SLEEP QUALITY AND COLLEGE STUDENT BLOOD PRESSURE IN WIDYA MANDALA CATHOLIC UNIVERSITY SURABAYA

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ABSTRACT

Introduction: Changes in sleep patterns that occur in college students due to the alteration of the direct learning system after two years of long-distance education caused by the COVID-19 pandemic affect the adaptation process of the circadian rhythm. Poor sleep quality due to changing sleep patterns is liable to increase mortality risk due to the escalation incidence of chronic diseases and cardiovascular disorders such as hypertension. The prevalence of adolescent hypertension in Indonesia (population > 18 years) is quite high at 34.11%.

Purpose: The study aims to learn the relationship between sleep quality and college student blood pressure at Widya Mandala Catholic University Surabaya.

Method: The study used a cross-sectional approach. The method used in this research was simple random sampling and obtained 80 respondents. The data was collected by sharing questionnaires in google forms containing data related to sleep quality; after that, we measured the blood pressure.

Result: in this study, it was found that the majority was the respondents who had good sleep quality and normal blood pressure with a total of 37 students (77.1%), good sleep quality and abnormal blood pressure with a total of 11 students (22.9%), bad sleep quality and normal blood pressure with a total of 13 students (34.2%), bad sleep quality and abnormal blood pressure with a total of 25 students (65.8%) the result was p=0.00 (p<0.05).

Conclusion: there was a relationship between sleep quality and blood pressure in Widya Mandala college student Surabaya.

Keyword: Sleep quality, Blood pressure, College student, PSQI, Chronic diseases

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INTRODUCTION

Sleep is the most important rest time because it can help the body to bring back stamina, refresh, and to increase alertness when doing activities.[1] According to Guyton and Hall, sleep is an unconscious state that can only be awakened by sensory stimulation.[2] The National Sleep Foundation recommends a good sleep time needs 7-9 hours at night.[1]

The body has a sleep-wake cycle that operates for 24 hours, called a circadian rhythm. This homeostasis induces the first physiological effect, such as the nervous system and other functional systems.[2]

There were some limitations during the COVID-19 pandemic about offline lectures, so the government provided a solution by conducting online lectures. According to Muthuprasad *et al.,* 307 students from different universities in India showed that during the online lectures, the most used communication devices were smartphones (57.98%), laptops (35.83%), tablets (4.89%), and desktops (0.65%).[4]

When there is an alteration in learning systems, there is a significant change in sleep patterns, causing the circadian rhythm to re-adapt due to this change. Because of these alterations, it caused a worsening sleep quality.[5] According to the NESTED analysis study, it also shows that sleep disturbances that occur may be one of the effects of classes that are not properly scheduled (asynchronous or unscheduled classes).[6]

A decrease in someone's sleep quality can cause changes in physiological function, especially a decrease the physical and cognitive performance, productivity, and health.[2] Someone's low sleep duration can also increase mortality due to an incidence of chronic diseases, one of which is cardiovascular disorders such as increased blood pressure. Based on NHANES data, adults aged > 20 years have an estimate of between 52.6% - 55.8% experiencing prehypertension.[7]

High blood pressure (hypertension) increases systolic blood pressure $\geq$ 140 mmHg and/or diastolic blood pressure $\geq$ 90 mmHg. The prevalence of hypertension in residents > 18 years in Indonesia is also quite high at 34.11% (Riskesdas 2018). The incidence of an increase in hypertension patients occurs, so it is often found in health services.[8]

According to the data of the World Health Organization (WHO), the number of people who suffer from hypertension is about 26.4% or around 972 million people; this percentage is expected to increase at 29.2% in 2025. About 972 million people suffer from hypertension; 333 million of them are residents of developed countries, and 639 others are in developing countries, one of them being Indonesia[9]

Based on research on the relationship between sleep quality and blood pressure in USU Medical Faculty students conducted by Subramaniam et al. of 90 samples, a significant relationship was found between sleep quality and blood pressure.[10] In addition, based on a meta-analysis study of 45,041 patients from 29 articles, it can be concluded that there is a significant relationship between sleep quality and hypertension.[11]

Hypertension is a chronic disease that can become a silent killer in aging people, so it is necessary to take preventive measures to reduce the incidence of hypertension from an early age. The preventive method is to maintain students' sleep quality during the alteration from online to offline lectures, which causes students to experience many changes in sleep schedules. This is why the researcher wants to research the relationship between sleep quality and blood pressure at Widya Mandala Catholic University Surabaya.

METHOD

This quantitative research uses a cross-sectional design, an observation that happened once. The research was conducted to look for the relationship between the independent (independent) variables and the dependent (dependent) variables.

This research was conducted by sending questionnaires to respondents via Google Forms and informed consent. The Google form consists of 3 pages, on the first page contains the identity of the respondent and questions to determine respondents based on inclusion and exclusion criteria; the second page contains the SRQ questionnaire, which also aims to determine inclusion criteria in the form of psychological health, and the third page regarding the sleep quality questionnaire (PSQI) that have to be filled in by the respondent.

Besides the questionnaire, the researcher will measure blood pressure directly. This blood pressure measurement was carried out in August – September 2022. Subjects who fulfilled the inclusion criteria would have their blood pressure measured the day after the questionnaire was distributed. Each time the blood pressure was measured, the researchers limited the measurement to 5-10 people; the measurement would be done thrice at 1-2 minutes intervals. Additional measurements were made if the first and second measurements differed > 10 mmHg. For respondents who get measured three times, the results taken were the average of the results will be the 2nd and 3rd measurements. The purpose of limiting subjects when measuring is to avoid bias due to the number of subjects examined.

RESULTS

Table 1: Distribution of Research Sample Demographic Data

Variable	Number of Respondents	Percentage (%)
Age		
18 y.o	6	7%
19 y.o	12	14%
20 y.o	30	35%
21 y.o	27	31%
22 y.o	11	13%
Gender		
Male	39	45.3%
Female	47	54.7%

Academic Year		
2019	46	53.5%
2020	20	23.25%
2021	20	23.25%

According to Table 1, the number of respondents aged 18 years was six respondents (7%), 19 years were 12 respondents (14%), 20 years were 30 respondents (35%), 21 years were 27 respondents (31%), and age 22 years were 11 respondents (13%) with the majority of research respondents aged 20 years, as much as 30 respondents (35%). In this study, the majority of respondents were female, of 46 respondents (53.5%), with the male respondents as 39 respondents (45.3%), 46 respondents (53.5%) are students from 2019, which is the majority of respondents, and 20 people (23.25%) are students from classes of 2020 and 2021.

Table 2: Sample Distribution Based on Sleep Quality

Sleep Quality	Number of Respondents	Percentage (%)
≤ 5	48	56%
> 5	38	44%
Total	**86**	**100%**

Based on Table 2, it can be seen that in this study, respondents with good sleep quality or a total score of ≤ 5 were 48 people (56%), and as many as 38 people (44%) students experienced poor sleep quality or a total PSQI score of >5.

Table 3: Distribution of Sleep Quality Samples by Gender

Category	Gender	Number of Respondents	Percentage (%)
Good	Female	25	29%
	Male	23	27%
Bad	Female	22	26%
	Male	16	18%
Total		**86**	**100%**

Based on Table 3, it can be seen that female respondents with good sleep quality were 25 people (29%), male respondents with good sleep quality were 23 people (27%),

female respondents with poor sleep quality were 22 people (26%), and male respondents with poor sleep quality were 16 people (18%).

Table 4: Distribution of Samples Based on Blood Pressure

Blood Pressure	Category	Number of Respondents	Percentage (%)
Sistolik (S) < 130 mmHg Diastolic (D) < 85 mmHg	Normal	50	58%
- Hypotension - Normal-high - Hypertension grade 1 - Hypertension grade 2	Abnormal	36	42%
Total		**86**	**100%**

Based on Table 4 regarding the distribution of samples based on blood pressure measured using a stethoscope and aneroid sphygmomanometer, it was found that 50 people (58%) had normal blood pressure and 36 people (42%) had abnormal blood pressure.

Table 5: Description of Abnormal Blood Pressure Categories in the Sample

Abnormal Blood Pressure	Number of Respondents	Percentage (%)
Hypotension	4	11.11%
Normal-High	12	33.33%
- Hypertension grade 1	15	41.67%
- Hypertension grade 2	5	13.88%

Based on Table 5 regarding the description of abnormal blood pressure categories in the sample, it was found that as many as four people were in the hypotension category, 12 people (33.33%) were in the normal-high category, 15 people (41.67%) were in the grade 1 hypertension category, and five people (13.88%) were in the category of grade 2 hypertension.

Table 6: Relationship between sleep quality and blood pressure

Variable		Blood Pressure		Total
		Normal	Abnormal	
Sleep Quality	Good	37 (77.1%)	11 (22.9%)	48 (100.0%)
	Bad	13 (34.2%)	25 (65.7%)	38 (100.0%)
Total		50 (58.1%)	36 (41.9%)	86 (100.0%)

Based on Table 6, subjects with good sleep quality who had normal blood pressure were 37 people, and those who had abnormal blood pressure were 11 people. Subjects with poor sleep quality who had normal blood pressure were 13 people, and those who had abnormal blood pressure were 25 people.

DISCUSSION

Based on the results of the analysis of the relationship between sleep quality and blood pressure in FKWM students, the results obtained were p = 0.000 or p <0.05. This shows that the hypothesis in the study is accepted, and there is a relationship between sleep quality and blood pressure in Widya Mandala Surabaya Catholic students.

Sleep quality is a person's ability to stay asleep and get the amount of rest according to their needs, not just to achieve a certain amount or length of sleep. 12 Potter and Perry also argue that sleep quality can be shown through the length of time sleeping, and the complaints felt when sleeping or after waking up.

In this study, there were also respondents with poor sleep quality. This was because, in the last month, the majority of respondents felt it was difficult to sleep because they could not fall asleep within 30 minutes (69%), and respondents felt that the amount of sleep when they slept at night was <7 hours (85%). The National Sleep Foundation recommends a good sleep time of 7-9 hours per night. 1 This is also supported by research conducted by Fernandez-Mendoza et al. (2017) which showed that sleep duration < 6 hours or ≤ 5

hours is closely related to the incidence of hypertension, which can cause death. Abnormal blood pressure (hypertension) is a disease that can be reinforced by various risk factors such as gender, family history, race, and genetic factors; obesity; tobacco consumption; salt consumption; alcohol consumption; and sleep quality. When a person experiences a decrease in sleep quality, the adrenal medulla glands will secrete the hormones norepinephrine and epinephrine, thereby affecting specific organs, including the heart and blood vessels.

Decreased sleep quality in college students can impact increasing blood pressure due to lifestyle changes, physical and psychological stressors, and changes in social factors. In the research that has been done, lifestyle changes can occur due to changing sleep-wake patterns due to changing the online (online) learning system to an offline one. Suppose there is a change in the sleep-wake pattern. In that case, the circadian rhythm will be disturbed so that it can increase the activation of the sympathetic nervous system, and increase the production of hormones in the adrenal cortex and adrenal medulla, such as the hormones cortisol, steroids, catecholamines (epinephrine and norepinephrine). In addition, the hormone cortisol that is produced can also cause activation of the RAAS, which can cause sodium and water retention. Blood pressure can increase as a result of vasoconstriction of blood vessels innervated by the sympathetic nervous system, which results in an increase in blood pressure.

The theory regarding increased blood pressure influenced by sleep quality is strengthened by previous research by Zhang et al. that a high PSQI score was associated with a significantly increased incidence of hypertension (P < 0.001). Other research that also supports this theory is research conducted by Liu et al., who showed that their results also showed that there a difference in global PSQI scores that a high

was associated with the incidence of hypertension in the Chinese population.[20, 21]

CONCLUSIONS

A relationship exists between sleep quality and blood pressure in Widya Mandala Catholic University Surabaya students with a p-value = 0.000 (α <0.005).

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