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Research Article

Relationship Between Sleep Quality and Body Mass Index in Nursing Students in the University of Muhammadiyah Malang

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Abstract.
Obesity in developing countries is an epidemic at almost all age levels. The prevalence of obesity continues to increase with age and can reach its peak in adulthood. Increased Body Mass Index (BMI) has a close relationship with poor sleep quality. Increasing body weight (BB) in adolescence will cause an increase in the number of fat cells. The research design used in this study was experimental research,. In conducting our research, we focused on the influence of the variables. The population that we used in this study was the UMM nursing students in the class of 2017-2019, with a total of 495 students. The technique we used in this study was multi-stage (cluster) sampling to reach a proportional sample size through a probability proportional to size (PPS). The number of respondents we got was 71 students. Data collection was done online through private messages sent to the class leader or commander level of each class and distributed a questionnaire. The results shown were that the two variables had no relationship. Based on the Spearman'a rho correlation test, the significance value or sig.2-tailed = 0.897, where the value is greater than α (0.05). The results of this study indicated that the strength of the relationship was (-0.016), which means that the relationship between sleep quality and BMI has a very weak relationship or correlation and the relationship between the two variables is unidirectional. In conclusion, there is no relationship between sleep quality and body mass index in UMM Nursing undergraduate students.

Keywords: sleep quality, body mass index, student

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1. INTRODUCTION

Every individual is required to meet their basic needs, one of which is sleep. Problems with a person's sleep patterns regarding sleep quality often appear in almost all circles worldwide. One factor that affects sleep quality is a person's motivation or desire to sleep, and a person's motivation may decrease if he has an unfinished job. Poor sleep habits will cause the possibility of obesity or weight gain to be more significant, and this is due to an imbalance of the hormones leptin and ghrelin, which are hormones that

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stimulate and reduce appetite. What's more, people who lack sleep will feel tired and less enthusiastic when doing activities in the morning. Fatigue is perceived because they lack food intake, so these people consume excess food on the pretext of meeting their nutritional needs or consume snacks at night to stifle their hunger. Thus, obesity or weight gain will increase (1).

Obesity in developing countries is a global epidemic at almost all age levels, namely in children, adolescents, adults, and the elderly (2). The prevalence of obesity continues to increase with age and can reach its peak in adulthood (3). Increased BMI has a close relationship with poor sleep quality; increasing body weight in adolescence will cause an increase in the number of fat cells. Once these fat cells formed, it will be challenging to get rid of them so it will be risky to become overweight and even obese, persists into adulthood (4).

Based on a survey conducted face-to-face in February 2020 to Students of the Nursing Science Study Program University of Muhammadiyah Malang, especially new students with sleep disorders. It is in line with Yilmaz's research (2016); the study explained that sleep quality problems could arise because they have difficulty initiating sleep, and they tend to feel more comfortable at home than in a boarding house or rented house (5). Some senior students also said that their sleep used to play gadgets to just open social media, watch movies, search for literature for assignments, and play games, as evidenced by statements that students have filled in when collecting data. Most of the senior students of the Nursing Science Study Program said that they tend to relax during the day but do all the tasks at night. Some of the habits that students do impact their sleep, especially the quality of the student's sleep.

Previous research has stated that sleep quality can lead to weight gain and even obesity, with poor sleep habits affecting sleep quality (6). Poor sleep quality causes all activities during the day to be disrupted due to decreased cognitive and mental abilities. Signs of decreased cognitive and mental abilities are a heavy head, difficulty concentrating, decreased memory, reduced ability to solve problems, and increased emotions. Smoking habits also influence students' sleep quality; the sleep quality of students who smoke tends to be more disturbed than those who do not smoke (7).

The incidence of decreased sleep quality is relatively high in adolescents, especially students. In a study conducted at the University of Riau in 2015, students experienced a decrease in sleep quality by 82.2% (8). Adolescents with good sleep quality tend to have an average Body Mass Index (BMI). In contrast, adolescents who often stay up late or have shorter sleep times and poor quality tend to be obese by 45% (9). They need

physical and psychological support, especially for new students who will adapt to the environment and new ways of learning (10).

The results of a scientific work entitled Investigating the Relationship Among Sleep, Stress, and Body Mass Index in At-risk First-year College Students concluded that male students with an average result if the Pittsburg Sleep Questionnaire Index (PSQI) increased by 1.0 points. Then BMI will experience a decrease of 0.19 Kg/m3, and for female students, if the PSQI value increases by 1.0 points, it will increase the BMI value by 0.21 Kg/m3 (11). Capucio et al. (2008) revealed that every one-hour decrease in adult sleep quality could increase BMI by 0.35 kg/m2 (12). Several studies have also proven that sleep quality is related to obesity, leading to diseases related to a person's lifestyle, such as hypertension and diabetes mellitus (13).

Based on the description of the background, in the city of Malang, especially in the Faculty of Health Sciences, the University of Muhammadiyah Malang, research on the incidence of sleep disorders in students has not been reported, especially at the beginning of the lecture. Given the vulnerability of students to experience stress due to changes in the situation with previous education levels and eventually can experience sleep disorders, the researchers are interested in researching sleep disorders in students of the Nursing Science Study Program at the University of Muhammadiyah Malang. So with this research, it is hoped that it can support nursing care and suppress the decline in sleep quality in students.

2. MATERIALS AND METHODS

This study uses a cross-sectional study design because, in this design, researchers can observe the prevalence of a phenomenon (dependent variable) associated with the cause (independent variable); in this study, BMI is the dependent variable associated with sleep quality as an independent variable. The population in this study were undergraduate nursing students at the University of Muhammadiyah Malang in the 2017-2019 class, with a total of 495 students, and researchers reached the population. The population in this study must meet the criteria, namely active students of the Faculty of Health Sciences majoring in Nursing, the University of Muhammadiyah Malang, in the 2017-2019 class. We limit the sample in this study by providing inclusion criteria for the population and also limiting the respondents for each class according to the calculation of the proportion population scale (PPS).

In this study, the sampling technique used is probability sampling, which provides equal opportunities or opportunities for each member of the population to be selected

or not selected as a sample. Data retrieval in this study was carried out online through private messages sent to class leaders or commanders at each class level. The message contains the sample inclusion criteria used in the study. In the message, some students will be sampled according to the calculations according to their respective classes. The probability sampling technique has several sampling techniques, including cluster sampling. Cluster sampling is a technique of taking or determining samples if the object to be studied or the data source is comprehensive, grouped, and has almost the same characteristics (14) (15). The use of cluster sampling in this study is because the sample has heterogeneous characteristics, so it is impossible to make a sampling frame. The researcher uses a multi-stage (cluster) sampling technique to reach the proportional size of the sample through the probability proportional to size (PPS), where the aim is to determine the number of samples as data to represent the target population. The size of each class of the 2017-2019 class is 14% (16).

Class	Years		
	2017	2018	2019
A	"Total number: 48 students 48 x 14% = 6.72. Rounded up to 7 samples"	"Total number: 43 students 43 x 14% = 6.02. Rounded up to 6 samples"	"Total number: 43 students 43 x 14% = 6.02. Rounded up to 6 samples"
B	"Total number: 48 students 48 x 14% = 6.72. Rounded up to 7 samples"	"Total number: 47 students 47 x 14% = 6.58. Rounded up to 7 samples"	"Total number: 40 students 40 x 14% = 5.6. Rounded up to 6 samples"
C	"Total number: 48 students 48 x 14% = 6.72. Rounded up to 7 samples"	"Total number: 44 students 44 x 14% = 6.16. Rounded up to 6 samples"	"Total number: 45 students 45 x 14% = 6.3. Rounded up to 6 samples"
D	"Total number: 47 students 47 x 14% = 6.58. Rounded up to 7 samples"	"Total number: 42 students 42 x 14% = 5.88. Rounded up to 6 samples"	-
Total per *cluster*	28 Students	25 Students	18 Students
"Total entire cluster"	71 Students		

Figure 1: Probability proportional size (PPS) measurement results for 2017-2019 students.

The independent variable in this study was sleep quality. The dependent variable in this study was body mass index. The questionnaire in this study used the Pittsburgh Sleep Quality Index (PSQI).

This research is an observational study where the researcher only makes observations without providing intervention on the variables to be studied. Data analysis aims to obtain a description or description of each variable, comparing and testing theories or concepts with the information found. Bivariate analysis was conducted to determine the relationship between the independent and dependent variables—this study analyzed the data using SPSS version 23. The data analysis that will be used in this study is to use the Spearman Rank statistical test based on the form of data to be analyzed is an ordinal data type. In this study using $\alpha = 0.05$.

3. RESULTS

The results of the study entitled The Relationship of Sleep Quality With Body Mass Index Values in Undergraduate Nursing Students of the University of Muhammadiyah Malang, class of 2017-2019, are explained as follows.

3.1. Sample Characteristics

Characteristics of respondents include gender, sleep quality values, and Body Mass Index, where the results of respondent characteristics are obtained from the distribution of online questionnaires. Respondents have filled out according to the inclusion criteria: active undergraduate Nursing students at the University of Muhammadiyah Malang class 2017-2019.

Based on Table 2, demographic characteristics of the respondents, and the percentage of gender, it was found that the majority of respondents were female, as many as 60 respondents (85%). The sleep quality of students with poor classification is relatively high, namely 58 respondents (82%). The Body Mass Index of students with standard classification is quite large, namely 46 respondents (64%).

3.2. Relationship between sleep quality and body mass index in nursing students

The relationship between sleep quality and body mass index of nursing students using the Spearman Rank test will be presented in the table below:

TABLE 1: Demographic Characteristics of Nursing Students, University of Muhammadiyah Malang.

Characteristics	F (n=71)	%
Gender		
Male	11	15%
Female	60	85%
Classification of sleep quality (PSQI)		
Good	13	18%
Bad	58	82%
BMI Classification		
Underweight	6	8%
Normal	46	64%
Obesity Risk	7	10%
Obesity I	4	6%
Obesity II	8	11%

TABLE 2: Crosstabulation of the relationship between sleep quality and body mass index in nursing students.

Sleep quality	Underweight		Normal		Obesity risk		Obesity I		Obesity II		Total	
	f	%	f	%	f	%	f	%	f	%	f	%
Good	2	3%	7	10%	2	3%	0	0%	2	3%	13	19%
Bad	4	6%	39	54%	5	7%	4	6%	6	8%	58	81%
	6	9%	46	64%	7	10%	4	6	8	11	71	100%

Table 3 explains that most nursing students have poor sleep quality but have a normal BMI, as evidenced by the study's results, which showed 54% (39 students).

3.3. Correlation statistics test results

The results of the significance of the Kolmogorov-Smirnov table <0.05 show that the data of the two variables are not normally distributed. The statistical correlation test uses Spearman rank if the variables are not normally distributed.

Based on the table above, knowing that Spearman's rho correlation test results obtained a significance value or sig.2-tailed = 0.897, where the value is more significant than 0.05, it can be explained that there is no significant relationship between sleep quality and BMI. The results of this study indicate the strength of the relationship of (-0.016), meaning that the relationship between sleep quality and BMI has a fragile relationship or correlation and the relationship between the two variables is not unidirectional.

TABLE 3: Spearman rank correlation test results.

			PSQI	BMI
Spearman's rho	PSQI	Correlation Coefficient	1,000	-0.016
		Sig. (2-tailed)	.	0.897
		N	71	71
	BMI	Correlation Coefficient	-0.016	1,000
		Sig. (2-tailed)	0.897	.
		N	71	71

*Correlation is significant at the 0.05 level (2-tailed).

4. DISCUSSION

4.1. Description of sleep quality with body mass index of nursing students

This study shows whether or not there is a relationship between sleep quality and the body mass index of nursing students. These results were obtained from the distribution of online questionnaires via Google Forms. Respondents in this study were active students in the department of nursing at the University of Muhammadiyah Malang. All respondents had the same opportunity to participate in this study. Researchers only collect data at a time, meaning respondent data collection is only done once. Researchers conducted data collection using a Google form online due to situations and conditions that did not allow face-to-face meetings with respondents.

The results of our research found that there was no relationship between sleep quality and body mass index in Nursing Students. Sinaga (2015) also stated that his research did not show a relationship between sleep quality and the incidence of obesity in students, which was caused by high levels of student stress, eating patterns, and smoking, or not, especially for men (13).

4.2. Nursing student sleep quality and body mass index

This study shows that nursing students mostly have poor sleep quality. Nursing students are adolescents where need for sleep ranges from 71/2 hours in one day. Some students stated that due to the influence of a noisy environment, some stated that the online learning method affected their sleep because college assignments were done at night.

It follows a study on students of the Faculty of Medicine, the University of North Sumatra, where it was found that 51% of students had poor sleep quality. The same

results were obtained in a study conducted by Pitaloka, 2015 on students of the Faculty of Medicine, University of Riau, showing that 84% of students had poor sleep quality (17). Poor sleep quality can be influenced by several factors that can interfere with feelings and thoughts, such as in a state of stress and anxiety. Using gadgets before bed can also affect a person's sleep quality, as evidenced by a study conducted by Sulistiyani, 2012 (18). The study explained that 57.7% of students who used gadgets before bed had poor sleep quality.

The results of this study also lead us to the purpose of this study, namely to find out the results of calculating the weight and height of nursing students. It was found that most nursing students had a normal BMI, which was 65% (46 respondents); this could be caused by factors of genetics or gender of the respondents, where the respondents we studied were 85% female respondents. One factor that affects BMI is gender; gender can affect BMI when men experience more weight gain than women. The fat distribution between men and women is also different; men tend to be more visceral obese than women. Visceral obesity can be recognized from fat accumulation in a person's waist circumference (19).

This study shows no relationship between sleep quality and BMI in Nursing Students. Most students who have poor sleep quality have a normal BMI. Students are included in the category of young adults, where it is explained that young adults tend to have enough sleep but have an average or even low BMI. It is because young adults are a productive age, where everyone at this age is very passionate about work and has many innovations or ideas to be achieved. Hence, most young adults sleep tired and do not necessarily have good sleep quality (6).

5. CONCLUSION

Based on the results of research and discussion in the research that we have done, 82% of respondents have poor sleep quality. However, the average BMI rate is also high at 65%, so we can conclude there is no relationship between sleep quality and body mass index in Nursing students.

Acknowledgments

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