seen from fat percentage, lifestyle, and physiological conditions. Genetic factors can affect the volume and capacity of the lungs and heart, cardiac output, stroke volume, red cell mass, peripheral circulation, the amount and composition of muscle fibers, as well as the density of mitochondria. Through the mechanism above, optimal physical fitness can be obtained.^{18,19} Physical activity is also a factor related to physical fitness.

The higher physical activities carried out, the higher level of physical fitness of someone.^{20,21} Physical fitness is also influenced by nutritional status. This factor can be seen from the body mass index or fat percentage. In this study, body mass index of all respondents were normal while the fat percentage was not controlled. Losing body fat deposits will significantly cause the level of physical fitness to increase by more efficient biomechanical process in the body.^{22,23} Another factor that affects physical fitness in college students is lifestyle. Lifestyle in terms of smoking habits, consumption of alcohol and drugs, eating habits, exercise and physical health, control of stress, and safety are known to have a significant relationship with physical fitness.²⁴⁻²⁶ Psychological factors such as stress and mental health can also affect physical fitness. A person with low levels of mental

illness will have higher cardiorespiratory fitness and muscle strength, as well as healthier body composition. Physical fitness activity can also be an effort to prevent stress because it reduces stress-inducing hormones, such as epinephrine and cortisol, which if too high can reduce immune function and affect the sympathetic nervous system. In addition, exercise also helps increase interleukins, which are associated with resistance to viral infections and tumor.^{25,27}

CONCLUSION

Based on the research, it can be concluded that the sleep quality among medical students of Udayana University class of 2019 has the same proportion of good and bad category. Meanwhile, the physical fitness is mostly good. Based on the Fisher's Exact Test, it was found that there was no significant relationship between sleep quality and physical fitness among medical students of Udayana University class of 2019. Suggestions for this study are to conduct further research to control other risk factors, as well as to analyze factors that can affect physical fitness in medical students. It is recommended for the community, especially students, to always maintain the quality of their sleep in order to have good physical fitness in order to avoid health complications in the future.

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