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The Correlation between Poor Sleep Quality with Academic Stress Level in Medical Profession Students of Cenderawasih University, Jayapura

Kaida Irma Setyarini[1*], Prysta Aderlia Sitanggang[2]
Faculty Of Medicine, Cenderawasih University
Corresponding Author: Kaida Irma Setyarini, kaidasetyarini33@gmail.com

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A B S T R A C T

Mental health problems are psychological conditions that threaten various groups of society, including medical students. Sleep quality are thought to correlate with stress levels. This study aims to explore academic stress in medicine profession students, with 70 respondents. Sleep quality was measured using the Pittsburgh Sleep Quality. This study is a quantitative research with a cross sectional design, Pearson correlation test are used. The results showed that out of 70 respondents, there were 34 (48.6%) experienced moderate-severe stress levels, and 36 people (51.4%) experienced normal-light stress levels. The Pearson correlation test showed a value of p = 0.00 (significant) so that it was concluded that there was a correlation between poor sleep quality and the level of academic stress.

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INTRODUCTION

Sleep is an essential and universal function for human physiology. Poor sleep quality causes negative impacts related to a person's physical and mental health. Diseases associated with poor sleep quality can lead to type 2 diabetes, hypertension, chronic pain, increased Body Mass Index, as well as other diseases (Clement-Carbonell et al., 2021). Poor sleep quality is also known to cause psychological problems, such as anxiety and depression, aggression, cognitive decline, lack of focus and concentration, and other mental health disorders (Clement-Carbonell et al., 2021).

Types of mental health problems that can occur in medical students include stress, depression, anxiety, emotional disorders and mood swings (a quick change of person's feelings). The various of stress that can occur in community groups is academic stress. Academic stress is an emotional condition that often occurs in students during their studies. Academic stress can be caused by external factors in academic factors such as lecture load, material difficulties, academic environment, and relationships with lecturers. This stress can also be triggered by economic conditions or residence status. The causes of stress from internal factors such as gender, health conditions, and sleep quality can be experienced by students (Anindhita, 2019; Irlaks et al., 2020).

According to WHO, the prevalence of stress is experienced by 350 million people in the world. The prevalence of people experiencing mental and emotional disorders in Indonesia from 2013 to 2018 increased from 6% to 9.8%. The stress conditions that are often experienced by students at several universities in Indonesia have been extensively researched and show that medical students are the group that most often experiences academic stress (Afif Januar Ginata et al., 2023; Faridah et al., 2022; Irlaks et al., 2020; Zamroni et al., 2018).

Research in Papua, Jayapura by Izak, et al (2023) obtained results from 114 medical faculty students during the pandemic experiencing mild stress levels of 11.4%, moderate stress of 22.8%, and severe stress of 20.2% (Izak Samay & Dais Iswanto, 2021). Based on a survey of medical students at the Faculty of Medicine, Cenderawasih University, the results of 250 preclinical medical students experienced difficulties in learning as much as 66.7%, and experienced pressure/stress as much as 19.6%. Research by Kaida, et al (2024) shows that of the 188 pre-clinical students who experienced mild academic stress levels, 148 (78%) and severe academic stress levels amounted to 40 (21%) (Setyarini et al., 2024).

Academic stress in students will affect the quality of learning as well as psychosocial conditions when dealing with patients in hospitals. Medical students of the Doctor Profession are very important to be able to avoid stress and maintain mental health in order to be able to perform their duties as young doctors in hospitals. This study has the urgency to find out the correlation between sleep quality and academic stress levels, so it is hoped that it can be a reference for data to evaluate the teaching and learning process in the medical profession expecially at Hospital.

LITERATURE REVIEW

Academic stress may be the single most dominant stress factor that affects the mental well-being of college students. Some groups of students may experience more stress than others, and the coronavirus disease 19 (COVID-19) pandemic could further complicate the stress response. Survey by Barbayannis et al found a significant correlation between worse academic stress and poor mental well-being in all the students, who also reported an exacerbation of stress in response to the pandemic from 843 college (Barbayannis et al., 2022).

Internal stressors originate within the individual, including fever, infectious diseases, physical trauma, malnutrition, physical fatigue, and chronic disruption of biological function. Various conflicts and frustrations related to *modern* life or an emotional state such as guilt and feelings of inferiority *(self-devaluation)* due to failure to achieve something desired (Chyu & Chen, 2022).

External stressors are sourced from outside the individual. There are meaningful changes in the environment, changes in roles and social, heavy learning processes, work, and interpersonal relationships. Individuals must be able to adapt and be able to deal with the stressors that occur in them. Thus the individual will be able to survive with stressors that come both internally and externally (Kahn et al., 2023).

Stress can produce several responses that can be useful as indicators and measures of the occurrence of stress in individuals. Stress responses can lead to a variety of physiological, adaptive and psychological responses. Physiological responses in the form of brain interpretation and neuroendocrine responses; Adaptive rrespondon in the form of *General Adaptive Syndrome* (GAS) and *Local Adaptive Syndrome* (LAS) stages. Psychological responses can be both constructive and destructive behaviors and stress also related with familial factors (Deng et al., 2022).

Physiological response is a protective and adaptive mechanism to maintain the body's hemostasis balance. This response is a series of neural and homornal events that result in short-term or long-term consequences for the brain and body. In a stress response, afferent impulses will be captured by the sensory organs and internally to the nerve center of the brain and then forwarded all the way to the hypothalamus. It is then integrated and coordinated with the necessary responses for the body's adaptation mechanisms. If the body is unable to overcome these problems, there will be a balance disorder in the body (Barret et al., 2016).

The neural and neuroendocrine pathways under the control of the hypothalamus will be activated. Then there will be a sympathetic nervous system secretion which will then be followed by sympathetic-adrenal-modular secretions, and finally when the stressor is still present in the hypothalamic-pituitary system it will be activated (Smeltzer & Bare 2008). The central nervous system secretes norepinephrine and epinephrine to enhance the sympathetic-adrenal-modular-sympathetic response to stressful states (Chandra et al., 2017;).

The secretion of Norepinephrine results in an improvement in the function of vital organs and the general state of the body. Meanwhile, endorphins will raise the pain threshold for mood responses. Manifestations of

norepinephrine and endorphin secretion include: sweating, increased pulse, increased blood pressure, headache, difficulty sleeping and difficulty sleeping that occur in students with a heavy burden of academic tasks (Chandra et al., 2017).

Stress indicators are quantitative and qualitative measures that can describe a person's stress level. Stress indicators can be both quantitative and qualitative describing impacts. Stress has a direct impact with psychology which is indirectly related to physiology. As for stress indicators, they include physiological, emotional and behavioral indicators of stress (Shetty et al., 2022)

The classification of stress levels is based on physiological, emotional and psychological symptoms experienced or felt by students. Stress can be measured using the DASS-42 (*Depression Ansiety Stress Scale*). The DASS-42 instrument includes questions that have been validated and tested for reliability, where there are 42 question points to measure depression, stress and anxiety conditions. In the questionnaire, questions will be taken for the stress component, and a classification of normal, mild, moderate, severe, and very heavy stress levels will be obtained (Sarah & Asnani, 2021).

Sleep quality is an action where a person can be sure to start getting sleepy and follow his rest. The need for adequate sleep is determined apart from the number of hours of sleep (quantity of sleep), coupled with the depth of sleep. Good sleep quality will cause hormonal balance, regular circadian silices and stable melatonin which causes the body to be fresh (Rahmatul, 2018).

Poor sleep quality in a person can cause lethargy, tiredness, fatigue and unproductiveness of a person. If the biological condition is in an unhealthy or fit condition, then the ability in stress management will also be poor so that the individual will fall into a stressful condition. (Irlaks et al., 2020; Rahmatul, 2018).

Sleep quality estimation can be measured using a sleep quality estimation instrument called the Pittsburgh Sleep Quality Index (PSQI). PSQI is an instrument used to measure sleep quality and sleep design in adults. The PSQI was created to measure and separate people with good sleep quality and poor sleep quality. Sleep quality is a complex peculiarity and includes several aspects that can all be covered in the PSQI, including measuring the quantity (amount) of sleep, subjective and objective sleep quality, sleep latency, use of sleeping pills, and physical symptoms experienced in the morning or afternoon (Rahmatul, 2018;)

Several studies have been conducted in various countries and in Indonesia related to academic stress in students and students. Research by Gazzaz (2018) entitled *Perceived stresses, reasons for and sources of stress among medical students at Rabigh Medical College King Abdulaziz University* revealed the results of the study which stated that out of 152 respondents there were 77 (51%) students from the pre-clinical stage and 75 people (49%) from the clinical stage, the result was that 59.2% of respondents experienced stress (Gazzaz et al., 2018).

Another study by Irlaks, et al. (2015) with the title The Relationship between Academic Stress and the Trend of Somatization Symptoms in Students

of the Final Level Medical Study Program, Faculty of Medicine, Andalas University, obtained the result that from a sample of 100 final level medical students, 56 people (56%) with moderate stress levels and 4 people (4%) experienced very severe stress. The study also showed the results of the level of somatization symptom tendency of 26 people was moderate (26%) and 11 people were very mild (11%). A total of 24 people who experienced academic stress had a tendency to moderate somatization symptoms (27.9%) (Irlaks et al., 2020).

The latest research in 2023 conducted by Ginata, et al. showed that the results of research on stress levels in general were most prevalent in moderate stress reaching 46.92%, stress levels based on *Academic Related Stressors* were the most severe stress reaching 40.77%, stress levels based on Interpersonal and Intrapersonal Related Stressors, and Group Activities Related Stressors, Social Related Stressors and Group Activities Related Stressors were most likely to experience mild stress. Factors that affect stress levels include an individual's ability to perceive stressors, the time of exposure to stressors, and the number of stressors (Ginata *et al*. 2023).

METHODOLOGY

This type of research is a quantitative analytical research with *a cross sectional* approach. The analysis test used univariate and bivariate tests with *chi square and Pearson correlation test*. The measuring tools used in this study are the DASS-42 *(Depression, Anxiety, Stress Scale-42*) Questionnaire for stress level variables and PSQI *(Pittsburg Sleep Quality Index*) for sleep quality variables. The research will be carried out in April 2024 – August 2024.

Location of this study Faculty of Medicine, Cenderawasih University and Network Hospitals (Abepura Hospital and Jayapura Hospital). The target population of this research is all students of the Faculty of Medicine at the Professional Stage who are active with a total of 150 people.

The sampling technique is *purposive sampling,* with minimal sampling get by use this formula;

$$n = \frac{N}{1 + N\ (e)^2}$$

Information
n : Approximate number of samples
N : estimated population number
E : The percentage of tolerance for sampling error that is still tolerable; e = 0,1

So the sample size used in this study is, if N is in a population of 150 students, then:

$$n = \frac{150}{1 + 150\ (0{,}1)^2} = \frac{150}{2{,}5} = 60\ orang$$

All data will analyzed by IBM SPSS *(Statistical Package for the Social Science)* application 24.0 version, then the result will be presented in table and narrative explanation use Ms Word.

RESEARCH RESULT

Tabel 1. Independent and dependent variables

No	Variable	Frekuensi (n)	Presentase (%)
1	**Student Age**		
	≤ 25 years	46	65,7
	> 25 years	24	34,3
2	**Tribal Origin**		
	Papua	40	57,1
	Non Papua	30	42,9
3	**Gender**		
	Woman	46	65,7
	Man	24	34,3
4	**Station**		
	Senior Stase	23	32,9
	Stasis Minor	47	67,1
5	**Sleep Quality**		
	Poor	53	75,7
	Good	17	24,3
6	**Stress Levels**		
	Medium - Heavy	34	48,6
	Normal-Mild	36	51,4

Source: Primary Data, 2024

Based on table 4.1, in the Independent variable, the respondents of the Faculty of Medicine students were dominated by 46 people (65.7%) who were less than 25 years old, the ethnic origin showed more than the Papuan tribe 40 people (57.1%), and the medical profession students with poor sleep quality were 53 people (75.7%). For the Dependent Variable, the respondents of medical profession students who experienced severe academic stress levels were 34 0rang (48.6%) out of a total of 70 respondents.

Bivariate Analysis Correlation Test

The Pearson correlation test was carried out to find out whether there was a relationship or correlation between sleep quality and academic stress levels, then the correlation would be seen whether it was positive or negative and how the degree of correlation between the two variables was. The existence of a correlation was expressed with a $p <$ value of 0.05. Based on statistical analysis, the following results were obtained;

Tabel. 2. Correlation of sleep quality with academic stress levels

No	Sleep Quality	Cademic Stress Level				n	%	*p-value*	RP CI95%
		Heavy		Normal-Mild					
		n	%	n	%				
1	Poor	34	64,2	19	35,8	53	100	0,00	18,715 (0,00-0,00) Pearson's R 0,55
2	Good	0	0	17	100	17	100		
	Total	34	48,6	36	51,4	70	100		

Source: Primary data 2024

DISCUSSION

Based on the data above, it is known that of the 70 respondents, there are 34 (48.6%) experiencing moderate-severe stress levels, and 36 people (51.4%) with normal-light stress levels. The Pearson correlation test showed a value of p = 0.00 (significant) so that it was concluded that there was a correlation between poor sleep quality and the level of academic stress of professional students, with a Pearson correlation value of 0.55 indicating a degree of "moderate correlation", thus the student sleep quality factor had a relationship with the level of academic stress of FK Uncen students. This shows that there is a compatibility between the research results and the theory.

Sleep quality is an action where a person can be sure to start getting sleepy and follow his rest. The need for adequate sleep is determined apart from the number of hours of sleep (quantity of sleep), coupled with the depth of sleep. Good sleep quality will cause hormonal balance, regular circadian silices and stable melatonin which causes the body to be fresh (Rahmatul, 2018). However, if a person's sleep quality is poor, it can cause lethargy, tiredness, fatigue and unproductiveness of a person. If the biological condition is in an unhealthy or fit condition, then the ability in stress management will also be poor so that the individual will fall into a stressful condition. (Irlaks et al., 2020; Rahmatul, 2018; Wang & Bíró, 2021; Wang & Boros, 2021)

Sleep quality estimation can be measured using a sleep quality estimation instrument called *the Pittsburgh Sleep Quality Index* (PSQI). PSQI is an instrument used to measure sleep quality and sleep design in adults. The PSQI was created to measure and separate people with good sleep quality and poor sleep quality. Sleep quality is a complex peculiarity and includes several aspects that can all be covered in PSQI, including measuring the quantity (amount) of sleep, subjective and objective sleep quality, sleep latency, use of sleeping pills, and physical symptoms experienced in the morning or afternoon (Rahmatul, 2018). In the study, a significant relationship was found between poor sleep quality and severe academic stress levels, which showed the compatibility of the results with previous research and theory (Coiro et al., 2021; Deniz et al., 2023; Park, 2020).

Sleep disorders can occur due to neurocognitive, psychobiological and neurotransmitter factors. Neurotransmitter factors can be caused by disruptions in the brain regions that regulate sleep or in brain neurotransmitters. The regulation of wake-up sleep is controlled by *the basal forebrain* through cholinergic and GABAergic projections. This region also gets input from various areas of the hypothalamus and *brainstem*. This region is also the *relay* of afferent fibers from the *reticular activating system* to the cortical area (K. Pavlova & Latreille, 2019).

The circuit that maintains a state of wakefulness is *the reticular activating system* formed from a group of neurons in the medulla that provides a diffuse projection to the posterior hypothalamus. These reticular formations receive input from various sensory systems and provide exitatory projection to *the basal forebrain*, thalamus, and hypothalamus. Disturbances in this network cause disturbances to maintain consciousness, for example in hypersomnia and narcolepsy (K. Pavlova & Latreille, 2019; Shelgikar & Castillo, 2023).

The neurotransmitters involved in the pathophysiology of sleep disorders are serotonin, norepinephrine, histamine, hypoctretin/orexin, acetylcholine, dopamine, glutamate and GABA. The imbalance of these neurotransmitters, if occurring in the long term, can cause individuals to experience stress, depression and even anxiety (Alegre et al., 2023; Larson et al., 2023). This is in accordance with the results of the study which showed a correlation between poor sleep quality and the level of academic stress of medical students.

CONCLUSIONS AND RECOMMENDATIONS

Academic stress can be caused by various factors, one of which is due to poor sleep quality. The results showed that the *Pearson Chi Square correlation test* obtained a value of p = 0.00, namely there was a correlation between sleep quality and academic stress levels, Perason's R value of 0.55 showed a moderate degree of correlation.

Finally, the researcher would like to recommend to the Medical Profession Study Program to be able to carry out academic management of night service schedules and screen/prevent mental health problems in students at the professional stage, so that students who are indicated to have mental problems can receive counseling and immediate treatment. We also reccomend for students who diagnosed with mental health problem, please come to others person or doctor to get counseling or medication.

ADVANCED RESEARCH

Each of these studies is limited in terms of the number of respondents and there has been no research development on the causes of poor sleep quality, including caffeine consumption so that it can be biased in research. For the next researcher, it is expected to explore more widely about the causes of poor sleep quality in medical students more widely in Papua.

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