

# Anxiety and Sleep Quality Among Medical Students in Indonesia During the COVID-19 Pandemic

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## ABSTRACT

The COVID-19 pandemic has brought significant mental stress to the community and disruptions to learning, especially to medical students, due to the increasing stress on the health system. This study is to examine the prevalence of anxiety and sleep quality and the association between anxiety and sleep quality among medical students during the COVID-19 pandemic. The method used was a cross-sectional web-based survey was conducted among year one to three medical students between December 2020 and February 2021 in Indonesia. Medical students were voluntarily recruited through student groups. Ethics approval was obtained from the Medical Faculty Ethics Committee of Tarumanagara University. The primary outcomes of interest were anxiety and sleep quality as measured by the Generalized Anxiety Disorder (GAD-7) Indonesian version and the Pittsburgh Sleep Quality Index (PSQI) Indonesian version. A total of 208 responses were collected. Respondents had a median age of 20 years (Range 17-26 years), and the majority (73%) were female. Anxiety was found in about 60% of respondents, with 4.8% found to have severe anxiety. Poor sleep quality was found among 70% of respondents, with a higher prevalence in females than males (72% vs. 64%). There was about a 1.5 times statistically significant increase in the risk of poor sleep quality among those with anxiety compared to those without (PR 1.53, 95% CI 1.23 to 1.90,  $p < 0.001$ ). The conclusion shows that anxiety and poor sleep quality are common among medical students. These results support a clear need for medical faculties to provide better support systems to support mental health for medical students during the COVID-19 pandemic. Future serial studies are recommended to track medical students' mental health post-pandemic.

**Keywords:** Anxiety, Sleep quality, Medical student, Medical education.

## 1. INTRODUCTION

Since the beginning of December 2019 in Wuhan, Hubei, China, there has been a disease known with the name COVID – 19, which is caused by the SARS-CoV-2 virus that had spread rapidly inside and outside the country.<sup>1</sup> Just within a month, the disease caused by the mentioned virus was declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) on January 30, 2020, which later declared as a world pandemic on March 11, 2020.<sup>2</sup>

Head of Indonesian National Board for Disaster Management (BNPB) declared the national condition as a 'Certain Emergency Disease Plague Disaster Caused by Corona Virus' with the supporting decree found in decree number 9A the year 2020 and decree number 13A year 2020.<sup>3</sup>

Total of COVID – 19 infection cases in China had reached 81,846 by March 25, 2020, and 3,287 death cases. The disease did not spread in only China alone but also in other 193 countries. It has been reported that there were approximately 69,176 cases in Italy, 42,058 cases in Spain, and 53,588 cases in the United States.<sup>4</sup>

The pandemic caused panic and mental pressure on civilians in many countries. The rising number of cases within each province and country has become a concern that people are afraid to be infected by this virus.<sup>5</sup> All of those pressure caused mental disorders, which caused sleep deprivation which later decreased sleep quality.<sup>6</sup>

A study done by Li et al. shows that the prevalence of insomnia increases significantly during the COVID – 19 pandemic, which occurs currently.<sup>7</sup> Another research is done by Celini et al. about sleep quality and insomnia

to 1,310 adults amongst workers and university/college students. The result of the study showed that those 1,310 adults had a borderline depressive disorder and higher stress level, which showed the low quality of sleep.<sup>8</sup>

The following research investigated the sleep quality of individuals who had isolated themselves during the COVID-19 pandemic. The researchers found that there is a relationship between worry and stress with low sleep quality. Other than that, researchers said that isolated individuals have a high borderline of worry and low sleep quality.<sup>9</sup>

The pandemic brings the risk of death and psychological pressure, which occurred to all people living in the world. The spread of this virus cannot be slowed down, which made restrictions to all activity (e.g., operational hours of stores are decreased, and restaurants are closed). Even educational organizations had to go online, which made the students had to study from home. This resulted in bad mental health for the students who were stressed by the disruption of the study procedure. With the disruption of the study procedure, which is hindered by the pandemic, it is enough to give psychological pressure to the students, and this will impact the quality of sleep among each student.<sup>10,11</sup>

From this study above, many types of study about the worry experienced by workers, but there are limited numbers of those that investigated how it affects students' sleep quality. Above all of those reasons, the writer researched the association between worry and sleep quality during the COVID – 19 pandemic on medical students in the University of Tarumanagara.

## 2. MATERIAL AND METHODS

### Measurement of anxiety symptoms

The Generalized Anxiety Disorder (GAD-7) is a measuring tool that will be used to measure anxiety. The instrument consisted of seven items: 1) feeling nervous, anxious, or on edge; 2) not being able to stop or control worrying; 3) worrying too much about different things; 4) trouble relaxing; 5) being so restless that it is hard to sit still; 6) becoming easily annoyed or irritable; 7) feeling afraid as if something awful might happen.<sup>12</sup>

The psychometric of GAD-7 has been tested in a heterogeneous sample of different diagnoses. The study found good internal consistency and convergent validity, but poor specificity and false-positive rates have also been found for specific anxiety disorders. Therefore GAD-7 can only be used to screen for generalized anxiety disorder, post-traumatic stress disorder (PTSD), *social anxiety disorder* (SAD), and panic disorder in primary health facilities. The GAD-7 with a  $\geq 10$  cutoff has a 74% sensitivity and 54% specificity.<sup>13</sup>

### Measurement of Sleep Quality

The Pittsburgh Sleep Quality Index (PSQI) is a questionnaire used to assess a person's sleep quality or sleep deprivation during the last one month.<sup>14</sup> This questionnaire produces a score between 0-21 with seven components: sleep quality, sleep duration, sleep onset latency, and whether there are sleep deprivations. Each component will be given a score of 0, 1, 2, and 3.

If the score of this questionnaire is high, it means that the research subject has a sleep disorder. A score of  $\leq 5$  is considered a threshold for moderately good sleep quality, whereas  $> 5$  is considered fairly poor.<sup>15</sup> A global score of  $> 5$  has proved to have a sensitivity of 98.7% and a specificity of 84.4%. The Pittsburgh Sleep Quality Index (PSQI) has a Cronbach's value ( $\alpha = 0.85$ ) and *test-retest reliability* ( $r = 0.87$ ).<sup>16</sup>

## 3. RESULTS

The study results obtained from 208 respondents showed that the age of the respondents on average was 19.78, with a range of 17-26 years. Most of the female respondents were as many as 152 (73.1%) students. In the GAD-7 questionnaire used in this study, the level of anxiety was divided into no anxiety, mild anxiety, moderate anxiety, and severe anxiety. There were 86 (41.3%) respondents with no anxiety, 83 (39.9%) respondents with mild anxiety, 29 (13.9%) with moderate anxiety, and 10 (4.8%) respondents with severe anxiety. The average level of anxiety was highest in the age range of 18-21 years. Respondents with the most severe anxiety at the age of 20 were 7 (6.9%) respondents.

Most of the respondents who experienced anxiety were women, with 90 (59.1%) respondents. The results data acquisition from the level of sleep quality obtained were 146 (70.2%) respondents who had poor sleep quality, whereas the other 62 (29.8%) respondents had good sleep quality. The study from the PSQI questionnaire conducted on 208 respondents showed that the average level of poor sleep quality was in the 18-21 year age range with an average of above 50%. Most of the respondents who experienced poor sleep quality were women, with a total of 110 (72.4%) respondents.

A chi-square statistical test showed a significant association between anxiety and poor sleep quality ( $p$ -value $<0,005$ ). Epidemiologically, a respondent who has anxiety is 1.5 times more at risk of having poor sleep quality.

## 4. DISCUSSION

In this study, based on the level of anxiety, most respondents who had severe anxiety levels were 20 years old, as many as 7 (6.9%) respondents. A study conducted by Malfasari, et al. on 272 students of

STIKes Payung Negeri Pekanbaru showed that the majority of respondents were 21 years old, as many as 58 (35.8%) students. This study revealed that the younger the respondents, the higher the level of anxiety. The younger a person is, the easier it is for the individual to experience psychological stress and anxiety due to immature mental factors and lack of life experience.<sup>17</sup>

This study showed that the level of anxiety based on sex was 4 (7.1%) male students and 6 (3.9%) female students who experienced severe anxiety. A study conducted by Demak, et al. of 110 students of medical faculty Universitas Tadulako, showed that 38 male students experienced mild anxiety and 72 female students had a severe level of anxiety. A statistical test showed a significant association between sex and anxiety level ( $p < 0,05$ ). This happens because the female has more active autonomic nerves than the male. As a result, sympathetic nerves and norepinephrine will increase, and there will be a release of catecholamine and abnormal serotonergic regulation so that women are more likely to experience anxiety than men.<sup>18</sup>

This study showed that the distribution of students' anxiety measured by GAD-7 questionnaire, students who experienced anxiety were as many as 58.6%. According to the study using Depression, Anxiety and Stress Scales (DASS-42) questionnaire conducted by Andy, et al., only 17 of 37 (36.17%) preclinic students of the medical faculty of Universitas Tarumanagara from January 2013 to January 2014 experienced anxiety.<sup>19</sup> Based on the study conducted by Gisela, et al. using the Beck Anxiety Inventory questionnaire, 37.9% of 2017 medical students of Universitas Tarumanagara had a minimum level of anxiety.<sup>20</sup> In a study conducted by Thinagar, et al. using the GAD-7 questionnaire, 76.9% of medical students of Universitas Udayana from February 2014 to April 2014 had moderate anxiety.<sup>21</sup>

In this study, 67 (66.3%) students had poor sleep quality with an average age of 20 years. Based on the study conducted by Ginting, et al. of 130 students of Universitas Indonesia, some respondents had poor sleep quality (measured by PSQI questionnaire) with an average age of 22.7 years, and based on a statistical test, there was no significant association between age and sleep quality ( $p > 0,05$ ). In the student group, sleep quality was not affected by age but was caused by a newly acquired feeling of independence or a lack of experience of greater responsibility.<sup>22</sup>

In this study, most of those who had poor sleep quality were 110 (72,4%) female respondents. This is in line with the study conducted by Tantri, et al. that out of 87 students in Denpasar City, there was a majority of 42 (76,4%) female respondents who had poor sleep quality. Women have a low tolerance mechanism in overcoming problems so that they will experience sleep deprivations more often than men.<sup>23</sup>

This study showed that the distribution of students' sleep quality measured by PSQI questionnaire, medical students of Universitas Tarumanagara class 2018-2020 who experienced poor sleep quality were as many as 70.2%. This is in line with the study conducted by Stefanie, et al. by using PSQI questionnaire that 73.1% with poor sleep quality were medical students of Universitas Tarumanagara who took the Biomedical II block from March to November 2017.<sup>24</sup> This is also similar to the study conducted by Pangestu, et al. with the same questionnaire which stated that there were 69.1% medical students of Universitas Tarumanagara who had poor sleep quality.<sup>25</sup>

This study showed a significant association between anxiety and sleep quality ( $p\text{-value} < 0,05$ ). The result obtained in this study was similar to the study conducted by Sugiarta, et al. using Zung Self-Rating Anxiety Scale questionnaire. The respondents of the study were medical students of Ukrida. The result showed a correlation and a significant association between levels of anxiety and sleep quality.

The sleep quality results obtained in the study measured by PSQI had a  $p\text{-value} = 0,016$ . However, the correlation between these two variables was considered weak because several factors included problems with adapting to a new place, environment, courses, new circle of friends, or family problems.<sup>26</sup>

The results were in line with the study obtained by Ramswah, et al., which showed that people aged 18-79 in Germany had a significant association between anxiety and sleep quality (AOR 3.94, 95% CI 1.66 – 9.34).<sup>27</sup>

## 5. CONCLUSION

People at a young age may be more susceptible to anxiety, resulting in their decreased sleep quality, which is evident in the results of this study. Most respondents who experienced severe anxiety were at the age of 20 years. This pandemic is not only bad for physical health but can also harm mental health and sleep quality. This study showed that anxiety was associated with sleep quality. However, there was a tiny relevant study, especially on interventions on mental health at a younger age. It is essential to intervene and increase the number of relevant studies in Indonesia and many countries, especially those experiencing a high rate of COVID-19 spread.

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