



The effect of sleep quality due to stress on medical students' academic achievement: A cross-sectional study

Arini Dyah Saputri^a, Imelda Ritunga^b

^a Medical Student, Bachelor Degree of Medicine, School of Medicine, Universitas Ciputra, Surabaya

^b Master of Medical Education, School of Medicine, Universitas Ciputra, Surabaya

Abstract

Stress on students can cause a decrease in sleep quality and potentially reduce academic achievement. Understanding the effect of stress-induced sleep quality on academic achievement allows for selecting the most appropriate intervention. This study aimed to determine the impact of sleep quality due to stress on the academic achievement of medical students at Universitas Ciputra Surabaya. The method used in this study is quantitative research in the form of analytic observational with a cross-sectional approach. Sampling was done by using a random sampling technique. The population is 80 students from the Faculty of Medicine at the Universitas Ciputra Surabaya, third year and fourth year medical students. The sample size in this study was 63 students. Data was collected using the Depression Anxiety Stress Scale-21 (DASS-21) questionnaire to measure stress levels and the Pittsburgh Sleep Quality Index (PSQI) questionnaire to measure sleep quality. Sampling was only done with the consent of the respondent. The data analysis used was the correlation test which was carried out to determine the relationship between sleep quality and stress levels; the linear regression test was carried out to assess the effect of sleep quality due to stress on academic achievement. All respondents experienced stress and sleep disturbance to various degrees. The highest proportion was mild stress and moderate sleep disturbance, respectively, 50.8% and 73%. Correlation test results showed a significant relationship between sleep disturbances and stress levels ($r= 0.29$; $p= 0.021$), and the linear regression test results showed no effect of sleep quality due to stress on academic achievement ($p= 0.241$). Based on the data analysis, it can be concluded that the decrease in sleep quality due to stress does not affect academic achievement in medical students.

Key words: sleep quality, stress level, academic achievement, medical students

Introduction

Education is crucial in life since it defines one's future quality of life; however, it is common for students to face pressure during the educational process, leading to stress. According to Sutjiato et al. (2015), stress is a condition that

a person experiences when there is individual contact with the environment that might generate a disparity between physical needs and mental conditions. Stress can induce

impaired focus, memory loss, decreased endurance, and poor sleep quality.¹

The World Health Organization (WHO) reported that stress affects about 350 million people globally and is ranked fourth as the most frequent ailment. According to Abdulghani, research on stress levels in 494 Saudi participants, the incidence of stress among medical students is 57%, with 21.5% experiencing light stress, 15.8% experiencing severe stress, and 19.6% experiencing heavy stress.² This demonstrates how stress can reduce academic achievement, learning focus, and memory.¹

Several studies have shown that medical students' stress events are very high compared to other study programs due to a busy class schedule such as introductory lectures, supporting lectures, practicum activities, medical skills, Small Group Discussions (SGD), block exams, Objective Structured Clinical Examination (OSCE), and general subject exams. Furthermore, student involvement in organizational committees and the student activity unit can cause stress. High-stress events have a negative impact on medical students' health, self-competence, professionalism, academic achievement, and grades. Furthermore, it influences harmful behavior changes such as smoking, drinking, and, the most serious, suicide.¹

Sleep quality is defined as a person's level of contentment with their sleep, such as not experiencing exhaustion, irritability, anxiety, lethargy, obvious darkening around the eyes, swelling of the eyelids, redness of the conjunctiva, headaches, or frequent yawning or drowsiness.³ Students who experience a decline in sleep quality due to stress are not doing well, which has a destructive impact on their physical and mental health. According to Dshinta's research, 220 students out of a total of 287 students at Tanjung Morawa 1 Public High School had poor sleep quality.⁴ According to Listiani's research, respondents whose sleep patterns are interrupted at night feel weary and sleepy during the day, making it difficult for them to concentrate on their studies and resulting in worse student academic scores.⁵

Medical education is a major that requires extensive study to become a doctor. As a result, it is critical to understand the effect of stress on sleep quality and academic accomplishment. This study aims to assess the impact of poor sleep quality caused by stress on the academic accomplishment of medical students at Universitas Ciputra Surabaya. The hypothesis of this study:

sleep quality due to stress is correlated with the academic performance of medical students of Universitas Ciputra.

Methods

Study Design

The research was a quantitative study with analytic observational using a cross-sectional approach. This study population is 80 students from the Faculty of Medicine at the Universitas Ciputra Surabaya, third year and fourth year medical students, with the number of samples determined to be 63 using the Yamane formula.⁶ The participants in this study were active students from the Faculty of Medicine, University of Ciputra Surabaya, third year and fourth year medical students, who met the inclusion and exclusion criteria.

Data Collection

The following are the sample criteria that were used in this study. Students from the Faculty of Medicine at the Universitas Ciputra Surabaya who were registered as active students, students who have signed an informed consent with a statement that they were willing to become respondents. Students who skipped lectures were excluded, and the sampling technique used in this study was probability sampling with simple random sampling.

This study makes use of both primary and secondary data sources. The answers to a questionnaire on stress and sleep quality were used to collect primary data. Academic achievement was taken from secondary data in the first student exam scores of the 2021/2022 semester. This value was taken to determine the stress and quality of sleep experienced by students while completing the questionnaire. This research has passed ethical approval by the ethical committee of the Universitas Ciputra with number 128/EC/KEPK-FKUC/IX/2021.

Statistical analysis

The instruments used in this study were the Depression Anxiety Stress Scale (DASS) and Pittsburgh Sleep Quality Index (PSQI) questionnaires. The secondary data used is the value of the first semester of the 2021/2022 school year with a ratio data scale. This research was conducted at the Faculty of Medicine, Universitas Ciputra Surabaya. The time of this research was conducted from July to December 2021. This study used statistical analysis using simple linear regression analysis.

Results

The following data is the demographic characteristics of students from the Faculty of Medicine, Universitas Ciputra Surabaya, third year and fourth year medical students. Respondents' sociodemographic data were obtained by filling out a sociodemographic characteristics questionnaire that included age, gender, and class.

Table 1. Demographic characteristics of students of the Faculty of Medicine, University of Ciputra Surabaya Class of 2018 and Class of 2019

Variable	Category	Amount	Percentage
Age	18-20	26	41.3%
	21-25	37	58.7% *
Sex	Male	26	41.3%
	Female	37	58.7% *
Class	2019	26	41.3%
	2018	37	58.7% *

Note. *Highest value

Table 2 below shows data on third year and fourth year students' stress levels at the Faculty of Medicine, Universitas Ciputra Surabaya, as measured using the DASS-21 questionnaire.

Table 2. Stress level of students of the Faculty of Medicine, Universitas Ciputra Surabaya

Classification	Interval	Amount	Percentage
Normal	0-7	0	0%
Light	8-9	32	50.8% *
Currently	10-12	20	31.7%
Heavy	13-16	7	11.1%
Very heavy	>17	4	6.3%

Note. *Highest value

From the study results, data on sleep quality disturbances for students of the Faculty of Medicine, Universitas Ciputra Surabaya are as follows as measured using the PSQI questionnaire.

Table 3. Quality of sleep in students of the Faculty of Medicine, Universitas Ciputra Surabaya

Classification	Interval	Amount	Percentage
No sleep disturbance	0	0	0%
Mild sleep disturbance	1-7	9	14.3%
Moderate sleep disturbance	8-13	46	73% *
Severe sleep disturbance	14-21	8	12.7%

disorder

Note. *Highest value

The following are the findings of statistical tests using SPSS on the association between stress and sleep quality for students of the Faculty of Medicine, Universitas Ciputra Surabaya.

Table 4. The relationship between stress and sleep quality for students of the Faculty of Medicine, Universitas Ciputra Surabaya

Correlations		SCORE PSQI	SCORE DASS
Spearman's rho	SCORE PSQI Correlation Coefficient	1.000	0.290*
	Sig. (2-tailed)	.	0.021
	N	63	63
	SCORE DASS Correlation Coefficient	0.290*	1.000
	Sig. (2-tailed)	0.021	.
	N	63	63

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

The table above shows that the results of the correlation analysis show a significant value of 0.021, so there is a significant relationship between sleep quality disturbances and stress disorders. The correlation coefficient of 0.29 indicates a weak relationship between sleep quality and stress levels.

Third year and fourth year medical students achievements at the Faculty of Medicine, Universitas Ciputra, were classified based on intervals and are summarized in the table below. Student achievement were secondary data from the first student exam of the 2021/2022 semester.

Table 5. Distribution of academic scores for students, Faculty of Medicine, Universitas Ciputra

Classification	Interval	Amount	Percentage
A	85-100	1	1.6%
A-	80-84,99	1	1.6%
B+	75-79,99	11	17.5%
B	70-74,99	11	17.5%
B-	65-69,99	15	23.8%*
C+	60-64,99	8	12.7%
C	55-59,99	7	11.1%
D	45-54,99	7	11.1%
E	0-44,99	2	3.2%

Note. *Highest value

Table 6 below shows the results of the Linear Regression analysis between sleep quality and stress levels on the academic achievement of the third year and

fourth year medical students of the Faculty of Medicine, Universitas Ciputra.

Table 6. The results of the Linear Regression analysis

Model	Coefficients ^a					Collinearity Statistics	
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF
1 (Constant)	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
	71.252	5.701		12.499	.000		
SCORE_DASS	.160	.443	.051	.362	.719	.834	1.200
SCORE_PSQI	-.639	.540	-.165	-1.184	.241	.834	1.200

Note. a. Dependent Variable: academic achievement

The PSQI and DASS-21 scores for the third year and fourth year medical students' academic achievement have p value 0.241 and 0.719, respectively, indicating that there was no influence of sleep quality owing to stress on the academic accomplishment of Medical students Universitas Ciputra Surabaya.

Discussion

Medical students' sleep quality varies significantly from one study to another. Researchers have shown a prevalence of sleep disorders of 60% and 68% among medical students.^{7,8} When compared, this study supports previous studies that showed a high prevalence of sleep disorders in medical students. However, in this study, it was found that there was no difference between the sleep quality of male and female students in this study. This result follows previous studies that gender is not a risk factor for low sleep quality.^{8,9} According to the findings of this study, all respondents experience varying degrees of stress. High stress levels may be caused by various factors, including students far from home, forced to enter medical school, overloaded material, educational system or environment demands, busy schedules, and overall grades.¹⁰⁻¹²

In theory, high stress levels are linked to poor sleep quality. Rezaei et al. reinforce this notion by demonstrating a link between sleep quality and factors connected to it, including stress.⁹ This study discovered that stress levels did not affect academic achievement in contrast to Lin et

al.'s study, which provides an overview of how stress affects student academic performance.¹³ In their study, Wondie et al. discovered a link between sleep quality and academic performance among Ethiopian medical students.⁸

There was no influence of stress-induced sleep quality on academic achievement in this study. This result could be due to various variables, including stress management, resilience, and social support. Compas et al. (2001) define stress coping as "a conscious effort and freedom to control emotions, thoughts, and behavior in response to stress."¹⁴ Meanwhile, resilience refers to an individual's ability to recover rapidly from adversity.¹⁵ Social support is defined as the perception and reality that someone is cared for by other people or the environment, and it is a type of social network support.¹⁶ Coping, resilience, and social support are interconnected and play critical roles in fostering high performance in medical students.

Adaptive coping is an active, flexible, and constructive effort in responding to stress. In contrast, maladaptive coping is a form of passive effort that tends to be unconstructive and avoids dealing with stress.¹⁷ Medical students generally experience decreased sleep quality due to stress during exams, including respondents in this study. Even so, medical students tend to have adaptive coping compared to non-adaptive coping. This mechanism allows students to adapt to various stress levels so they don't get into severe stress, disrupt daily functions, and reduce academic performance.¹⁸

Resilience is the ability to overcome difficulties well, which can be learned. This stressor that exists continuously, unknowingly makes medical students, perhaps, already accustomed to difficult situations, so it is relatively easier to get up when faced with difficult situations. This creates a privilege that medical students have a higher resilience than non-medical students.¹⁹ Innes also argues that medical students are more resilient than the general population.²⁰ In this study, poor sleep quality due to stress did not affect academic achievement. This result may be because medical students have formed resilience due to their daily stressors. Therefore, even though medical students have poor sleep quality, this does not affect their academic performance.

Social support significantly affects academic achievement. Social support may be better for students in online learning because they are at home rather than overseas. Families tend to provide direct support both psychologically and physically. Students with good social support adapt more easily, including dealing with stressors, than poor social support.²¹ Besides family support, peer support will improve academic performance. Peer support is proven to have a major role in the formation of resilience in medical students.¹⁹ Aside from stress management, time management skills may also have an impact. Time management has been found to improve medical students' academic performance when they are stressed and when they are not.²²

The limitations of this study were that the time required for the study was insufficient, and the population in the study was homogeneous because it only involved students from the Universitas Ciputra Medical Faculty. Hence, the characteristics were more or less the same. The researchers could not meet and have direct contact with the respondents, so they did not know whether they answered questions correctly.

Conclusion

Sleep quality due to stress does not affect the academic achievement of medical students at Universitas Ciputra, Surabaya. Medical students should adopt various attitudes to ensure that poor sleep quality due to stress does not interfere with academic accomplishment, including stress management, resilience, social support, and time management.

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Correspondence: Imelda Ritunga, East Java, Indonesia. Imelda.ritunga@ciputra.ac.id

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