Sleep Quality and Anxiety Among College Students in West Kalimantan, Indonesia

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ABSTRACT

The purpose of this study was to assess college students’ sleep quality and the prevalence of anxiety in this group. This study was conducted cross-sectionally online and was carried out at universities in the province of West Kalimantan. 663 students were selected as participants through snowball sampling. Instruments used included the General Anxiety Disorder-7 (GAD-7) and the Pittsburgh Sleep Quality Index (PSQI). We found that students had poor sleep quality and high anxiety levels, while students had good sleep quality but also experienced high levels of anxiety. We also observed a correlation between sleep quality subscales (subjective sleep quality, duration of sleep, sleep latency, disturbance of sleep) and anxiety (p = 0.293, p = 0.182, p = 0.279, p = 0.361). Overall, sleep quality correlated with anxiety (p = 0.735). Sleep quality was significantly associated with academic major (OR = 0.73, 95% CI [0.49, 1.51]) and anxiety was significantly associated with age (OR = 1.139, 95% CI [0.769, 1.68]). Sleep quality and anxiety were significantly correlated in students, and they both correlated with socio-demographic characteristics such as age and academic major. Coping strategies are considered a control point that could help overcome the impact of COVID-19.

Kata kunci: Anxiety COVID-19 Students Sleep Quality

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INTRODUCTION

The Covid-19 pandemic is attracting attention on an international scale. According to WHO data, on April 9, 2021, the number of worldwide coronavirus cases had reached 133,146,550 people. Indonesia is facing an increasing number of positive cases and has reached 1,552,880 people. Meanwhile, in West Kalimantan, 6,211 cases of Covid-19 have been confirmed (WHO, 2021).

Indonesia has been implementing activity restrictions to slow the virus for the past year. Around the world, social isolation and distance restrictions have been essential in preventing Covid-19 infection (Shen, Yang, Wang et al, 2020). Many campuses have suspended face-to-face lectures and are using virtual learning (Zhai & Du, 2020), including those in West Kalimantan (Tri bun Pontianak, 2020). Studies indicate that students have experienced more stress attending virtual classes during the pandemic (AlAteeq, Aljhani, & AlEesa, 2020). Lockdown has increased feelings of loneliness and anxiety, both of which have been emphasized during the pandemic (Boursier, Gioia, Musetti, & Schimmitt, 2020). Students think of campus as their home, but this inevitable state is beyond everyday experience and may cause stress, anxiety, and feelings of helplessness that affect students (Loaiza, Soriaeche, & Ayala, 2021). This suggests that mental health problems among students have worsened during the pandemic.

Several studies have examined the mental health impact of Covid-19 on students in the past year. Literature has reported worsening sleep quality, insomnia, and depression, evidenced by increased sleep latency, sleep hours, and wake times compared to before the pandemic (Marella, Castelnuovo, Summa et al, 2020). Students have moderate to extreme anxiety, and anxiety is closely related to age, gender, and education level (Khoshaim, Al-Sukayt, & Chinnia et al, 2020). Students describe negative impacts from the pandemic such as decreased social interaction, difficulty concentrating, disturbed sleep patterns, due to physical distance, and increased attention to academic performance (Son, Hegde, Smith, Wang, & Sasangohar, 2020). Meanwhile, a study conducted in 15 countries showed higher rates of post-traumatic stress disorder, stress, anxiety, depression, and disturbed sleep quality in students (Batara, Sharma, Batra, Singh, & Schwaneveldt, 2021). Mental health and poor sleep quality can increase the chance of contracting a Covid-19 infection.

Mental health difficulties such as stress, anxiety, and depression have been correlated with students’ academic performance and grades (Eisenberg, Daniel, & Ezra, 2009). However, stress and sleep quality do not correlate with academic performance (Alotaibi, Aloa iami, Al ajlan, & Bin, 2020). To overcome the anxiety created by the pandemic and the effects of activity limitation, college students have shown greater use of maladaptive coping strategies (compared to adaptive coping strategies) (Kamaludin, Chinna, Sundarasen et al, 2020). An even more concerning threat is emerging from the pandemic: stigma. This study examines how students who have experienced discrimination related to Covid-19 relate to internalized shame and stigma, which impacts mental health (Li, Zheng, Le et al, 2020). Recent reports have identified another development of significant concern: students are at risk for self-harm. Nearly 13% of suicide cases occur in college students, with risk factors including insufficient or excessive sleep, smoking, a history of suicide, depression, anxiety, and stress (Wu, Zheng, Lin, Lee, & Chung, 2020). Research is needed on college students’ reactions to the pandemic to minimize mental health problems, but limited attention has been paid to this area. Through this study, we hope to examine the impact of mental health: sleep quality and anxiety on college students in West Kalimantan, Indonesia.

METHOD

Participant characteristics and research design

This study used an online, quantitative, cross-sectional, independent measures design. It was conducted from June 20, 2020, to June 25, 2020, at public and private universities throughout the West Kalimantan Province. The population was all students who lived on campus in the West Kalimantan province. The inclusion criteria were: 17 to 26 years old, residing on a university campus in the West Kalimantan region, willing to fill out the questionnaire, and could read and use gadgets. The Institutional Ethics Committee of the Tanjungpura University of Medical Sciences approved this study. Participants were assured that their responses would remain confidential until the end of this survey. All procedures completed in parts of the study requiring human participants on the institutional national research committee’s ethical.

Sampling procedures

A snowball sampling technique was used. A structured instrument was created using Google Forms. It also contained the agreement form. Researchers, research assistants, and research data collectors contacted potential participants and informed them of the inclusion and exclusion criteria and the snowball sampling selection method. The instrument’s link was distributed via social media, e.g., email, Instagram, Telegram, WhatsApp, and other to contact. Assistants distributed the link to all students in the Kalimantan area using snowball sampling techniques. Hence, the link was passed to participants by a person separate from the first point of contact. The internet was required to participate in this study. Participants sent their responses to the questionnaire form, and then the researcher checked whether the respondent had filled in all the questions. When completing the form, participants agreed to take the survey and completed a screening. If they met inclusion criteria, the link was automatically provided and they proceeded to the informed consent procedure and filled out demographic information. Questions were administered in a fixed sequence and participants were required to answer all questions. Socio-demographic variables include age, sex, education, ethnicity, religion, and academic major. The online questionnaire developed by the researcher contains empathy for sections related to sleep quality (PSQI) and anxiety (GAD-7).

Sociodemographic, Generalized Anxiety Disorder-7, and Pittsburgh Sleep Quality Index

Five survey instruments were used, including a socio-demographic form, the GAD-7, and the PSQI. The socio-demographic form contained information about participants’ age, sex, ethnicity, religion, and academic major. The GAD-7, which was translated English to Bahasa Indonesia, consisted
of 7 items, including symptoms of anxiety and their frequency within the last two weeks. The measure uses a 4-item Likert rating scale ranging from 0 (not at all) to 3 (almost every day), while the total score ranges from 0 to 21. The GAD-7 has good validity (Cronbach’s α = .811). The PSQI, which was translated, has nineteen items that assess the essential components of sleep difficulties: sleep efficiency, sleep medication use, sleep latency, duration of sleep, disturbance of sleep, daytime dysfunction, and subjective sleep quality. This measure uses a Likert rating scale ranging from 0 to 4. To get a total form, a sleep profile was applied which was translated, has nineteen items that assess the essential components of sleep difficulties: sleep efficiency, sleep latency, duration of sleep, daytime dysfunction, and subjective sleep quality. The measure uses a Likert rating scale ranging from 0 to 4. To get a total form, a sleep profile was applied and subjective sleep quality, sleep latency, and duration of sleep ($p = 0.361$, $p = 0.293$, $p = 0.279$, $p = 0.182$). Overall, sleep quality correlated with anxiety ($p = 0.735$) (Table 3). In the multivariate logistic regression analysis, sleep quality correlated with academic major (OR = 0.73, 95% CI [0.49, 1.51]). Similarly, anxiety was correlated with age (OR = 1.139, 95% CI [0.769, 1.68]) (Table 4).

**Table 2. Frequency Distribution of PSQI and GAD-7 of the Students (n=663)**

<table>
<thead>
<tr>
<th>Sleep Quality</th>
<th>Anxiety</th>
<th>Total F(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal F(%)</td>
<td>Mild F(%)</td>
</tr>
<tr>
<td>Poor</td>
<td>92 (18.7)</td>
<td>219 (44.5)</td>
</tr>
<tr>
<td>Good</td>
<td>66 (38.6)</td>
<td>50 (29.2)</td>
</tr>
<tr>
<td>Total</td>
<td>158 (23.8)</td>
<td>268 (40.6)</td>
</tr>
</tbody>
</table>

**Result and Discussion**

Based on the table 1, 63% of participants were female, 37% were male, and 53% were >20 years old. Most of the students were Malay (39.2%), Muslim (70.4%), and from the Department of Health (40.4%) (Table 1). We found that 8.3% of students had poor sleep quality and high anxiety levels, while 7.6% of students had good sleep quality but also experienced high levels of anxiety (Table 2). We also observed correlations between subscales of our sleep quality measure and anxiety, including disturbance of sleep, sleep latency, and duration of sleep ($p = 0.361$, $p = 0.293$, $p = 0.279$, $p = 0.182$). Overall, sleep quality correlated with anxiety ($p = 0.735$) (Table 3). In the multivariate logistic regression analysis, sleep quality correlated with academic major (OR = 0.73, 95% CI [0.49, 1.51]). Similarly, anxiety was correlated with age (OR = 1.139, 95% CI [0.769, 1.68]) (Table 4).
The results showed that college students had poor subjective sleep quality, poor sleep duration, poor sleep latency, and increased sleep disturbance. Several studies reported significant sex differences between males and females regarding subjective sleep quality, sleep latency, sleep efficiency, duration of sleep, and disturbance of sleep (Tang, Liao, Kelly et al., 2017). Substantial differences in sleep quality before and after the outbreak of Covid-19 have been reported (Patra, Kanungo, & Bawa, 2020). A study reported that students showed poor sleep quality related to their level of daytime sleepiness (Pensuksan, Lertmaharit, Lohsoonthorn et al., 2016) increased anxiety ex-acerbates the problem, negatively affecting students’ strength and sleep quality. Their experiences include changes to their daily habits, boredom, fear, discomfort, and uncertainty about when the pandemic will end. Students feel overwhelmed adjusting their study schedules at home and receiving their assignments online instead of face-to-face. Every change in timetable and routine can negatively influence sleep and rest (Ishak, Illangkumaran, Muthiah, & Wajeeth, 2020). According to another study, longer times to fall asleep and wake up and shorter night-time sleep duration were both correlated with severely worsened sleep quality post-lockdown (Gupta, Girish, Yadav, Shanker, & Yadav, 2020). The shift to longer sleep and wake times during the pandemic has in-creased nighttime sleep and daytime naps (Kandeger, Guler, Eglimez, & Guler, 2018).

Sleep quality is significantly correlated with anxiety and the results showed that almost all students reported experiencing poor sleep quality during the pandemic. Previous studies identified PSQI as having a cause-and-effect disor-der with symptoms of insomnia, symptoms correlating with poor sleep quality with depression and depression (Frangopoulos, Zannetos, Nicolau et al., 2021). Students with poor sleep quality have high anxiety levels, but this study also reports that students with good sleep quality still experience high anxiety levels. Even when symptoms of anxiety have subsided, the quality of sleep still deteriorates (Hacimusalar & Karaaslan, 2020). Another study found that sleep quality and anxiety were significantly associated with depressive symptoms (Tu, He, & Zhou, 2020).

We found that sleep quality was correlated with academic major. Academic pressure medical students are

### Table 3. Correlation PSQI Global and Sub-Scales with GAD-7 Score of the Students (n=663)

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Mean</th>
<th>SD</th>
<th>Anxiety Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective Sleep quality</td>
<td>1.61</td>
<td>0.74</td>
<td>0.293*</td>
</tr>
<tr>
<td>Sleep latency</td>
<td>1.40</td>
<td>0.94</td>
<td>0.279**</td>
</tr>
<tr>
<td>Sleep Duration</td>
<td>1.60</td>
<td>1.04</td>
<td>0.182**</td>
</tr>
<tr>
<td>Sleep efficiency</td>
<td>0.54</td>
<td>0.87</td>
<td>-0.33</td>
</tr>
<tr>
<td>Sleep Disturbance</td>
<td>1.45</td>
<td>0.57</td>
<td>0.361**</td>
</tr>
<tr>
<td>Sleep Medication</td>
<td>0.12</td>
<td>0.35</td>
<td>0.108</td>
</tr>
<tr>
<td>Daytime disfunction</td>
<td>1.55</td>
<td>0.80</td>
<td>0.011</td>
</tr>
<tr>
<td>Global Sleep Quality</td>
<td>5.64</td>
<td>4.24</td>
<td>0.735**</td>
</tr>
</tbody>
</table>

Note: n=(663), *p < 0.05, **p<0.01, p=pearson

### Table 4. Multivariate Logistic Regression Analyses

<table>
<thead>
<tr>
<th>Variables</th>
<th>Anxiety</th>
<th>P-Value</th>
<th>Sleep Quality</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>1.00</td>
<td>-0.096*</td>
<td>1.00</td>
<td>-0.013</td>
</tr>
<tr>
<td>&gt;20</td>
<td>1.139 (0.769-1.68)</td>
<td>1.23 (0.77-1.62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.00</td>
<td>0.039</td>
<td>1.00</td>
<td>0.037</td>
</tr>
<tr>
<td>Female</td>
<td>1.009 (0.669-1.52)</td>
<td>1.31 (0.85-1.67)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>0.87 (0.62-1.35)</td>
<td>0.86 (0.53-1.37)</td>
<td></td>
<td>0.559</td>
</tr>
<tr>
<td>Dayak</td>
<td>0.72 (0.59-1.46)</td>
<td>0.81 (0.66-1.36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Javanese</td>
<td>0.82 (0.79-1.32)</td>
<td>0.93 (0.71-1.52)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Islam</td>
<td>1.41 (1.05-1.88)</td>
<td>1.33 (0.71-1.87)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>1.51 (0.91-1.83)</td>
<td>-0.038</td>
<td>1.27 (1.11-1.77)</td>
<td>-0.021</td>
</tr>
<tr>
<td>Christian</td>
<td>1.24 (0.85-1.91)</td>
<td>1.30 (0.91-1.82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sains³</td>
<td>1.139 (0.769-1.68)</td>
<td>0.73 (0.49-1.51)</td>
<td>-1.131*</td>
<td></td>
</tr>
<tr>
<td>Non-Sains³</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, *spearman-rank

**DISCUSSION**

The results showed that college students had poor subjective sleep quality, poor sleep duration, poor sleep latency, and increased sleep disturbance. Several studies reported significant sex differences between males and females regarding subjective sleep quality, sleep latency, sleep efficiency, duration of sleep, and disturbance of sleep (Tang, Liao, Kelly et al., 2017). Substantial differences in sleep quality before and after the outbreak of Covid-19 have been reported (Patra, Kanungo, & Bawa, 2020). A study reported that students showed poor sleep quality related to their level of daytime sleepiness (Pensuksan, Lertmaharit, Lohsoonthorn et al., 2016) increased anxiety ex-acerbates the problem, negatively affecting students’ strength and sleep quality. Their experiences include changes to their daily habits, boredom, fear, discomfort, and uncertainty about when the pandemic will end. Students feel overwhelmed adjusting their study schedules at home and receiving their assignments online instead of face-to-face. Every change in timetable and routine can negatively influence sleep and rest (Ishak, Illangkumaran, Muthiah, & Wajeeth, 2020). According to another study, longer times to fall asleep and wake up and shorter night-time sleep duration were both correlated with severely worsened sleep quality post-lockdown (Gupta, Girish, Yadav, Shanker, & Yadav, 2020). The shift to longer sleep and wake times during the pandemic has in-creased nighttime sleep and daytime naps (Kandeger, Guler, Eglimez, & Guler, 2018).

Sleep quality is significantly correlated with anxiety and the results showed that almost all students reported experiencing poor sleep quality during the pandemic. Previous studies identified PSQI as having a cause-and-effect disor-der with symptoms of insomnia, symptoms correlating with poor sleep quality with depression and depression (Frangopoulos, Zannetos, Nicolau et al., 2021). Students with poor sleep quality have high anxiety levels, but this study also reports that students with good sleep quality still experience high anxiety levels. Even when symptoms of anxiety have subsided, the quality of sleep still deteriorates (Hacimusalar & Karaaslan, 2020). Another study found that sleep quality and anxiety were significantly associated with depressive symptoms (Tu, He, & Zhou, 2020).

We found that sleep quality was correlated with academic major. Academic pressure medical students are
owned by other majors (law and economics). Physical and cognitive health are threatened if the quality of night sleep deteriorates and results in daytime sleepiness (Khero, Fatima, Shah, & Tahir, 2019). Other studies have reported that medical students’ poor sleep quality negatively impacted their academic achievement (Wondie, Molla, Mulat et al, 2021) and an increase in sleep disorder symptoms decreased their GPA (Yassin et al., 2020). Research also suggests that nursing students have had poor sleep quality because in their final year of study are canceled for placement, while students in their first year must adapt to online learning and virtual assessments to graduate (Romero et al., 2020).

This study found that anxiety levels were mild to severe among college students. The results of the systematic review found that anxiety was most common in medical students from Asia and the Middle East, and the prevalence of anxiety was high compared to the general population (Quek, Tam, Tran et al., 2019). During the pandemic, students’ anxiety was due to the rising number of confirmed and suspected instances of Covid-19 and its spread. High anxiety scores were found in stu-dents who were afraid of being infected (Savitsky, Findling, Ereli, & Hendel, 2020). Having a friend or relative affected by Covid-19 resulted in a significant increase in anxiety (Halperin, Henderson, Prenner, & Grauer, 2021). These students also faced stigma. Anxiety and age were correlated in this study. Students under the age of 20 are more anxious during the pandemic (Biswa & Biswas, 2021). Stress, anxiety, and depression are under twenty-five years, and the lowest rates are among those over sixty years of age Nwachukwu, Nkire, Shalaby et al, 2020). This is in contrast to other studies that do not show significant differences in anxiety correlated with age, social distance, or location (suburban, urban, or rural) (Halperin, Henderson, Prenner, & Grauer, 2021). Students receive much negative information during the pandemic, which increases their anxiety. Special attention should be paid to the psychological state of students dur-ing long-term home isolation (Fu, Yan, Zong et al., 2021). The higher students’ anxiety, the more coping strategies are used. Students have different abilities regarding overcoming problems and the coping strategies that they use are not the same. Inappropriate coping was observed in this study, triggered by the pandemic situation. When trying to overcome problems, it is crucial to maintain health, especially mental health (Huang & Zhao, 2020). Those who prefer to solve their problems outside the home are forced to stay at home and do not know when the epidemic will end. Students living with parents is one factor that can prevent anxiety during a pandemic (Biswa & Biswas, 2021).

LIMITATION OF THE STUDY

This study has limitations in that this study only looks at the respondents’ factors due to limited time, energy, and cost.

CONCLUSION AND SUGGESTION

This study reported negative impacts on students’ mental health during the pandemic. Sleep quality and anxiety are significantly correlated, and both are correlated with socio-demographic characteristics, including age and academic major. This situation is expected to continue and cause more severe problems.

Coping strategies are considered a control point to help students overcome the impact of Covid-19, even if students’ limitations make anxiety difficult to handle. Professional nurses (primarily mental and community nurses) and policymakers can contribute to efforts to reduce the pandemic’s impact on students via various interventions and counselling to improve student coping.

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Conflict of Interest statement

The author declares that there is no potential conflict of interest in relation to the authorship and publication of this article.

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