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The Relationship between Sleep Quality and Blood Pressure in Students of the Faculty of Medicine, Universitas Prima Indonesia

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A B S T R A C T

Poor sleep quality is one of the risk factors for high blood pressure or hypertension in adults. Disorders of the cardiovascular system are believed to be one of the effects of poor sleep quality. This study aims to determine the relationship between sleep quality and cardiovascular performance of students at the Faculty of Medicine, Universitas Prima Indonesia, as assessed by systolic and diastolic blood pressure. This study is an observational study with a cross-sectional approach. A total of 75 subjects participated in this study. Sleep quality was assessed by PSQI, and blood pressure was assessed by an aneroid tensimeter. This study shows that sleep quality is related to blood pressure. Poor sleep quality is associated with increased blood pressure, $p<0.05$. Sleep quality is related to blood pressure in students of the Faculty of Medicine, Universitas Prima Indonesia.

1. Introduction

Poor sleep quality will hinder a person's ability to work. This has an impact on the disruption of various physiological and psychological functions of the individual.[1] Various disorders ranging from decreased learning ability, decreased performance at work, difficulty focusing, and various psychological disorders, such as mood disorders, are disorders that occur due to sleep quality disturbances.[2,3] This does not include the potential for traffic accidents due to drowsy drivers due to poor sleep quality. Sleep, which is considered only a routine activity, turns out to play a big role in individual success and safety. In adolescents and young adults, sleep-related disorders are often found as a result of activities at school or even after-school activities, namely other social activities. Medical Faculty students are in a community with very limited sleep time. The demands of coursework, lessons, exams, and various student activities sometimes cause Medical Faculty students to reduce sleep time.[4-6]

Sleep plays an important role in maintaining the body's immune system, memory, metabolism, and

various other important functions. Poor sleep quality is said to be one of the risk factors for high blood pressure or hypertension in adults.[7,8] Disorders of the cardiovascular system are believed to be one of the effects of poor sleep quality. Various studies show that decreased sleep quality has an impact on a person's cardiovascular performance.[9,10] Students of the Faculty of Medicine are certainly a community with the potential for prominent cardiovascular disorders due to suboptimal sleep quality. Therefore, this study aims to determine the relationship between sleep quality and cardiovascular performance of students at the Faculty of Medicine, Universitas Prima Indonesia, as assessed by systolic and diastolic blood pressure. This study is an initial study that aims to map the potential for cardiovascular disorders in the medical faculty student community, which is believed to be representative of the condition of the younger generation with poor sleep quality.

2. Methods

This study is an analytic observational study with a cross-sectional approach with the aim of knowing the relationship between sleep quality and blood pressure in students of the Faculty of Medicine, Universitas Prima Indonesia, Medan, Indonesia. This study used primary data collected from May – June 2022. A total of 75 subjects took part in this study, where the subjects met the inclusion criteria, namely students from the Faculty of Medicine, Universitas Prima Indonesia, Medan, Indonesia, class of 2019, without a history of cardiovascular disease and agreed to participate in this study by signing informed consent. This study was approved by the medical and health research ethics committee of the Faculty of Medicine, Dentistry and Health Sciences, Universitas Prima Indonesia, Medan, Indonesia (No. 19/KEPK/UNPRI/IV/2022).

This study presents sociodemographic data of research subjects. The sleep quality of the study subjects was assessed using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. If the PSQI score > 5 means poor sleep quality, and if ≤ 5 means good sleep quality. Before measuring blood pressure, research subjects were asked not to consume salt and monosodium glutamate. The blood pressure measurement instrument used is an aneroid sphygmomanometer and stethoscope. Data analysis was performed with the help of SPSS software version 25. Univariate analysis was performed to present the frequency distribution of sociodemographic data and test variables. Bivariate analysis was performed to analyze the relationship between the test variables with $p<0.05$.

3. Results and Discussion

Table 1 shows that the majority of respondents were female, namely 50 people (66.7%), and male gender, as many as 25 people (33.3%). The distribution of respondents at the age of 20 was 29 people (38.7%), 21 years old were 37 people (49.3%), which was the age of the majority of respondents, 22 years old were 7 people (9.3%), and 23 years old years as many as 2 people (2.7%). The majority of respondents who had poor sleep quality were 50 people (66.7%), and those who had good sleep quality were 25 people (33.3%). The majority of blood pressure respondents were prehypertension, as many as 34 people (45.3%), while normal blood pressure was 21 people (28%), blood pressure Grade 1 hypertension was 15 people (20%), and blood pressure was Grade 2 hypertension was 5. people (5%).

Table 1. Characteristics of research subjects.

Characteristics	Frequency	Percentage
Gender		
Female	50	66.7%
Male	25	33.3%
Age		
20 years	29	38.7%
21 years	37	49.3%
22 years	7	9.3%
23 years	2	2.7%
Sleep quality		
Poor	50	66.7%
Good	25	33.3%
Blood pressure		
Normal	21	28%
Prehypertension	34	45.3%
Hypertension grade 1	15	20%
Hypertension grade 2	5	6.7%

Table 2. Relationship between variables.

Sleep quality	Blood pressure				P-value
	Normal	Prehypertension	Hypertension grade 1	Hypertension grade 2	
Poor	3	32	11	4	0.00
Good	18	2	4	1	

*Fischer test, p <0.05.

Table 2 shows the relationship between sleep quality and blood pressure. This study shows that sleep quality is related to blood pressure. Poor sleep quality is associated with increased blood pressure, p<0.05.

This study shows that sleep quality is associated with increased blood pressure. Sleep disorders cause the activation of various neurotransmitters in the brain.[11] Sleep disturbances cause activation of the neurotransmitter glutamate in the brain, while at the same time, inhibition of the neurotransmitter GABA occurs.[12] Sleep disturbance conditions cause cortisol activation in the supra-adrenal glands. Cortisol triggers excitatory activation of glutamate in the brain, which leads to the activation of the alert system and prevents the activation of sleep activities.[13] Because the alert system is activated continuously, it causes the need for glucose in the brain to increase. This, of course, will trigger the renin-angiotensin-aldosterone system, which will trigger vasoconstriction of blood vessels, which will cause an increase in blood pressure.[14,15]

4. Conclusion

Sleep quality is related to blood pressure in students of the Faculty of Medicine, Universitas Prima Indonesia.

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