



## THE CORRELATION OF SMARTPHONE OVERUSE, PSYCHOLOGICAL PROBLEMS, AND SLEEP STATUS IN NURSING STUDENTS

Ferdy Lainsamputty\*<sup>1</sup>, Metty Wuisang<sup>2</sup>

<sup>1,2</sup> *Department of Nursing, Faculty of Nursing, Universitas Klabat, Airmadidi*  
e-mail: [ferdy.l@unklab.ac.id](mailto:ferdy.l@unklab.ac.id)

### ABSTRACT

Nursing students tend to overuse smartphones, and when this is combined with psychological issues, it often disrupts their sleep patterns. This study aimed to investigate the correlation of smartphone overuse, psychological problems, sleep quality, and daytime sleepiness among professional nursing students. Descriptive correlational and cross sectional design were employed. The samples were recruited using convenience sampling technique involving 110 students. The questionnaires were Smartphone Addiction Scale-Short Version (SAS-SV), Depression, Anxiety Stress Scale-42 (DASS-42), Pittsburgh Sleep Quality Index (PSQI), and Epworth Sleepiness Scale (ESS). Pearson correlation was utilized to examine the correlation between study variables. Majority of students were addicted to smartphone (65.5%), poor sleepers (78.2%), and had excessive daytime sleepiness (EDS) (54.5%). Sleep quality was negatively correlated to depression ( $r=-0.335$ ,  $p<0.001$ ), anxiety ( $r=-0.333$ ,  $p<0.001$ ), and stress ( $r=-0.331$ ,  $p<0.001$ ). EDS had correlation with smartphone overuse ( $r=0.315$ ,  $p=0.001$ ), depression ( $r=0.252$ ,  $p=0.008$ ), anxiety ( $r=0.288$ ,  $p=0.002$ ), dan stress ( $r=0.216$ ,  $p=0.024$ ). Participants with poorer psychological problems were trying to manage their sleep quality to be better, even though still experienced EDS. Future studies could investigate the factors contributing to excessive smartphone use, psychological influences, and other elements impacting sleep, while also incorporating more objective methods to improve data precision.

*Keywords: Nursing Students, psychological problems, sleep status, smartphone overuse*

### INTRODUCTION

Nurses are health workers and the center of health services. According to the World Health Organization (2020), the number of nurses in healthcare worldwide was 27.9 million in 2018, with an annual increase of 1.72 million nursing graduates. Meanwhile, in Indonesia, the number of health students is about 7,7%, including those in nursing education (Ministry of Education And Culture Republic of Indonesia, 2020).

Educated and qualified nursing students impact the quality of care, patient satisfaction, and health services (Poggi et al., 2021). However, the quality of nursing students may be influenced by the heavy workload of academic and clinical practice, resulting in poor sleep status (Thomas, McIntosh, Lamar, & Allen, 2017). According to Blanco et al. (2020), sleep patterns could change in COVID-19 pandemic because it forced nursing students to isolate and fear of infection also increased psychological problems.

The prevalence of sleep disorders in 417 Italian health students by Belingheri et al. (2020) showed that 44% and 63% of nursing and medical

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students reported at least one symptom of a sleep disorder. Meanwhile, in a study conducted among 173 second grade nursing students in Indonesia, 85% of them had poor sleep quality (Hutasoit, Mendrofa, Arkianti, & Diannita, 2024).

Poor sleep status may cause nursing students to have poor sleep habits and sleep patterns that affect service, patient safety, and student academic performance (Gallego-gómez et al., 2021). Sleep quality could be affected and reduced due to excessive or addictive and less effective use of smartphones (Sharoni, Bakar, & Bakar, 2020). The prevalence of smartphone use as stated in study by Ghosh *et al.* (2021) showed that among 91 nursing students at West Bengal, half of them were addicted to smartphones. Another study in Indonesia found that above 50% of participants were highly addicted (Annisa, 2018).

High and ineffective use of smartphones might increase the risk of depression, anxiety, stress, reduce self-confidence, and poor sleep status could lead to lack of academic knowledge (Mohamed & Mostafa, 2020). Furthermore, the use of problematic smartphones can reduce or worsen sleep status so that fatigue can occur during activities especially for nursing students during the COVID-19 pandemic (C. Zhang et al., 2021). According to Kalyani et al. (2017), sleep quality was associated with mental issues, emotional changes and often led to psychological problems.

Psychological issues were significant stressors that could alter emotions, influence perceptions of objects or individuals, and result in a diminished quality of life. Nursing students can be affected by stress, depression, anxiety even thereby reducing the quality of individual psychology and lack of sleep (Villarroya et al., 2021). Nursing students often experience high levels of depression, stress and anxiety, especially when taking a new clinical practice and these feelings can negatively impact sleep patterns, learning and performance (Antonishen, 2019). Furthermore, high levels of these psychological problems may contribute to emotional exhaustion (Riet, Levett-Jones, & Aquino-Russell, 2018).

Psychological problems were found among 6348 nursing students in China during COVID-19. One third of participants experienced anxiety, depression and post-traumatic stress symptoms (Li et al., 2021). Meanwhile, in Australia study by Stanton et al. (Stanton et al., 2021), nursing students had mild to severe 46.6% stress, 52.8% anxiety and 42.2% depression. While a study conducted involving 102 respondents in Jember, Indonesia mentioned that students experienced mild to severe problems of stress, anxiety, and depression (Ariviana, Wuryaningsih, & Kurniyawan, 2021).

Smartphone overuse, psychological problems, and poor sleep status are suspected common in professional nursing students who have to make direct contact with patients in the clinical settings. These conditions may be worsened by the fear of getting infected with communicable diseases. Limited information is available related to these variables among nursing students after the time of COVID-19 pandemic, in fact the incidence of infections among nursing students still exists and the vaccination program continues to be implemented several years after the new normal era was established. Thus, describing and investigating the correlation of smartphone overuse, psychological problems, and sleep status among professional nursing students, is imperative.

## RESEARCH METHODS

Descriptive correlation and cross-sectional design were used in this current study. The population of this study were professional nursing students at



a university in North Sulawesi, Indonesia, from October to December 2022. Based on calculations using the Slovin formula, a sample target of 89 was obtained. To anticipate the risk of missing data or drop out, extra samples were added. Overall, a total of 110 nursing students were recruited using the convenience sampling technique, with the inclusion criteria: 1) Active students; 2) Willing to participate as study participants. While the exclusion criteria were students who were ill or absent when data collection.

The study gathered demographics and health characteristics as well as COVID-19 related data. Demographics included age, gender, semester, place of residence, relationship status, family financial status, ethnicity, religiosity, and reasons of taking nursing major. Health characteristics were body mass index (BMI), chronic disease, regular exercise, and caffeine intake. Data regarding COVID-19 included the availability of personal protective equipment (PPE), fear of COVID-19, knowledge and prevention of COVID-19, contact with COVID-19 patients, history of COVID-19 infection, and vaccination.

The Smartphone Addiction Scale-Short Version/SAS-SV questionnaire (Kwon, Kim, Cho, & Yang, 2013) was used to evaluate smartphone overuse. This tool consists of 10 statements with 6 alternative responses: 1 (strongly disagree), 2 (disagree), 3 (disagree), 4 (fairly agree), 5 (agree), and 6 (completely agree). The total SAS-SV score was obtained by adding up the overall participants' responses, ranging from 10-60. The category of smartphone overuse: Not addiction (10-21), high risk (Male: 22-31, Female: 22-33), and addiction (Male: 32-60, Female: 34-60). The reliability of the SAS-SV in the current study obtained a Cronbach's alpha score of 0.84.

The Depression Anxiety Stress Scale (DASS-42) questionnaire was used to measure psychological problems (Lovibond & Lovibond, 1995). This tool consists of 42 statements and 4 optional answers, from 0 (never), 1 (sometimes), 2 (quite often), and 3 (often). Each domain has 14 statements (depression: 3, 5, 10, 13, 16, 17, 21, 24, 26, 31, 34, 37, 38, 42; anxiety: 2, 4, 7, 9, 15, 19, 20, 23, 25, 28, 30, 36, 40, 41; stress: 1, 6, 8, 11, 12, 14, 18, 22, 27, 29, 32, 33, 35, 39). The score for each domain can be obtained by accumulating all responses according to their domain. The score categories for depression were normal (0-9), mild (10-13), moderate (14-20), severe (21-27), and very severe (28-42). Anxiety scores were classified as normal (0-7), mild (8-9), moderate (10-14), severe (15-19), and very severe (20-42). The stress score categories were normal (0-14), mild (15-18), moderate (19-25), severe (26-33), and very severe (34-42). The Cronbach's alpha in this study were 0.91 for depression, 0.88 for anxiety, and 0.93 for stress, demonstrating the instrument's reliability.

The Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) and the Epworth Sleepiness Scale (ESS) (Johns, 1991) were employed to measure sleep status (sleep quality and daytime sleepiness). The PSQI consists of 19 statements and 7 components, each of which has a score range of 0-3. The accumulation of these seven components of sleep quality will result in a score ranging from 0 to 21. The sleep quality category is divided into good sleep quality (0-5) and poor sleep quality (6-21). The reliability of the PSQI in this study is acceptable, with a Cronbach's alpha of 0.78. The ESS questionnaire consists of 8 statements that have 4 answer choices. The total of all responses are summed to obtain an overall daytime sleepiness score. The ESS classification was: Normal daytime sleepiness (0-10) and severe excessive

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daytime sleepiness (11-24). In this study, the ESS demonstrated good internal consistency, with a Cronbach's alpha of 0.81.

Prior to data collection, the ethical clearance was obtained from the committee of research and ethics in a private university in West Java, Indonesia no. 253/KEPK-FIK.UNAI/EC/X/22. Professional nursing students who met the criteria were selected as potential participants. The study objectives and procedures are explained in detail. If participants wish to join, informed consent will be given. After signing the consent, the participant may proceed to fill out the questionnaire. All completed questionnaires will be kept confidentially. Participants may withdraw from this study at any time.

Study data were analyzed using statistical computer software. Data distribution was checked using skewness, kurtosis, and histogram. Data analysis in this study including: 1) Descriptive statistics; 2) Pearson correlation tests. The statistical significance was assigned at 0.05 level.

## RESULTS AND DISCUSSION

The demographic characteristics and clinical variables of the participants is shown in Table 1. The mean age of the sample was 21.86 (SD=1.77). The majority of participants were female (80.9%), from second semester (73.6%) and living on rent (68.2%). There were fifty-six (50.9%) in relationship. Most participants had stable family financial (87%) and from Minahasan ethnic (59.1%). There were eighty-five students (77.3%) having poor religiosity. Fifty-seven participants (51.8%) decided to study in nursing program by themselves.

The participants had a mean BMI of 25.56 kg/m<sup>2</sup> (SD=4.92), ranging from 16.3 to 36.3 kg/m<sup>2</sup>. Seventy-five participants (68.2%) had normal BMI, thirteen (11.8%) had underweight, seventeen (15.5%) had overweight and five (4.5%) had obesity. There were four participants (3.6%) reporting they had chronic diseases, and nineteen (17.3%) reported caffeine was the most favorite drink. There were 86.4% participants reporting they did regular exercise. Most participants had less adequate of availability PPE (47.1%), did not have fear of COVID-19 (53.6%) and 70 (63.6%) had history of COVID-19 infection. There were twenty-five (22.7%) had enough knowledge of COVID-19. Lastly, only four participants (3.6%) reporting had first dose vaccine of COVID-19, seventy (66.4%) had second dose vaccine, and thirty-three (30%) had booster.

**Table 1 Demographic Data, Health Characteristics, and Knowledge of COVID-19 (n=110)**

Variables	Mean $\pm$ SD / n (%)
Age (Years)	21.86 $\pm$ 1.77
Gender	
Male	21 (19.1)
Female	89 (80.9)
Semester	
1 <sup>st</sup> Semester	29 (26.4)
2 <sup>nd</sup> Semester	81 (73.6)
Residence	
Rent	75 (68.2)
Home	25 (22.2)
Other	10 (9.1)
Status	
Single	48 (43.6)

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Variables	Mean $\pm$ SD / n (%)
In Relationship	56 (50.9)
Married	6 (5.5)
Financial	
Unstable	23 (20.9)
Stable	87 (79.1)
Ethnicity	
Minahasan	30 (27.3)
Sangirnese	4 (3.6)
Mollucan	5 (4.5)
Torajanese	3 (2.7)
Papuanese	2 (1.8)
Javanese	2 (1.8)
Mogondownese	4 (3.6)
Bataknese	30 (27.3)
Other	4 (3.6)
Religiousity	
Poor	85 (77.3)
Good	25 (22.7)
Reason to Study Nursing	
Self-Choice	57 (51.8)
External	53 (48.2)
BMI	25.56 $\pm$ 1.77
Underweight	13 (11.8)
Normal	75 (68.2)
Overweight	17 (15.5)
Obesity	5 (4.5)
Chronic Disease	
No	106 (96.4)
Yes	4 (3.6)
Regular Exercise	
No	95 (86.4)
Yes	15 (13.6)
Caffeine	
No	91 (82.7)
Yes	19 (17.3)
PPE COVID-19	
Poor	32 (47.1)
Adequate	26 (38.2)
Fear of COVID-19	
No	59 (53.6)
Yes	51 (46.4)
Knowledge of COVID-19	
No	25 (22.7)
Yes	85 (77.3)
History of COVID-19 Infection	
No	40 (36.4)
Yes	70 (63.6)
COVID-19 Vaccination	
Vaccine 1	4 (3.6)
Vaccine 2	70 (66.4)
Booster	33 (30.0)

*Note: BMI=Body Mass Index; PPE=Personal Protective Equipment; COVID-19=Coronavirus Disease 2019.*

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The overall score of smartphone overuse had mean of 35.97 (SD=7.99), ranging from 19 to 56. SAS-SV 4 was the highest with a mean score of 4.05 (SD=7.99), whereas item SAS-SV 10 had the lowest mean of 3.10 (SD=1.23). Majority of participants was addicted to smartphone (65.5%). Description of smartphone overuse are provided in Table 2.

**Table 2 Description and Category of Smartphone Overuse Items (n=110)**

Smartphone Overuse	Mean $\pm$ SD / n (%)
SAS-SV 1	3.39 $\pm$ 1.24
SAS-SV 2	3.72 $\pm$ 1.23
SAS-SV 3	3.70 $\pm$ 1.22
SAS-SV 4	4.05 $\pm$ 1.32
SAS-SV 5	3.81 $\pm$ 1.34
SAS-SV 6	3.39 $\pm$ 1.17
SAS-SV 7	3.40 $\pm$ 1.26
SAS-SV 8	3.55 $\pm$ 1.32
SAS-SV 9	3.86 $\pm$ 1.18
SAS-SV 10	3.10 $\pm$ 1.23
Smartphone Overuse Score	35.97 $\pm$ 7.99
Not Addiction (10-21)	7 (6.4)
High Risk (Male: 22-31, Female: 22-33)	31 (28.2)
Addiction (Male: 32-60, Female: 34-60)	72 (65.5)

*Note: SAS-SV=The Smartphone Addiction Scale-Short Version.*

Among all psychological domains, stress had the highest score with a mean of 15.29 (SD=9.02). Anxiety was the second highest domain with mean of 11.22 (SD=7.19). Depression was the domain with the lowest mean score of 6.98 (SD=6.77). Majority of participants had normal stress, anxiety, and depression (55.5%, 73.6%, 33.6%, respectively). Description of psychological problems are portrayed in Table 3.

**Table 3 Description and Category of Psychological Problems (n=110)**

Psychological Problems	Mean $\pm$ SD / n (%)
Anxiety Score	11.22 $\pm$ 7.19
Normal (0-7)	37 (33.6)
Mild (8-9)	10 (9.1)
Moderate (10-14)	34 (30.9)
Severe (15-19)	14 (12.7)
Extremely Severe (20-42)	15 (13.6)
Depression Score	6.98 $\pm$ 6.77
Normal (0-9)	81 (73.6)
Mild (10-13)	12 (10.9)
Moderate (14-20)	11 (10.0)
Severe (21-27)	5 (4.5)
Extremely Severe (28-42)	1 (0.9)
Stress Score	15.29 $\pm$ 9.02
Normal (0-14)	61 (55.5)
Mild (15-18)	13 (11.8)
Moderate (19-25)	23 (20.9)
Severe (26-33)	9 (8.2)
Extremely Severe (34-42)	4 (3.6)

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The overall score of global PSQI had mean of 7.45 (SD=2.66). Daytime dysfunction was the highest component with a mean score of 1.66 (SD=0.87), whereas use of sleeping medication had the lowest mean of 0.05 (SD=0.26). Majority of participants were poor sleepers (78.2%). Overall score of ESS had mean of 11.48 (SD=4.84) with 54.5% had severe EDS. Description of sleep status are provided in Table 4.

**Table 4 Description and Category of Sleep Status (n=110)**

Sleep Status	Mean $\pm$ SD / n (%)
Sleep Latency	1.22 $\pm$ 0.83
Sleep Disturbances	1.27 $\pm$ 0.56
Daytime Dysfunction	1.66 $\pm$ 0.87
Subjective Sleep Quality	1.52 $\pm$ 0.67
Sleep Duration	1.33 $\pm$ 0.73
Habitual Sleep Efficiency	0.40 $\pm$ 0.68
Use of Sleeping Medication	0.05 $\pm$ 0.26
Global PSQI Score	7.45 $\pm$ 2.66
Good (0-5)	24 (21.8)
Poor (6-21)	86 (78.2)
ESS Score	11.48 $\pm$ 4.84
Normal (0-10)	50 (45.5)
Severe EDS (11-24)	60 (54.5)

*Note: PSQI=Pittsburgh Sleep Quality Index; ESS=Epworth Sleepiness Scale; EDS=Excessive Daytime Sleepiness.*

The association between smartphone overuse, psychological problems, and sleep status were displayed in Table 5. The analysis showed smartphone overuse had positive relationship with sleep latency ( $r=0.208$ ,  $p=0.030$ ), daytime dysfunction ( $r=0.194$ ,  $p=0.042$ ), and daytime sleepiness ( $r=0.315$ ,  $p=0.001$ ). Depression had positive relationship with subjective sleep quality ( $r=0.242$ ,  $p=0.011$ ), sleep latency ( $r=0.323$ ,  $p=0.001$ ), sleep disturbance ( $r=0.268$ ,  $p=0.005$ ), daytime dysfunction ( $r=0.369$ ,  $p<0.001$ ), excessive daytime sleepiness ( $r=0.252$ ,  $p=0.008$ ), but had negative relationship to global PSQI score ( $r=-0.335$ ,  $p<0.001$ ). Anxiety had positive relationship with subjective sleep quality ( $r=0.236$ ,  $p=0.013$ ), sleep latency ( $r=0.366$ ,  $p<0.001$ ), sleep disturbance ( $r=0.382$ ,  $p<0.001$ ), daytime dysfunction ( $r=0.320$ ,  $p=0.001$ ), and daytime sleepiness ( $r=0.288$ ,  $p=0.002$ ), but had negative relationship to global PSQI score ( $r=-0.333$ ,  $p<0.001$ ). Stress had positive correlation with subjective sleep quality ( $r=0.293$ ,  $p=0.002$ ), sleep latency ( $r=0.308$ ,  $p=0.001$ ), sleep disturbance ( $r=0.272$ ,  $p=0.004$ ), daytime dysfunction ( $r=0.312$ ,  $p<0.001$ ), and daytime sleepiness ( $r=0.216$ ,  $p=0.024$ ), but had negative relationship to global PSQI score ( $r=-0.331$ ,  $p<0.001$ ).

**Table 5 The Matrix Corellation between Smartphone Overuse, Psychological Problems, and Sleep Status (n=110)**

	SAS-SV	Depression	Anxiety	Stress
SS	$r=0.037$ ; $p=0.703$	$r=0.242$ ; $p=0.011$ *	$r=0.236$ ; $p=0.013$ *	$r=0.293$ ; $p=0.002$ **
SL	$r=0.208$ ; $p=0.030$ *	$r=0.323$ ; $p=0.001$ **	$r=0.366$ ; $p=0.000$ **	$r=0.308$ ; $p=0.001$ **

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	SAS-SV	Depression	Anxiety	Stress
DS	r=0.037; p=0.749	r=0.186; p=0.052	r=0.156; p=0.105	r=0.137; p=0.153
HSE	r=0.021; p=0.825	r=-0.060; p=0.533	r=-0.084; p=0.381	r=0.062; p=0.518
SD	r=0.138; p=0.151	<b>r=0.268;</b> <b>p=0.005 **</b>	<b>r=0.382;</b> <b>p=0.000 **</b>	<b>r=0.272;</b> <b>p=0.004 **</b>
USM	r=-0.042; p=0.663	r=0.008; p=0.931	r=0.057; p=0.554	r=0.000; p=0.999
DD	<b>r=0.194;</b> <b>p=0.042 *</b>	<b>r=0.369;</b> <b>p&lt;0.001 ***</b>	<b>r=0.320;</b> <b>p=0.001 **</b>	<b>r=0.312;</b> <b>p=0.001 **</b>
PSQI	r=-0.090; p=0.352	<b>r=-0.335;</b> <b>p&lt;0.001 ***</b>	<b>r=-0.333;</b> <b>p&lt;0.001 ***</b>	<b>r=-0.331;</b> <b>p&lt;0.001 **</b>
ESS	<b>r=0.315;</b> <b>p=0.001 **</b>	<b>r=0.252;</b> <b>p=0.008 **</b>	<b>r=0.288;</b> <b>p=0.002 **</b>	<b>r=0.216;</b> <b>p=0.024 *</b>

Note: \* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$  level (2-tailed); SSQ=Subjective Sleep Quality; SL=Sleep Latency; DS= Duration of Sleep; HSE=Habitual Sleep Efficiency; SD=Sleep Disturbance; USM=Use of Sleep Medications; DD=Daytime Dysfunction; PSQI=Pittsburgh Sleep Quality Index; ESS=Epworth Sleepiness Scale; SAS-SV=Smartphone Addiction Scale-Short Version.

The result of this study showed the majority of participants was addicted to smartphone. This is in line with the study findings by Mohamed and Mostafa (2020), who examined 320 nursing students at Cairo University where 95.8% were addicted to smartphones. Almost every nursing student use smartphones as daily life as well as education, online communication, online searching which can make overuse even addicted to it (Celikkalp, Bilgic, Temel, & Varol, 2020). Addicted to smartphone can make nursing students had various health problems like headache, shoulder pain or certain extremities and visual display syndrome that made poor quality of life deteriorating in COVID-19 pandemic (Kim and Lee, 2022; Özdi, Çatıker and Bulucu Büyüksoy, 2021).

Majority of nursing students had normal anxiety. This is similar with the result of study among 218 nursing students by Gangadharan and Madani (2018) who found most of nursing students (45.5%) had normal anxiety. During COVID-19 pandemic, all nursing institutions around the world had been obliged to use of sudden e-learning that could raise anxiety levels in students (Gonzalez et al., 2021). Furthermore, Savitsky, Findling, Erel, and Hendel (2020) mentioned that nursing students who studied where the COVID-19 was spread and transmission had more positive attitude.

Most participants had normal depression in this study. This is in line with a study finding by Kalok et al. (2020), who found that most of nursing students during COVID-19 had normal depression (64.0%). According to Patelarou et al. (2021), the psychological problem such as depression was impacted because of quarantine situation and lockdown due to COVID-19 pandemic. Depression in nursing students can be alleviated and managed through multi-level interventions or social support (Bai et al., 2021).

Normal stress was found among majority of participants. This is similar with a study of Chouhan et al. (2021) who found normal stress among 65.02% of 397 nursing students in India. Nursing students who watched news about COVID-19 and feared contracting the virus were found to experience increased stress levels (Aslan & Pekince, 2020). Nursing students can alleviate stress through strategies such as preventing the development of problems,

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implementing hospital-based screening programs, enhancing clinical courses, and providing education on stress management (Suprpto, Linggi, & Arda, 2022).

Most of nursing students were poor sleepers. Blanco et al. (2020) also found 67.1% of 207 nursing students had poor sleep quality. Nursing students experienced fear during the COVID-19 pandemic, which could further worsen their sleep quality (Santos, Labrague, & Falguera, 2022). Furthermore, nursing students during the COVID-19 pandemic were able to manage poor sleep through adequate clinical practice preparation, mental resilience, and physical readiness (Mulyadi, Tonapa, Luneto, Lin, & Lee, 2021).

More than half of study participant experienced severe excessive daytime sleepiness. A study by Isac and Abraham (2020) also found that 57.4% nursing students had excessive daytime sleepiness. The COVID-19 pandemic led to widespread isolation as a preventive measure, which impacted sleep patterns. Additionally, factors such as coffee or tea consumption, living alone, and poor academic performance contributed to severe excessive daytime sleepiness among nursing students (Demir, 2017; Idrissi et al., 2020).

Addicted to smartphone could disrupt sleep status. This is supported by a study by Nowell and Thompson (2020) who found that there was a correlation between smartphone and poor sleep quality among nursing students. Furthermore, Ammati et al. (2018) reported that majority of students who used the internet for more than 4 to 6 hours per day experienced longer sleep latency, sleep disturbances, and excessive daytime sleepiness.

Depression, anxiety, and stress also affected nursing students during and after the COVID-19 pandemic, particularly those who remained isolated at home, lacked adequate social support, or had limited physical activity, making them more susceptible to psychological issues (Li et al., 2021). According to study by Zhang, Peters and Chen (2018), nursing students with poor sleep quality showed a positive relationship with symptoms of depression, anxiety, and stress, although these psychological issues varied. Psychological problems could disrupt sleep, increase sleep latency, and even lead to severe excessive daytime sleepiness. Psychological problems could disrupt sleep, increase sleep latency, and even lead to severe excessive daytime sleepiness. Mental health disorders could contribute to poor sleep quality (Zeng, Wang, Xie, Hu, & Reinhardt, 2019).

This study has several limitations. Data were primarily gathered from second-semester nursing students and focused on only one nursing faculty, making it difficult to generalize the findings to other populations. Additionally, the use of a cross-sectional design limits the ability to test causal relationships between variables.

## CONCLUSION AND RECOMMENDATION

The majority of participants were addicted to use smartphone. Normal depression, anxiety and stress were found among most of participants. Most of nursing students had poor sleep quality and experienced excessive daytime sleepiness. Poor sleeper students had a better control of their mental conditions. Excessive daytime sleepiness was suffered by nursing students who had poor psychological problems and addicted to use smartphone. This study suggested that individuals with severe psychological issues should manage their sleep patterns, and students addicted to smartphones should address their daytime sleepiness. Nursing education institutions should enhance student well-being by offering education in digital literacy and smartphone-use management. Easily

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accessible psychological counseling services and instruction on the importance of sleep quality are also crucial to prevent mental health issues and fatigue. Academic advisors ought to take a more proactive role in monitoring students' academic and psychological balance. Moreover, restricting smartphone use in learning environments and promoting non-digital activities can help improve focus, sleep quality, and overall mental health among students. Future research could explore factors influencing excessive smartphone use, psychological factors, and other elements affecting poor sleep, while also using more objective tools, such as polysomnography, to enhance data accuracy.

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