

Association between social media addiction and sleep quality among undergraduate nursing students: a cross-sectional study



Original Article

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Abstract: **Objectives:** To examine the association between social media addiction and sleep quality among undergraduate nursing students. **Methods:** This research is an analytical observational study with a cross-sectional approach. The sampling technique was purposive sampling of 150 nursing students at a private university in Malang, Indonesia. Respondents filled out a questionnaire about self-identity, a sleep quality questionnaire from the Pittsburgh Sleep Quality Index (PSQI), and social media addiction from Social Media Addiction Scale (SMAS). This was a bivariate analysis which was conducted using the Pearson Product Moment Correlation test. **Results:** The results of this study reported that most nursing students were addicted to social media (76%). As for the parameter of the quality variable, most respondents had poor sleep quality, which were about 106 people (70.3%). The result of the Pearson Product Moment Correlation test obtained a *P* value of 0.000. The Pearson correlation coefficient was 0.358. Social media addiction (adjusted odds ratio [OR] 4.80, 95% confidence interval [CI] = 2.08–11.02), gender (adjusted OR 3.79, 95% CI = 1.58–9.12), and using social media for a long time (adjusted OR 4.21, 95% CI = 1.97–10.48) were associated with sleep quality. **Conclusions:** We found that there is an association between social media addiction and sleep quality among nursing students. Furthermore, we might be educating nursing students to manage their time to improve their quality of sleep to avoid any health problems.

Keywords: addiction • social media • sleep quality • nursing student • correlation

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1. Introduction

The dynamics of life in Indonesia is currently experiencing very rapid development. Cultural acculturation with the existence of information technology is one of the

phenomena driving these changes.¹ According to Jones (2007) and Xanidis and Brignell,² usage of internet use is an inseparable part of activities in daily life, especially

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among young adults. Today's modern society is almost impossible not to be exposed to media exposure; whether we realize it or not, all content is present as a part of human life. Along with the development of this modern era, the presence of the media is increasingly diverse and growing bigger.³

The age group of 19–34 years accounts for 49.52% of the phenomenon of social media use among internet users; nevertheless, the greatest age group accounts for 75.50% of all users. The number of Facebook users began to compete with Instagram users, followed by YouTube, Twitter, and LinkedIn.⁴ Although Facebook is still popular among young adults, teenagers are starting to switch to Instagram.⁵ The results of a survey conducted by the Ministry of Communication and Information Technology of the Republic of Indonesia⁶ showed the five most frequently used social media platforms in Indonesia: Facebook (50.7%), Instagram (17.8%), YouTube (15.1%), Twitter (1.7%), and LinkedIn (0.4%).

A previous study by Pane et al.⁷ reported that 85 nursing students in level III which were as many as 54 people (63.5%) who were students used social media moderately and as many as 31 people (36.5%) who were students used social media more than normal. Furthermore, in a previous study by Stiawan et al.,⁸ the number of respondents were 128 nursing students: 41 students (32%) used social media moderately, as many as 87 students (68%) used social media at a normal rate, and as many as 117 students (91.4%) used social media more than normal, with the average use time being 11–20 min; 57 people (44.5%) had used social media for an average of 11–20 min. Besides that, a study by Hartinah et al.⁹ as many as 240 respondents showed that the level of symptoms of social media addiction in nursing students was dominated by moderate levels of 173 students (72.1%).

The use of social media greatly affects a person's mental health. A research study by Bashir and Bhat¹⁰ stated that several mental health problems were related to the use of social media such as anxiety, stress, depression, and loneliness. A previous study by Nurlina et al.¹¹ showed that nursing students had moderate levels of anxiety, which was the result of using social media excessively. A research study by Al Aziz¹² shows that the higher the intensity of the use of social media, the higher the level of depression of a person. Symptoms of depression result in loss of interest and reduced energy, which resulted in tiredness, pessimism, and disturbed sleep patterns in students. During the recovery period, fear of COVID-19 was predicted by a shift in problematic internet use, according to a regression analysis.¹³

The use of social media can also cause dependence/addiction and adversely affect sleep quality.¹⁴ Recent research conducted by the Great British Sleep

Survey shows that women are 3 times more likely to suffer from sleeplessness or insomnia than men. The results of survey for cases of insomnia from various countries show that approximately 30%–45% of adults experienced symptoms of insomnia such as difficulty falling asleep, difficulty managing sleep, waking up too early, and poor sleep quality.¹⁵

Sleep is a condition in which individual perceptions and reactions to the environment have decreased.¹⁶ Sleep is an activity that must be fulfilled as it is the state of the body at which the brain rests.¹⁷ To restore biochemistry in the body, sleep is necessary.¹⁸ A good number of hours of sleep as recommended by the American National Sleep Foundation are 7–9 h for adults.¹⁹

Poor sleep quality can result in disturbed physiological and psychological health.²⁰ Physiologically, poor sleep quality can cause a person's level of health to decline and experience fatigue easily. Psychologically, poor sleep quality causes unstable emotions, reduced self-confidence, excessive impulsivity, and carelessness.²¹ Poor sleep quality can be caused by social activities as young adults are highly active and spend more time and energy in social activities. In addition to this, electronic devices also affect sleep quality, which includes accessing the internet and using electronic equipment (TV, gadgets, and computers). Syamsoedin et al. and Wicaksono et al.^{22,23} said in their research "Analysis of dominant factors related to sleep quality in nursing students at Airlangga University" that stress can affect a person's sleep quality. The results of this study showed a significant factor between stress and sleep quality ($P = 0.024$) and tiredness and sleep quality ($P = 0.001$).

According to the National Sleep Foundation in America, more than a third (36%) of young adults aged 18–29 years report experiencing difficulty in getting up in the morning. Nearly a quarter of young adults (22%) are often late for class or work because it is difficult for them to get up. About 40% of young adults complain of drowsiness when working at least 2 d a week or more.¹⁹ The lack of sleep has an impact on memory and concentration of a person. In this condition, lack of sleep is often found in school children and students; in this case, the group that has a high risk of developing sleep disorders is students.²⁴

In general, internet usage by students has reached a critical point, which is >5 h a day on average, and most of their time is spent on chat applications on social media.²⁵ Students are one of the groups that have quite dense activities, as students must wake up early morning to prepare for lectures. Both adolescents and young adults find it difficult to fall asleep, sleep late at night, and wake up early in the morning because of the burden of tasks they do until they stay up late.²⁶ Therefore, this

study aims to identify the association between social media addiction and sleep quality among undergraduate nursing students in Malang City, Indonesia.

2. Methods

2.1. Study design

The research design used in this research is a non-experimental research study, which is an analytical observational study with a cross-sectional approach. This research was conducted from August to December, 2020.

2.2. Setting and sample

In this study, the sample used was nursing students at a private university in the city of Malang. Through purposive sampling, 150 nursing students were selected as respondents. Respondents recruited had to meet the inclusion criteria, which are as follows: (1) nursing students with active college status, (2) students who use social media, and (3) students who are willing to be respondents.

2.3. Data collection

Data were collected by using a questionnaire which was filled out by the respondent through the Google form, taking up approximately 15 min to complete each form. Indonesian language version was used in the measures. Then, the researcher would check the completeness of the data collected from the respondents. The questionnaires used are given in the following sections.

2.3.1. The Pittsburgh Sleep Quality Index (PSQI)

The PSQI questionnaire was used to measure sleep quality, which was adopted from the study by Buysse et al.²⁷ This questionnaire consists of questions about sleep latency, sleep duration, sleep efficiency, and drug use, along with 10 closed-ended questions. The scores of these components are added to make up one global score, which ranges from 0 to 21. The number of scores is adjusted according to the assessment criteria: good sleep quality is characterized if the score is <5 and poor sleep quality is characterized if the score is ≥5. The reliability of the PDSI is 0.889.

2.3.2. Social Media Addiction Scale (SMAS)

This questionnaire was used to measure the use of social media, which was adopted from the study by

Ünal and Deniz²⁸. It is a scale that consists of 41 items and 4 factors (occupation, mood modification, relapse, and conflict). It is represented on a 5-point Likert scale with "Always," "Often," "Sometimes," "Seldom," and "Never." Thus, respondents with a total score of <123 are categorized as not dependent on social media use, while >123 of them are categorized as dependent on social media use. Cronbach's α value of the SMAS is 0.789.

2.4. Data analysis

The Pearson Product Moment Correlation test was used to examine the correlation between social media addiction and sleep quality among undergraduate nursing students. The significance level was set at $P < 0.05$.

2.5. Ethical clearance

Ethical clearance was obtained from the Ethical Review Board (ERB) Committee of the Faculty of Medicine, University of Muhammadiyah Malang, Indonesia (No:E.5.a/023/KEPK-UMM/III/2021).

3. Results

3.1. Sociodemographic characteristics of the participants

The minimum age of the respondent is 19 years, and the maximum age of the respondent is 25 years. The mean value of the age was 20.97 years, with a standard deviation of 2.54 years. This shows that the respondents are still in the productive age range.

The data showed that most respondents were females with a total of 123 people (82%), the year with a huge number of enrollments was in 2017, where as many as 52 people (35%) enrolled. The social media platform most used by students is WhatsApp, which was chosen by 44 respondents (29%), and Twitter is reportedly used rarely by the students. The results of this study through data on the duration of using social media in students with a category of addicted level of 114 (76%). As for quality of sleep, 104 people (70.7%) reported poor sleep quality. Full data of sociodemographic characteristics of the respondents are shown in Table 1.

3.2. Relationship between social media addiction and sleep quality

Table 2 shows the results of students who have poor sleep quality; it represents students who are addicted social media (79.8%) than those who are not.

Items	F	%
<i>Age (mean, SD)</i>	20.97	2.54
<i>Gender</i>		
Male	27	18
Female	123	82
<i>Year of enrollment</i>		
2017	52	35
2018	49	33
2019	49	33
<i>Most frequently accessed social media platform</i>		
Twitter	15	10
Facebook	30	20
Instagram	35	23
YouTube	26	17
WhatsApp	44	29
<i>Using social media for a long time</i>		
≤3 years	32	21.3
>3 years	118	78.7
<i>The amount of time spent on social media</i>		
≤3 h of social media use	46	30.7
>3 h of social media use	104	69.3
<i>Categorization in the SMAS</i>		
Addicted	114	76
Not addicted	36	24
<i>Quality of sleep</i>		
Good	44	29.3
Poor	106	70.3
<i>Sleep efficiency (%)</i>		
>85	28	18.7
75–84	49	32.7
65–74	51	34
<65	22	14.7
<i>Total sleep time (h)</i>		
>7	11	7.3
6–7	39	26
5–5.9	61	40.7
<5	39	26
<i>Sleep latency (min)</i>		
14–30	39	26
31–60	61	40.7
>60	39	26

Note: SMAS, Social Media Addiction Scale.

Table 1. Characteristics of respondents ($n = 150$).

The results of the Pearson Product Moment Correlation test obtained a P value of <0.05 . This means that there is a relationship between social media addiction and sleep quality in nursing students. The Pearson correlation

coefficient was 0.358. These data illustrate that addiction of students on social media will affect the sleep quality.

3.3. Logistic regression analysis of factors related to sleep quality

Table 3 shows the analysis results using multivariate logistic regression with the backward Euler method. The final results showed that the variables which significantly related to the incidence of sleep quality were gender, social media addiction, and using social media for a long time. The value of Nagelkerke $R^2 = 0.31$, those the independent variables contained in the model incidence of sleep quality by 31%. Social media addiction is the most dominant variable associated with poor sleep quality (odds ratio [OR] = 4.7 95% confidence interval [CI]: 1.96–11.29). Students who are addicted to social media are at a risk of experiencing poor sleep quality 4 times as compared with students who are not addicted to social media. Another finding is that students who use social media for >3 years have a risk of experiencing poor sleep quality 4.2 times more as compared with students who use social media for <3 years (OR = 4.2; 95% CI: 1.69–10.48). On the other hand, female students risk experiencing poor sleep quality 3.6 times as compared with men (OR = 3.62; 95% CI: 1.45–9.02).

4. Discussion

The results of the analysis showed that majority of nursing students were addicted to social media. This phenomenon is currently a trend among the public, especially among students. The visible phenomenon is, whenever and wherever students are never separated from social media, both in their daily activities on campus, and outside campus.²⁹

According to Kandell, college students are a group that appears to be more vulnerable in using internet than any other community group. Students appear to be more vulnerable as they are in the phase of reaching adulthood, namely the transition period from late adolescence to young adulthood, and experience psychological dynamics. This shows that currently with the emergence of Web 4.0 Technology, if social media applications are widely used, the risk of addiction from excessive use of social media would also get higher.³⁰

The analysis results of respondent data indicate that the social media platform that is most widely used is WhatsApp, this shows that through communication with WhatsApp there will be a lot of information obtained such as academic information, lecture information or information about administration on campus, even now information through social media is received more quickly. publication rather than announcements through

Sleep quality	Social media addiction				Amount		P-value r
	Addicted		Not addicted				
	n	%	N	%	n	%	
Poor	91	79.8	15	41.7	106	70.7	0.000 r = 0.358
Good	23	20.2	21	58.3	44	29.3	
Total	114	100	36	100	150	100	

Table 2. Relationship between social media addiction and sleep quality.

Variable	OR	(95% CI)	B	P-value	Nagelkerke R ²
Social media addiction	4.80	(2.08–11.02)	4.70	0.006	0.31
Gender	3.79	(1.58–9.12)	3.62	0.001	
Using social media for a long time	4.21	(1.97–10.48)	4.21	0.002	
The amount of time spent on social media	1.12	(0.489–2.83)	1.17	0.718	

Note: CI, confidence interval; OR, odds ratio.

Table 3. Logistic regression analysis of factors related to sleep quality of nursing student.

campus print media. This is what makes students happy to use social media because it is more convenient and easier to get information through social media as compared with other platforms. The more information that is sought, the higher the use of the internet and social media interactions among students.²⁵

The use of WhatsApp is the most dominant one as this is equipped with photo, video, and voice messages along with features including sharing documents, contacts, location, etc., which makes it easier for someone to communicate with family and friends and obtain information, as well as receive subject matter expertise by teachers through chat groups. In addition, WhatsApp has no advertisements or pop-ups like other social media; this proves to be more effective as WhatsApp directly connects users with its phone contacts and conveys information related to the user.³¹

This dependence on social media can lead to negative impacts that will be experienced because social media makes a person indifferent to his responsibilities as a student, which has an impact on delays in collecting school assignments, learning time is reduced, and achievement has decreased drastically because teenagers are busy in spending their studying time in accessing social media.³²

The results of statistical tests show that social media addiction, gender, and using social media for a long time affect the sleep quality of nursing students. The use of social media results in melatonin imbalance, causing unfulfilled sleep. Melatonin is a hormone formed by the pineal gland and retina which is responsible for falling asleep and restoring physical energy during sleep. The production of melatonin can be stimulated by darkness and silence; melatonin production is inhibited by bright

light and devices with electromagnetic fields. Melatonin in the body depends on the amount of light that the eyes receive; a lot of light will slow down the process of forming melatonin in the body; in other words, lack of light will rapidly increase the amount of melatonin, causing drowsiness in people.³³

From the results of research on students from the 2017–2019 batches who lack sleep fulfillment due to frequent use of social media for a long time. Most students admitted that they spent a lot of time using social media to complete their college assignments; Most of them admitted to using smartphones to access social media at that time. In this case, accessing social media for too long makes students addicted it, leading to a decline in sleep quality. As a result, the students have difficulty in sleeping and reduce their sleep time. On average, most teens claim to sleep <7 h. According to Haswita,³⁴ students aged 18–40 years should sleep for 8.5 h. Students should have adequate sleep time so that it does not interfere with their college activities.

Poor sleep quality can also make a person use social media more as it is difficult for the person to initiate and maintain sleep.³⁵ The incidence of insomnia is then assumed by researchers as an indicator of poor sleep quality. Based on the frequency and duration of using social media, which gradually becomes frequent and long, the habit of carrying a gadget when going to bed can interfere with melatonin regulation, which is one of the hormones that triggers feelings of depression. If melatonin regulation is disturbed, sleep is also disturbed. So, the quality of sleep decreases as well.³⁶ The limitation of the present study was the small sample size as a result having low generalizability of the study

findings, and the impacts of COVID-19 pandemic not included in this study.

5. Conclusions

Most nursing students were addicted to the social media. Most respondents had poor sleep quality due to social media addiction. Social media addiction, gender, and using social media for a long time affected the sleep quality of nursing students. Students who are addicted to social media tend to experience poor sleep quality four times more as compared with those who are not addicted to social media. Furthermore, we might be educating the

nursing student to manage their time to improve their quality of sleep to avoid any health problems.

Ethics approval

This study was approved by the Ethical Review Board (ERB) Committee of Faculty of Medicine, University of Muhammadiyah Malang, Indonesia (IRB approval number: E.5.a/023/KEPK-UMM/III/2021).

Conflicts of interest

All contributing authors declare no conflicts of interest.

References

1. Cahyono AS. The influence of social media on social change in society in Indonesia. *Publiciana*. 2016;9:140–157 (in Indonesia).
2. Xanidis N, Brignell CM. The association between the use of social network sites, sleep quality and cognitive function during the day. *Comput Hum Behav*. 2016;55:121–126.
3. Dwi E, Watie S. Komunikasi dan Media Sosial (Communications and Social Media). *J Messenger*. 2011;3:69–75.
4. Ministry of Communication and Information Technology of the Republic of Indonesia. *Jumlah Pengguna Internet 2017 Meningkat, Kominfo Terus Lakukan Percepatan Pembangunan Broadband*. Jakarta: Kementerian Komunikasi Dan Informatika; 2018.
5. Nurfitri AD. Perilaku Pengguna Media Sosial beserta Implikasinya Ditinjau dari Perspektif Psikologi Sosial Terapan. *Buletin Psikologi*. 2017;25: 36–44.
6. Ministry of Communication and Information Technology of the Republic of Indonesia. *Laporan Tahunan Kementerian Komunikasi dan Informatika 2018*. Jakarta: Kementerian Komunikasi Dan Informatika Republik Indonesia; 2019.
7. Pane JP, Saragih S, Astuti MP. Hubungan Penggunaan Media Sosial Dengan Prestasi Belajar Pada Mahasiswa S1 Keperawatan Tingkat III. *J Penelit Perawat Prof*. 2022;4:941–946.
8. Stiawan I, Dewi EI, Kurniawan EH. Hubungan Penggunaan Sosial Media dengan Kecerdasan Moral Mahasiswa Tingkat Pertama Fakultas Keperawatan Universitas Jember. *e-Journal Pustaka Kesehatan*. 2021;9:151–157.
9. Hartinah S, Sriati A, Kosasih CE. Gambaran Tingkat Gejala Kecanduan Media Sosial pada Mahasiswa Keperawatan Universitas Padjadjaran. *Jurnal Keperawatan BSI*. 2019;7:123–133.
10. Bashir H, Bhat SA. Effects of social media on mental health: a review. *Int J Indian Psychol*. 2017;4:125–131.
11. Nurlina M, Anggraini A, Meriyandah H. Hubungan Intensitas Penggunaan Media Sosial Pada Tingkat Kecemasan Generasi Z Mahasiswa Keperawatan Di Stikes Medistra Indonesia Tahun 2022. *Jurnal Ilmu Kesehatan Mandira Cendikia*. 2022;1:97–104.
12. Al Aziz AA. Hubungan Antara Intensitas Penggunaan Media Sosial dan Tingkat Depresi pada Mahasiswa. *Acta Psychol*. 2020;2:92–107.
13. Chen IH, Chen CY, Liu CH, et al. Internet addiction and psychological distress among Chinese schoolchildren before and during the COVID-19 outbreak: a latent class analysis. *J Behav Addict*. 2022;10:731–746.
14. Wolniczak I, Cáceres-DelAguila JA, Palma-Ardiles G, Arroyo KJ, Solís-Visscher R, Paredes-Yauri S. Association between Facebook dependence and poor sleep quality: a study in a sample of undergraduate students in Peru. *PLoS One*. 2013;8: e59087.
15. Kiayi S, Boekoesoe L, Salamanja V. The Relationship between the Intensity of Using Social Networking Sites and Insomnia in Adolescents at Telaga 1 Public High School, Gorontalo Regency). *Jurusan Ilmu Keperawatan FIKK UNG*. 2015 (in Indonesia).
16. Mubarak WI, Indrawati L, Susanto J. *Buku Ajar Ilmu Keperawatan Dasar (Buku 1)*. Jakarta: Salemba Medika; 2015.
17. Wartonah T. dan. *Kebutuhan Dasar Manusia dan Proses Keperawatan* (Edisi 4). Salemba Medika; 2015.

18. Sherwood L. *Human Physiology: From Cells to System* (7th edisio). Brooks/Col: Cengage Learning; 2010.
19. National Sleep Foundation. Feel better about any length of sleep. 2018. <https://www.sleepfoundation.org/>. Accessed January 10, 2022.
20. Jenkins MS. *Sleep Habits and Patterns of College Student and their Relationship to Selected Personality Characteristics. Doctoral Dissertation*. LA: Louisiana Tech University; 2005.
21. Krenek RL Jr. *The impact of sleep quality and duration on college student adjustment and health. Dissertation Abstracts International: Section B: The Sciences and Engineering*. Louisiana Tech University; 2006.
22. Syamsoedin WK, Hendro B, Ferdinand W. Correlation between Duration of Social Media Use and the Incidence of Insomnia in Adolescents at SMA Negeri 9 Manado. *Ejournal Keperawatan (e-Kp)*. 2015; 3(1) (in Indonesia).
23. Wicaksono DW, Yusuf A, Widyawati IY. Faktor Dominan yang berhubungan dengan Kualitas Tidur pada Mahasiswa Fakultas Keperawatan Universitas Airlangga. *Crit Med Surg Nurs J*. 2013;1: 92–101.
24. Fenny F, Supriatmo S. Hubungan Kualitas Dan Kuantitas Tidur Dengan Prestasi Belajar Pada Mahasiswa Fakultas Kedokteran. *Jurnal Pendidikan Kedokteran Indonesia*. 2016;5:140–147.
25. Meilinda N. Social media on campus: Studi Peran Media Sosial sebagai Media Penyebaran Informasi Akademik pada Mahasiswa di Program Studi Ilmu Komunikasi FISIP UNSRI. *J Soc Media*. 2018;2:53–64.
26. Sulistiyani, C. Several factors related to sleep quality in students of the Faculty of Public Health, University of Diponegoro Semarang. *Jurnal Kesehatan Masyarakat*. 2012;1:280–292 (in Indonesia).
27. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989;28:193–213.
28. Ünal AT, Deniz L. Development of the social media addiction scale. *Acad J Inf Technol*. 2015;6: 51–70.
29. Khafhi RA, Mulyana, Y. Jurnal Tentang Pengaruh Penggunaan Media sosial Di Kalangan Mahasiswa. *Sekolah Tinggi Manajemen Informatika Dan Komputer (STMIK) Sumedang*. 2018.
30. Soliha SF. Tingkat Ketergantungan Pengguna Media Sosial Dan Kecemasan Sosial. *INTERAKSI: Jurnal Ilmu Komunikasi*. 2015;4:1–10 (in Indonesia).
31. Aprilia R, Sriati A, Hendrawati S. Tingkat Kecanduan Media Sosial pada Remaja. *J Nurs Care*. 2018;3:41–53.
32. Mim FN, Islam MA, Paul GK. Impact of the use of social media on students academic performance and behavior change. *Int J Stat Appl Math*. 2018;3:299–302.
33. Nafiah N, Kustiningsih. *Hubungan Durasi Penggunaan Media Sosial dengan Kualitas Tidur pada Remaja Kelas VIII di SMP Muhammadiyah 1 Yogyakarta*. Yogyakarta: Universitas Aisyiah Yogyakarta; 2018:1–13 (in Indonesia).
34. Haswita RS. *Kebutuhan Dasar Manusia untuk Mahasiswa Keperawatan dan Kebidanan*. Jakarta: CV. Trans Media; 2017 (in Indonesia).
35. Tavernier R, Willoughby T. Sleep problems: predictor or outcome of media use among emerging adults at university? *J Sleep Res*. 2014;23:389–396.
36. Exelmans L, Van den Bulck J. Bedtime mobile phone use and sleep in adult. *Soc Sci Med*. 2016;148:93–101.