Current Clinical and Medical Education

The Correlation between Levels of Stress and Sleep Quality of Medical Student at Sultan Ageng Tirtayasa University

Tricahyani Endah Yuniarti[1], Dewi Friska[2], Pandu Sabatian Sumarsono[3]

[1]Lecturer at Faculty of Medicine and Health Science, Sultan Ageng Tirtayasa University, Banten, Indonesia

[2]Lecturer of Faculty of Medicine, University of Indonesia, Depok, Indonesia

[3]Student of Faculty of Medicine and Health Science, Sultan Ageng Tirtayasa University, Banten, Indonesia

Abstract: Background: Disturbed homeostasis due to physical or psychological stimulation can cause stress. According to the World Health Organization (WHO) in research by Clariska, et al (2020), as many as 264 million people in the world experience stress.

Aims: This research aims to obtain an overview of the mental health of students at the Sultan Ageng Tirtayasa University Medical Study Program.

Methods: This research uses an analytical observational design using a cross-sectional approach. The questionnaaire link was distributed to students of the Sultan Ageng Tirtayasa University Medical Study Program via Google Form. Stratified random sampling was chosen as the sampling technique in this study with a sample size of 148 people.

Results and Conclusion: There were 83 people (56.1%) with moderate levels of stress, which was also the highest level of stress experienced by students in the study. In addition, poor sleep quality in the study was found to be 87.2%. In the research, no relationship was found between gender, age, class, and non-academic activities with sleep quality. Student with moderate-bad stress levels are 4.26 times more likely to experience poor sleep quality compared to students with mild stress levels. There is a relationship between moderate- severe stress levels and sleep quality in students of the Sultan Ageng Tirtayasa University Medical Study Program.

Recommendation: Students still have a long future and must be developed so that they become people who are useful to those around them. Therefore, levels of stress and sleep quality must be taken seriously so that negative impacts on mental and physical health can be prevented.

Keyword: Levels of Stress, Sleep Quality, Student, Medical Study Program

Corresponding Author: Tricahyani Endah Yuniarti†, Lecturer at Faculty of Medicine and Health Science, Sultan Ageng Tirtayasa University, Banten, Indonesia

Introduction

Disturbed homeostasis due to physical or psychological stimulation can cause stress.[1] According to the World Health Organization (WHO) in Clariska et al (2020), as many as 264 million people in the world experience stress.[2] Medical students at the Faculty of Medicine in Saudi Arabia in Abdulghani et al.'s (2011) study had high levels of stress. The prevalence of stress in this study was 63.7% with stress in first year students (78.7%), second year student (70.8%), third year students (68%), fourth year students (43.2%).[3] Another case is that of University of Indonesia students by Herawati K (2018), 76.7% of students experienced moderate-severe stress and 23.4% mild stress.[4] Student can also have unique stressors in the form of pressure or discomfort in studying. Deadlines for assignments and busy preparations before exams are pressures related to learning and college activities. Apart from that, stressors in students can also be caused by the desire to get high grades and students' efforts not to fail which causes anxiety. Stress can cause students' sleep quality to decrease. Medical students prioritize sleep less in the context of meeting academic needs. Heavy levels of stress due to study loads and assignments often make medical students have to sacrifice sleep quality of medical students' sleep.[5,6] Increased stress due to academics will cause poor sleep quality.[2,7]

Research on 1.065 students in China's Jiangsu Province shows poor sleep quality in students whose lives are full of stress. This should be a concern, supported by research at the University of Indonesia which states that students who have poor sleep quality are 4.7 times more likely to experience stress than those who have good sleep quality. Based on these various data, medical students have a high potential to experience stress which can have a negative effect on sleep quality. This information is important is to dig deeper and study in order to maintain student' mental health while studying.[8,9] Indonesia has a Medical Study Program which applies different learning characteristics to other study programs. In this study program in Indonesia, especially in Banten Province, there is still limited research regarding the correlation between levels of stress and sleep quality.

Significance of the Study

It is important to conduct research on the relationship between stress levels and sleep quality, especially among students from the Medical Study Program class of 2020, 2021, 2022, and 2023. The hope is that by carrying out this research, students can prevent poor sleep quality by responding to various existing stressors appropriately so that student learning achievment can be optimal. Apart from that, it can provide information for students of the Sultan Ageng Tirtayasa University Medical Study Program regarding the importance of maintaining stress levels and sleep quality.

Objectives of the Study:
This research aims to obtain an overview of the mental health of students at the Sultan Ageng Tirtayasa University Medical Study Program.

Methodology:

The type of research used is quantitative with an analytical observational design using a cross-sectional approach. The location of this research was carried out at the Medical Study Program at Sultan Ageng Tirtayasa University. After obtaining research ethics, a questionnaire link was distributed via Google Form to student of the Sultan Ageng Tirtayasa University Medical Study Program. The target population in this research is students of the Medical Study Program in Indonesia. The reachable population in this study were students of the Sultan Ageng Tirtayasa University Medical Study Program class of 2020, 2021, 2022, and 2023.

Stratified random sampling was chosen as the sampling technique in this research, by selecting samples randomly in each generation and the results were combined into one sample that was free from variation for each generation. The formula for calculating the sample size is based on the type of data for the independent variable and dependent variable from the research. The title of this research is 'The Relationship between Stress Levels and Sleep Quality of Medical Study Program Student at Sultan Ageng Tirtayasa University. The independent and dependent variables based on the title are categorical data so that the sample is determined based on the proportion comparison formula. Calculating the sample size, it was found that 148 samples were taken from 4 classes. The number of student from the

class of 2020 is 47 people, the class of 2021 is 44 people, the class of 2022 is 44 people, and the class of 2023 is 42 people. The samples in each generation were obtained by researchers through names from the data that had been obtained. The data will be randomly shuffled via the random list generator website to obtain the name that will be used as the research subject.

The questionnaire used to measure levels of stress is the Perceived Stress Scale (PSS). Meanwhile, the questionnaire used to measure sleep quality is the Pittsburgh Sleep Quality Index (PSQI). Data processing was carried out using SPSS application statistical tests with data processing processes starting from editing, coding, data entry, cleaning, and data transformation. Univariate data variables examined in this research include age, gender, class, non-academic activities, and Grade Point Average (GPA). Apart from that, the bivariate data variables examined in this study include levels of stress and sleep quality. The study was approved by the Ethics Coommitte with letter number 8/UN43.20/KEPK/2024.

Setting

The location of this research was carried out at the Medical Study Program at Sultan Ageng Tirtayasa University

Sample

Stratified random sampling was chosen as the sampling technique in this research, by selecting samples randomly in each generation and the results were combined into one sample that was free from variation for each generation. The formula for calculating the sample size is based on the type of data for the independent variable and dependent variable from the research. The title of this research is 'The Relationship between Stress Levels and Sleep Quality of Medical Study Program Student at Sultan Ageng Tirtayasa University. The independent and dependent variables based on the title are categorical data so that the sample is determined based on the proportion comparison formula. Calculating the sample size, it was found that 148 samples were taken from 4 classes. The number of student from the class of 2020 is 47 people, the class of 2021 is 44 people, the class of 2022 is 44 people, and the class of 2023 is 42 people. The samples in each generation were obtained by researchers through names from the data that had been obtained. The data will be randomly shuffled via the random list generator website to obtain the name that will be used as the research subject.

Tools

After obtaining research ethics, a questionnaire link was distributed via Google Form to student of the Sultan Ageng Tirtayasa University Medical Study Program. The target population in this research is students of the Medical Study Program in Indonesia. The reachable population in this study were students of the Sultan Ageng Tirtayasa University Medical Study Program class of 2020, 2021, 2022, and 2023.

Validity

The study was approved by the Ethics Coommitte with letter number 8/UN43.20/KEPK/2024.

Statistical Analysis:

The questionnaire used to measure levels of stress is the Perceived Stress Scale (PSS). Meanwhile, the questionnaire used to measure sleep quality is the Pittsburgh Sleep Quality Index (PSQI). Data processing was carried out using SPSS application statistical tests with data processing processes starting from editing, coding, data entry, cleaning, and data transformation. Univariate data variables examined in this research include age, gender, class, non-academic activities, and Grade Point Average (GPA). Apart from that, the bivariate data variables examined in this study include levels of stress and sleep quality.

Ethical Consideration

Request was submitted through Medical Study Program Student at Sultan Ageng Tirtayasa University for approval of the study to seek permission for data collection obtained

Results of the Study:

A. Overview of research

The total population in the Sultan Ageng Tirtayasa University Medical Study Program is 177 people. The required number of research samples is 148 people. After carrying out stratified random sampling, the sample size of student from each class was obtained with 39 students from the class of 2020, 37 people from the class of 2021, 37 people from the class of 2022, and 35 people from the class of 2023 who were then selected randomly. All samples met the inclusion criteria and there were no excluded samples so data could be collected to obtain research results.

B. Univariate Analysis

The characteristics of respondents in this study consisted of gender, age, class, Grade Point Average (GPA), and non-academic activities. Men and women are a division of gender characteristic. Age was categorized as 17-21 years and > 21 years. Class are categorized into the 2020-2021 and 2022-2023 groups. Grade Point Average (GPA) is categorized into GPA >2.75 and GPA < 2.75. Non-academic activities are categorized into two groups, namely not participating in and participating in non-academic activities. Female respondent were 76.4%. The largest age group is 17-21 years and the percentage for the 2020-2021 class is 51.4%. Most respondents had a GPA > 2.75 with a total 142 people (95.9%). Students who take part in non- academic activities are 61.5%, as seen in Table 1.

Table 1. Characteristics of Respondents from the Medical StudyProgram atSultan Ageng TirtayasaUniversity(n=148)

Variables	Description (n%)
Gender	
Male	35(23.6%)
Female	113(76.4%)
Age	
17-21years	114(77%)
>21years	34(23%)
Class	
- 2020-2021	76(51.4%)
- 2022-2023	72(48.6%)
Grade Point Average	
- GPA$\geq$2.75	142(95.9)
- GPA<2.75	6(4.1%)
Non-Academic Activity	
Not participating	57(38.5%)
Participating	91(61.5%)

Levels of stress are divided into three categories, namely high perceived stress, moderate stress, and low stress. The moderate stress level was 83 people (56.1%), which was also the highest level of stress experienced by student (figure 1). There are far fewer students who have good sleep quality than poor sleep quality (figure 2).
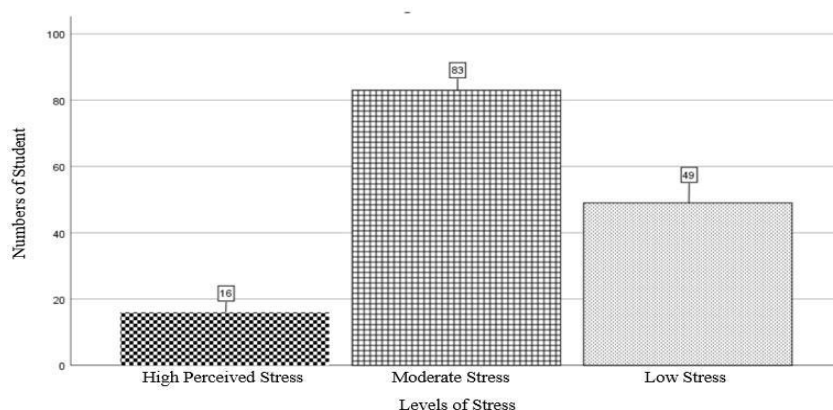

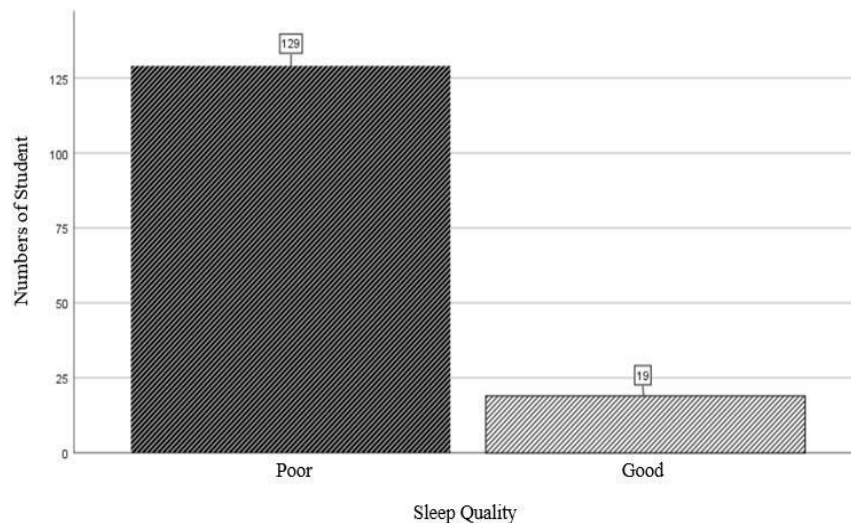**Figure 1. Levels of Stress Medical Study Program Students at Sultan Ageng Tirtayasa University**

Figure 2. Sleep Quality of Medical Study Program Students at Sultan Ageng Tirtayasa University

C. Bivariate Analysis

In the comparative test analysis, the proportion of poor sleep quality experienced by 92 people among respondents who had moderate-severe levels of stress. The p value was found to be significant with $p < 0.05$. Moderate-high levels of stress are 4.26 times more likely to experience poor sleep quality compared to respondents who have low levels of stres (table 3).

Table 3. The Correlation between Levels of Stress and Sleep Quality of Medical Student at Sultan Ageng Tirtayasa University.

Levels of Stress	Sleep Quality		P-value*	OR(95%CI)
	Poor	Good		
Moderate-High	92(92.9%)	7(7.1%)	0.003	4.26(1.56-11-67)
Low	37(75.5%)	12(24.5%)		ref

*Chi-SquareTest

Discussion:

Gender, age, class, non-academic activities, and Grade Average Point (GPA) are characteristics of respondents. The female gender numbered 113 people (76.4%), making up the majority in this study. The female gender is more interested in medical majors compared to males because girls tend to choose literature, social service, and have the ability to express stronger feelings in the fields of aesthetic, social, and religious values compared to man. This is differens from majors that are generally sought after by men, such as Faculty of Engineering. Differences in brain structure in men and women also influence this. The main bridge between the left brain and the right brain at the back of the corpus callosum which contains neuron and function to carry messages between the brain hemispheres in women is larger than in men. This cause women to use both sides of the brain for languange. Apart from that, the anterior commissure, which is a collection of nerves that also connects the two hemispheres of the female brain, is larger in women, causing the female cerebral hemispheres to be able to work together in carrying out languange functions and emotional responses.[4,10,11]

In this study, the age group aged 17-21 years was greater than those aged > 21 years with the percentage aged 17-21 years amounting to 114 people (77%). This is because most of the class of 2020, which is an older class, most of whom were born in 2002, were still 21 years old when the research was carried out. This is supported by previous research on students conducted by Lauren SMD (2018) that the number of respondents aged 17-21 years was 78.7%. Meanwhile, respondents aged > 21 years were only 21.3%.[12] Based on the results obtained, the group in the 2020-2021 class had 4 more people than group in the 2022-2023. Previous research conducted by Adriyana NC et al (2020) stated that first year students were more unstable in managing problems that occurred in their surrounding environment.[13]

The Grade Point Average (GPA) with a GPA > 2.75 was 142 people (95.9%), which was different from the number with a GPA < 2.75, which was 6 people (4.1%). This is supported by research conducted by Saptarina D et al (2023), which showed that there were 134 Grade Point Average (GPA) result for students at the Faculty of Medicine who had a GPA > 2.75 (87.6%) and 19 people who had a GPA <2.75l (12.4%).[14] A person's academic achievment is influenced by internal and external factors. Internal factors that can influence, namely physical factors (physiology) such as hearing, vision, body structure. Other internal factors, namely psychological factors (intellectual and non-intellectual factors). Sedangkan, cultural factors, social factors, and physical environmental factors are included in external factors.[15] Characteristics of non-academic activities among students in the research showed that 61.5% took part in non-academic activities. Research conducted by Trenggono et al is in line with this research where there are 60% students who take 1-2 non-academic activities. There is a positive influence on students when carrying out non-academic activities if they can manage their time properly and focus on their goals.[16]

In this study, the research results showed that 49 students experienced low stress (33.1%), 83 people experienced moderate stress (56.1%), 16 people experienced high perceived stress (10.8%). Previous research results stated that the level of moderate stress in medical students was 82.42%).[17] Stress in medical students related to academics is often due to very tight study time and short exam periods. Research on medical students related to academic shows that 56.63% of students experience moderate stress due to academics. The response to stress depends on each individual's adaptive abilities or coping strategies. This adaptability and coping strategy can influence the body's response to stress, whether it can manage stress into eustress or distress. If distress occurs, it can have a negative impact on human health.[18] In this study, it was found that 87.2% of Sultan Ageng Tirtayasa University Medical Study Program Students experienced poor sleep quality. This is in line with research conducted by Sutrisno et al (2017) on Padjadjaran University medical students with a percentage experiencing poor sleep quality of 93.8%. Another study at the University of Indonesia conducted by Herawati K (2018) on students found poor sleep quality of 76.4%. Poor sleep quality of 75.3% was found at the University of Indonesia Health Science Cluster.[4,19]

The results of this study show a significant relationship between levels of stress and sleep quality. Students with moderate-high levels are 4.26 times more likely to experience poor sleep quality compared to students with low stress levels. These results also support research conductes by Sulana et al (2020) where there is a relationship between levels of stress and sleep quality in students. Stress activates the adrenal-medullary-central nervous system and the hypothalamic-pituitary-adrenal center so that the hormones epinephrine, norephinephrine, and cortisol are continuously produced into the blood. An increase in these various hormones causes circadian rhythm disturbances by the centralnervous system involving the Reticular Activating System (RAS) in the brain stem. An increase in RAS makes a person more awake and has difficulty starting to sleep.20 Research conducted by Herawati K (2018) stated that there is a relationship between sleep quality and levels of stress. The research showed that poor sleep quality was 4.7 times higher of moderate-high stress compared to students who had good sleep quality.[4]

Conclusion:

There is a relationship between levels of stress and sleep quality in student of the Sultan Ageng Tirtayasa University Medical Study Program. Students with moderate-high stress are 4.26 times more likely to experienced poor sleep quality compared to those with low stress levels. This can become a cycle that gets worse if it is not handled properly. Apart form that, students still have a long future and must be developed so that they become people who are useful to those around them. Therefore, levels of stress and sleep quality must be taken seriously so that negative impacts on mental and physical health can be prevented.

Recommendations:

Students still have a long future and must be developed so that they become people who are useful to those around them. Therefore, levels of stress and sleep quality must be taken seriously so that negative impacts on mental and physical health can be prevented.

Reference:

1. ChuB, MarwahaK, SanvictoresT, AyersD. Physiology, stress reaction. Stat Pearls.2022.

2. Clariska W, Yuliana Y, Kamariyah K. Hubungan tingkat stres dengan kualitas tidur padamahasiswa tingkat akhir di fakultas kedokteran dan ilmu kesehatan universitas jambi. JI lmiah Ners Indonesia. 2020 Nov30;1(2):94–102.

3. Abdulghani HM, AlKanhal AA, Mahmoud ES, Ponnamperuma GG, Alfaris EA. Stress and its effects on medical students: a cross-sectional study at a college of medicine in saudi arabia. J Health Popul Nutr. 2011 Nov 13;29(5):516–22.

4. Herawati K. Hubungan kenyamanan fisik: kualitas tidur dengan tingkat stres pada mahasiswa universitas indonesia [Thesis].[Depok]:Universitas Indonesia;2018.

5. Kountul YP, Kolibu FK, Korompis GE. Faktor-faktor yang berhubungan dengan tingkat stresspada mahasiswa fakultas kesehatan masyarakat universitas sam ratulangi manado. Jurnal KESMAS.2018;7(5).

6. Almojali AI, Almalki SA, Alothman AS, Masuadi EM, Alaqeel MK. The prevalence and association of stress with sleep quality among medical students. Journal of Epidemiol and Glob Health.2017;7(3):169–74.

7. Wang H, Fan X. Academic stress and sleep quality among chinese adolescents: chainmediating effects of anxiety and school burnout. Int J Environ Res Public Health. 2023 Jan26;20(3):2219.

8. Herawati K, Gayatri D. The correlation between sleep quality and levels of stress among studentsin Universitas Indonesia. EnfermClin.2019Sep;29(2):357–61.

9. LiY,GuS,WangZ, Li H,XuX,ZhuH,etal.Relationship between stressful life events and sleep quality: rumination as a mediator and resilience as a moderator. Front Psychiatry. 2019May 27;10:348.

10. Batubara HP. Gambaran minat dalam pemilihan program studi di universitas pada siswa kelasxii berdasarkan jenis kelamin di sma negeri 10 fajar harapan banda aceh [Thesis].[BandaAceh]:Universitas Syah Kuala;2015.

11. Kheirkhah M, Baumbach P, Leistritz L, Witte OW, Walter M, Gilbert JR, et al. The righthemisphere is responsible for the greatest differences in human brain response to high-arousinge motional versus neutral stimuli:ameg study.Brain Sci. 2021Jul21;11(8).

12. Lauren SMD. Hubungan tingkat stres dengan gangguan tidur mahasiswa keperawatan universitas padjajaran selama pembelajaran daring di masa pandemi covid-19. [Bandung]:Universitas Padjajaran ;2022.

13. Adriyana NC, Oktafany, Apriliana E, Oktaria D. Perbandingan tingkat stres pada mahasiswa tingkat I,II,dan III fakultas kedokteran universitas lampung.Majority. 2020;9(2).

14. Saptarina D, Nurikhwan PW, Sanyoto DD, Bakhriansyah M, Limantara S. Hubungan tingkat kecemasanterhadapipk mahasiswa pskpsfkulm. Homeostasis. 2023;6(1):145–52.

15. Pusparini M, Imaningdyah A, Andayani SH, Mahardika ZP, Miranti DD. Hubungan antara ipkprogramsarjanakedokterandengankelulusanukmppdmahasiswafkuy.JKUnila.2016;2(1).

16. Trenggono, Septalia D, Maharani AN, Fadillah YN, Zahroh F, Khairunnisa Z. Pengaruhkegiatan non akademik terhadap prestasi mahasiswa arsitektur dan desain universitas pembangunan nasional veteranjawatimur. IJM. 2023;1(1).

17. Charles Y, Halim S. Penurunan prestasi akademik akibat stres selama pandemi covid-19.EBERSPAPYRUS. 2023;29(1).

18. Wahyudi R, Bebasari E, Nazriati E. gambaran tingkat stres pada mahasiswa fakultas kedokteran universitas riautahunpertama.JIK.2015;9(1):107–13.

19. Sutrisno R, Faisal, Huda F. Perbandingan kualitas tidur mahasiswa fakultas kedokteran universitas padjadjaran yang menggunakan dan tidak menggunakan cahaya lampu saat tidur.2017;3(2).

20. Hutahean RG, Sitepu JN, Hendra. Hubungan stres dengan kualitas tidur pada mahasiswa/ifakultas kedokteran universitas hkbpnommensen. NJM. 2022;8(1).