

Stress Levels And Sleep Disorders Among Undergraduate Nursing Students During Covid-19 Pandemic: A Cross-Sectional Study From Indonesia

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Abstract

The COVID-19 pandemic has forced universities to change their teaching and learning activities using online methods, which can impact students' stress problems, including undergraduate nursing students. This study aims to identify the relationship between stress levels and sleep disorders among nursing students in online learning during the COVID-19 pandemic. A cross-sectional study included 253 nursing students from the Faculty of Nursing at Universitas Padjadjaran between 2018 and 2021, and completed the Student Nurse Stress Index (SNSI) questionnaire and the Pittsburgh Sleep Quality Index (PSQI) questionnaire from June 2022 to July 2022. Study findings, all individuals reported experiencing moderate to severe stress levels and had an impact on sleep disorders, with a sig. (2-tailed) namely 0.001 (<0.05) and correlation (r) 0.290. The majority reported moderate stress, i.e. less disturbed sleep (70.6%), disturbed (63.2%), and very disturbed (52.6%). Meanwhile, severe stress, namely disturbed sleep (33%) and very disturbed (47.4%). Although, there were 14.3% had mild stress and slept less disturbed. The highest levels of stress and sleep disorders were reported by women (85.4%), 17-21 years old (78.7%), and lived with their family (77.1%). This study highlights that the COVID-19 pandemic related to stress and sleep disorders has a significant relationship. Therefore, future studies using meta-regression are needed to investigate the factors influencing and exacerbating stress and sleep disorder among nursing students in online learning during the COVID-19 pandemic to minimize results bias.

Keywords: COVID-19 pandemic, online learning, sleep disorders, nursing students, stress, Indonesia

Introduction

The COVID-19 pandemic is an outbreak due to a new type of coronavirus that first appeared in 2019 in Wuhan, China (Paules et al., 2012). During the COVID-19 pandemic, social distancing, physical distancing, and Large-Scale Social Restrictions policies were implemented to prevent the virus's spread (Aufar & Raharjo, 2020). In addition, the COVID-19 pandemic has forced universities worldwide to change face-to-face teaching and learning activities into distance learning using online methods, which impacts stress problems (Azis et al., 2015; Masha'al et al., 2020).

The prevalence of stress among students during the COVID-19 pandemic is relatively high. A meta-analysis of 17 studies reported that 13,247 nursing students experienced health problems during the COVID-19 pandemic, including stress (30%) and sleep problems (27%) (Mulyadi et al., 2021; Hamadi et al., 2021). Previous research shows that as many as 21 nursing students experienced severe stress (89%) (Ishmah et al., 2020). The studies by Hidayah et al. (2020) show that 27.9% of 140 nursing students experience moderate stress, and 5% experience severe anxiety. Another study showed that 108 Bachelor of Nursing students reported that online learning during the COVID-19 outbreak was stressful (44.4%) and very stressful (47.2%) (Oducado & Estoque, 2021).

Events of stress on students who carry out nursing education are a phenomenon that is often reported and considered a significant problem because it can cause fatigue (Giallardo et al., 2020; Nebhinani et al., 2020). A study by Rakhmawati et al. (2014) stated that the stress level of nursing students was higher than other majors, such as medical, pharmaceutical, and social students. However, learning stress can affect experience, performance and academic achievement, and student satisfaction as the primary indicator of the quality of education (Oducado et al., 2021; Amir et al., 2020). In addition, stress experienced by students can affect health problems mentally, physically, emotionally and spiritually (Khaleel et al., 2023). Stress-related physical symptoms

include headaches, dizziness, sleep disorder, fatigue or energy loss (Barselii et al., 2017; Purhadi, 2021).

Previously, several studies with the same topic have been investigated only assessing stress levels and sleep disorders in general students other than undergraduate nursing students, assessing either stress or sleep disorders, as well as in populations of professional program students. The study by Wahyuni (2018) showed that stress levels could cause sleep disorders in students of the nursing profession program with a yield of 82.6% (p-value 0.001). Another study by Ratnaningtyas et al. (2019) showed that in the last year, students in the general population experienced severe levels of stress and experienced sleep disorders, namely 94.3% (p-value 0.016). Additionally, during wave 2 of the COVID-19 pandemic, there was a significant correlation between mental health and sleep among primary health workers (Pataka et al., 2022). Nevertheless, studies regarding the relationship between stress and sleep disorder among undergraduate nursing students are still limited. The variability of conclusive information about stress events and sleep disorders in undergraduate nursing students during the COVID-19 pandemic requires additional study.

The current study was conducted to determine the relationship between stress to sleep disorders in nursing students. Moreover, a better understanding of the association between stress and sleep disorders related to the COVID-19 pandemic could provide significant information to define effective prevention, improving students' well-being and preventing the impact of reduced study outcomes. Thus, we hypothesised that undergraduate nursing students' stress levels related to sleep disorders in online learning during the COVID-19 pandemic. Therefore, this study aimed to identify the relationship between stress levels and sleep disorders among undergraduate nursing students in online learning during the COVID-19 pandemic.

Research Method

Study Design

This study used a cross-sectional design with a correlational approach through online surveys to identify the relationship between stress levels and sleep disorders among undergraduate nursing students in online learning during the COVID-19 pandemic at the Faculty of Nursing, Universitas Padjadjaran, Indonesia. This study was conducted on nursing students because the study load of nursing faculty students is quite high. The study population is 687 undergraduate nursing students with four strata, namely the 2018-2021 class. This study used stratified random sampling with the Slovin formula, 253 research samples were obtained consisting of final-year students or 2018 (212), third-year students or 2019 (142), second-year students or 2020 (153), and first-year students or 2021 (180).

The tools used in this study were a questionnaire, which consisted of a Student Nurse Stress Index (SNSI) questionnaire to assess stress levels, and a Pittsburgh Sleep Quality Index (PSQI) questionnaire to assess sleep disorder or quality in 1-month intervals. The Student Nurse Stress Index (SNSI) questionnaire consists of 18 questions that have been modified by previous researchers (Widjaya, 2019). The answer choices use a Likert scale in the form of numbers, namely 1 (not stressful), 2 (a little stressful), 3 (sometimes stressful), 4 (stressful), and 5 (always stressful). There are three results of measuring stress levels in this instrument scores 18-42 (mild stress), 43-66 (moderate stress), and 67-90 (severe stress). While the PSQI Questionnaire consists of 19 questions to measure seven assessment components modified by Moi et al. (2017), namely subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disorders, sleep medication, and daytime dysfunction. Questions were taken only from questions 5a-5j regarding sleep disorders, and There are four answer choices using a Likert scale, namely 0 (never), 1 (one time a week), 2 (Two times a week), and 3 (> three times a week). The results of measuring sleep disorders are seen from the total score,

namely scores 0 (not disturbed), 1-9 (less disturbed), 10-18 (disturbed) and 19-27 (very disturbed).

The SNSI questionnaire used has a validity value of 0.943, and the reliability value of this questionnaire is 0.763 (Cronbach's $\alpha > 0.6$), so it has sufficient internal consistency to assess stress levels in nursing students. The PSQI questionnaire shows the validity test results are 0.594, and the reliability is 0.811 (Cronbach's $\alpha > 0.6$), so it can be used to determine student sleep disorders.

Data Collection and Data Analysis

The data collection procedure used the Google form, which contained questions on the characteristics of the respondents, the SNSI and PSQI questionnaires. Furthermore, the Google Form link was distributed via WhatsApp to students who were selected as research subjects. The data that has been collected is then recapitulated and then processed using a computer program, namely Statistical Product and Service Solution (SPSS). Data analysis was carried out in this study, namely univariate, which aims to describe the characteristics of each of the variables studied, including the characteristics of the respondents, stress levels, and sleep disorders. And bivariate analysis to analyze two variables to determine the relationship between stress levels and sleep disorders in nursing students in online learning during the COVID-19 pandemic using the Spearman's Rank Correlation Coefficient (Spearman ρ) correlation test. The Spearman-rho rank correlation coefficient is used to measure correlation in nonparametric statistics (ordinal scale).

This study was conducted from June 2022 to July 2022. Ethical approval was obtained from the Research Ethics Commission of Universitas Padjadjaran with Letter Number 490/UN6.KEP/EC/2022. In the study, participation is voluntary, and the research objectives are clearly stated on the cover page of the questionnaire. Informed consent was recorded in the subject's consent form to participate in this study and conveyed a guarantee of the confidentiality of information from each respondent. Respondents are not required to fill out an anonymous questionnaire and use initials.

Results

Characteristics of participants

The data collection results that the researchers carried out obtained a sample distribution based on the characteristics of the respondents, stress levels, sleep disorders, and the relationship between stress levels and sleep disorders of nursing students in online learning during the COVID-19 pandemic.

A total of 253 undergraduate nursing students participated in the questionnaire. Most participants were women (85.4%) and men (14.6%). Age distribution of participants 78.7% aged 17-21 years and 21.3% over 21 years. Most participants live with their parents (77.1%) and are members of the Nuclear Family (87%). Descriptive statistics and socio-demographic data of the participants are shown in Table 1.

Table 1. Descriptive statistics and participants' socio-demographic data (n=253)

Characteristics	N (%)
Overall	253 (100%)
Age	
17 – 21	199 (78.7%)
> 21	54 (21.3%)
Gender	
Male	37 (14.6%)
Female	216 (85.4%)
Year of Class	
Final year	78 (30.8%)
Third year	52 (20.6%)
Second year	57 (22.5%)
First-year	66 (26.1%)
Place of Residence	
Stay with family	195 (77.1%)
Stay without family	58 (22.9%)
Family Type	
Extended Family	21 (8.3%)
Nuclear Family	220 (87%)
Single Parent	12 (4.7%)

Noted: Big family (extended family); Main family (nuclear family); 2018 (final year); 2019 (third year); 2020 (second year); 2021 (first year)

Table 2. Frequency distribution of nursing student stress levels (n=253)

Stress Level	N	Percentage (%)
Mild	22	8,7
Moderate	168	66,4
Severe	63	24,9

Noted: 18-42 (mild stress); 43-66 (moderate stress); 67-90 (severe stress)

Overall the majority of nursing students who were respondents experienced moderate stress during online learning during the COVID-19 pandemic (66.4%). However, the severe stress level is relatively high (24.9%). The results of the SNSI score assessment regarding the stress level of nursing students in online learning during the COVID-19 pandemic showed that the highest reports of stress occurred at the age of 17-21 years, with moderate stress (51.8%) and severe stress (21.3%), whereas at the age of more than 21 years reporting the highest moderate

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stress of 14.6%. In addition, women reported experiencing higher stress levels, namely 55.7% moderate stress and 22.5% severe stress (see table 3). Most moderate to severe stress events occur in first-year and final-year students. Medium stress levels, namely final year students or 2018 (19%) and the first year or 2021 (15.8%). Severe stress is on final-year students or 2018 (7.5%) and the first year or 2021 (7.1%). Most respondents' stress related to living with their parents was moderate 51%, and severe stress was 17.8% (see table 3).

Table 3. Frequency distribution of undergraduate nursing student stress levels by age, gender, class year, and place of residence (n=253)

Characteristics	Stress Level			
	Mild	Moderate	Severe	Total
	N (%)	N (%)	N (%)	N (%)
Age				
17 – 21	14 (5.5)	131 (51.8)	54 (21.3)	199 (78.7)
> 21	8 (3.2)	37 (14.6)	9 (3.6)	54 (21.3)
Gender				
Male	4 (1.6)	27 (10.7)	6 (2.4)	37 (14.6)
Female	18 (7.1)	141 (55.7)	57 (22.5)	216 (85.4)
Year of Class				
Final year	11 (4.3)	48 (19)	19 (7.5)	78 (30.8)
Third year	1 (0.4)	37 (14.6)	14 (5.5)	52 (20.6)
Second year	2 (0.8)	43 (17)	12 (4.7)	57 (22.5)
First-year	8 (3.2)	40 (15.8)	18 (7.1)	66 (26.1)
Place of Residence				
Stay with family	21 (8.3)	129 (51)	45 (17.8)	195 (77.1)
Stay without family	1 (0.4)	39 (15.4)	18 (7.1)	58 (22.6)

Noted: 2018 (final year); 2019 (third year); 2020 (second year); 2021 (first year); 18-42 (mild stress); 43-66 (moderate stress); 67-90 (severe stress)

Table 4. Frequency distribution of sleep disorders in nursing students (n=253)

Category	Sleep Disorders	
	N	Percentage (%)
Not disturbed	2	0.8
Less disturbed	126	49.8
Disturbed	106	41.9
Very disturbed	19	7.5

Noted: Not disturbed (never); Less disturbed (One time a week); Disturbed (Two times a week); Very disturbed (> three times a week)

The incidence of sleep disorders among nursing students in online learning during the COVID-19 pandemic is quite high. Most respondents were in the less disturbed category, namely 49.8%. However, the number of participant respondents who reported having sleep disorders was still high, namely 41.9% of the total number of participants (Table 4). The results of the PSQI score assessment regarding sleep disorders of nursing students in online learning during the COVID-19 pandemic showed that the highest reports of sleep disorders occurred at the age of 17-21 years, including 37.5% less disturbed, 34.4% disturbed, and 5.9% very disturbed. In addition, at the age of more than 20 years, most said they were less disturbed by 12.3% and disturbed by 7.5%. Women reported the most experiencing sleep disorders: less disturbed by 39.5% and disturbed

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by 39.1%. Most men, namely 10.3%, are in the less disturbed category, although 4.4% are in the disturbed and very disturbing category (see table 5). Table 5 presents the majority of sleep disorders reported by students in the last year or 2018, namely less disturbed (16.6%) and disturbed (11.9%), and in the first year, reporting disturbed by 13%. In addition, the first and last-year students each reported being distracted by 2.4%. The report found that most students living with their parents were mainly less disturbed, 39.9% and 31.6% disturbed. Students who do not live with their parents, at most 10%, report being sleep disorders. However, both had high scores related to reports of sleep disorders, namely, students who live with their parents (4.7%) and do not live with their parents (2.8%).

Table 5. Distribution of sleep disorders among undergraduate nursing students based on age, gender, class year, and place of residence (n=253)

Characteristics	Sleep Disorders				Total N (%)
	Not disturbed	Less disturbed	Disturbed	Very Disturbed	
	N (%)	N (%)	N (%)	N (%)	
Age					
17 – 21	2 (0.8)	95 (37,5)	87 (34,4)	15 (5.9)	199 (78,7)
> 21	0 (0.0)	31 (12,3)	19 (7,5)	4 (1.6)	54 (21.3)
Gender					
Male	0 (0.0)	26 (10,3)	7 (2,8)	4 (1.6)	37 (14.6)
Female	2 (0.8)	100 (39,5)	99 (39,1)	15 (5.9)	216 (85.4)
Year of Class					
Final year	0 (0.0)	42 (16,6)	30 (11,9)	6 (2.4)	78 (30.8)
Third year	1 (0.4)	30 (11,9)	17 (6.7)	4 (1.6)	52 (20.6)
Second year	1 (0.4)	27 (10,7)	26 (10.3)	3 (1.2)	57 (22.5)
First-year	0 (0.0)	27 (10,7)	33 (13)	6 (2.4)	66 (26.1)
Place of Residence					
Stay with family	2 (0.8)	101 (39,9)	80 (31.6)	12 (4.7)	195 (77.1)
Stay without family	0 (0)	25 (9.9)	26 (10.3)	7 (2.8)	58 (22.9)

Noted: 2018 (final year); 2019 (third year); 2020 (second year); 2021 (first year); not disturbed (never); Less disturbed (One time a week); Disturbed (Two times a week); Very disturbed (> three times a week)

Table 6. The Relationship between Stress Levels and Sleep Disorders of Nursing Students in Online Learning during the COVID-19 pandemic (n=253)

Stress Levels	Sleep Disorders				Correlation coefficient (r)	S i g . (2-tailed)
	Not disturbed	Less disturbed	Disturbed	Very disturbed		
	N (%)	N (%)	N (%)	N (%)		
Mild	0 (0)	18 (14,3)	4 (3.8)	0 (0)	0,290	0,001
Moderate	2 (100)	89 (70.6)	67 (63.2)	10 (52,6)		
Severe	0 (0)	19 (15.1)	35 (33)	9 (47,4)		
Total	2 (100)	126 (100)	106 (100)	19 (100)		

Noted: Statistically significant at alpha = 0,001 and Correlation coefficient (r) = 0,290

Table 6 presents the results of statistical tests using the Spearman correlation test, namely that there was a significant relationship between stress levels and sleep disorders for nursing students in online learning during the COVID-19 pandemic. The COVID-19 pandemic situation related to stress events and sleep quality has a significant relationship, where 14.3% of students who have mild stress say they are less disturbed, students with moderate stress are the highest, as many as 70.6% are less disturbed, 63.2% disturbed, and 52.6% were very disturbed, whereas in students with severe stress, 33% were disturbed and 47.4% were very disturbed. All individuals reported that during the COVID-19 pandemic, there was a relationship between moderate to severe stress levels and sleep disorders. Sig. Value (2-tailed), namely 0.001 (< 0.05) and correlation (r) 0.290.

Discussion

This study aimed to identify the relationship between stress levels and sleep disorders of nursing students in online learning during the COVID-19 pandemic. A total of 253 nursing students participated in the questionnaire. Most of the participants were women (85.4%), aged 17-21 years (78.7%), lived with their parents (77.1%), and belonged to a Nuclear Family (87%). This study results show a relationship between stress levels and sleep disorders in nursing students during the COVID-19 pandemic. All individuals reported that during the COVID-19 pandemic, they experienced moderate to severe stress and sleep disorders.

Principal findings

The results of this study indicate that the majority of undergraduate nursing students who were respondents, as many as 66.4% experienced moderate stress during online learning during the COVID-19 pandemic. However, the severe stress level is relatively high, namely 24.9%. As for sleep disorders, most students reported being in the less disturbed category, namely as many as 49.8%, but reports of students experiencing sleep disorders were still high, namely as many as 41.9%. In several studies, a meta-

analytic study on 13,247 nursing students. During the COVID-19 pandemic, problems with stress and sleep disorders have been identified, including stress (30%) and sleep disorders (27%). Another study showed that 108 nursing undergraduate students reported stress (44.4%) and tension (47.2%) in online learning during the COVID-19 pandemic (Oducado & Estoque, 2021). This study's results align with other studies, revealing that students felt stressed while learning online during the COVID-19 pandemic (Purhadi, 2021).

The stress and sleep disorders experienced by nursing students during online learning during the COVID-19 pandemic can be influenced by factors such as age, gender, education level, and place of residence. The results of the assessment of the SNSI and PSQI scores regarding stress levels and sleep disorders were both highest reported by respondents at the age of 17-21 years, women, first-year and final-year students, and students living with their parents (see table 3). In contrast to the study by Begam & Devi (2020), which states that there is no significant relationship between socio-demographic variables and the incidence of stress levels in nursing students.

The age of the participants was categorized into late teens, namely 17-21 years and over 21 years. In this study, most stress events were reported by students aged 17-21. Previous research stated that the age of adolescence to early adulthood is very influential on the occurrence of stress (Begam et al., 2020; Ambarwati et al., 2019). Regarding the gender factor, previous research said that female students experience severe stress 2.7 times more than male students, who will tend to have coping strategies such as the fight or flight response (Barselii et al., 2017). Other studies reveal that currently, during the COVID-19 pandemic, there is a significantly higher stress perception score among women and students (Sheroun et al., 2020).

Another finding in this study, the level of stress and distraction experienced by students is influenced by the level of student education, family factors, and place of residence (see table 3). The impact of COVID-19 is that campus activities are limited, including research, learning and

practice, so it can hamper the learning process and student thesis, increasing stress and panic (Sheroun et al., 2020; Thomas, 2022; Ozturk & Tekkas-Kerman, 2022). In addition, final-year students must be adaptive to the learning process and assignments online and must share roles within the family. In line with research Romero-Blanco et al. (2020), PSQI score results worsened by 0.91 points during lockdown (95% CI, -0.51, -1.31). In addition, sleep quality changed significantly ($p \leq 0.05$), one of the factors being nursing students living with their families. In addition, a place to live that is less conducive and varied can create saturation and affect sleep disorders (Wicaksono et al., 2013).

This study findings are consistent with those found in previous studies. Research by Ratnaningtyas & Fitriani (2019) shows a relationship between stress levels and sleep quality in college students. Stress due to many burdens on the mind is the cause of sleep disorders problems that are often not realized by himself. When a person experiences stress, there will be an increase in the hormones epinephrine, norepinephrine and cortisol, which affect the entire nervous system in the human body and keep our bodies awake (Mayoral, 2019). Since the COVID-19 pandemic, one of the problems students face in the learning process is an unstable internet connection, a less conducive learning environment, and increased task loads (Dewart et al., 2020).

The impact of stressful conditions and sleep disorders can affect the body's immunity, cause psychological problems such as emotional disturbances, metabolic disorders, risk of heart disease and stroke, feeling tired, weak and lethargic, and decreased ability to concentrate, performance and productivity (Nag et al., 2019). In addition, for nursing students, sleep disorders will impact decreasing academic achievement and, over time, can affect cognitive function (Khalil, 2017). Thus, measuring the relationship between stress levels and sleep disorders in college students during the COVID-19 pandemic is an important variable to study, which must be considered for the potential effects that can be caused both in the short and long term.

The most published research assesses

students' stress levels or sleep disorders during the COVID-19 pandemic in the general student population and nursing students. The current study found a relationship between the two variables of stress levels and sleep disorders in online learning among nursing students with an r correlation value of 0.290 and a sig. (2-tailed) namely 0.001 (< 0.05). Based on the study findings, the hypothesis in this study states that there is a significant relationship between stress levels and sleep disorders for undergraduate nursing students in online learning during the COVID-19 pandemic.

Implications of the study

The findings of this study provide information and input to faculty to pay more attention to students. The nurse's role as a counsellor and advocator is to conduct preventing of physical and psychological problems related to stress levels and sleep disorders among undergraduate nursing students in online learning during the COVID-19 pandemic, one of which is to collaborate with the faculty in carrying out interventions such as screening and counselling. Besides that, the study results can be used as an additional source of information for further studies.

Limitations

This study has limitations, including that this research was conducted online and is a self-report, so it has yet to be able to validate every answer from each individual. In addition, this study cannot be generalized to the entire population of nursing students in various countries because of possible differences in characteristics. However, the strengths of this study are new explorations and a focus on the relationship between stress levels and sleep disorders during the learning of nursing students during the COVID-19 pandemic, which is still limited.

Conclusion

The study highlights a significant relationship between stress levels and sleep disorders among undergraduate nursing students in online learning during the COVID-19

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pandemic. In addition, the current study found that stress levels and sleep disorders experienced by students were influenced by age, gender, education level, and place of residence. Future meta-regression studies are needed to investigate the factors influencing and exacerbating stress and sleep disorder among nursing students in online learning during the COVID-19 pandemic to minimize results bias.

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