Original Research Article

Smartphone addiction and its effect on sleep quality in medical students - a cross-sectional study

Mudita Jain*, Mohit Kumar, Avinash Gawande, Uday Narlawar, Pratik Padyal

Department of Community Medicine, Government Medical College, Nagpur, Maharashtra, India

*Correspondence:
Dr. Mudita Jain,
E-mail: jainmudita3@gmail.com

ABSTRACT

Background: Individuals increasingly rely on their smartphones for communication, entertainment, and work, the boundaries between day and night seem to blur, leading to disrupted sleep patterns and reduced sleep quality. This cross-sectional study aims to investigate the relationship between smartphone addiction and sleep quality in medical students.

Methods: A cross-sectional study was carried out among 228 undergraduate medical students in Nagpur from 01 May 2023 to 30 July 2023. Data were collected using universal sampling. A semi-structured proforma was used to obtain demographic details. Smartphone addiction scale-short version was used to assess smartphone addiction in the participants. Sleep quality was assessed using Pittsburgh's sleep quality index (PSQI). Data were analysed using Microsoft excel.

Results: Among 228 medical students, 129 (56.58%) were addicted to smartphone usage and 162 (71.05%) used smartphone to access social media. There was no statistically significant gender difference in smartphone addiction (p=0.68). The PSQI revealed poor sleep quality in 158 (69.3%). Smartphone addiction was found to be statistically significantly associated with poor sleep quality (p<0.001).

Conclusions: This cross-sectional study underscores the significant negative impact of smartphone addiction on sleep quality among medical students. Addressing this issue is crucial for promoting their well-being and academic success, necessitating interventions to cultivate healthy digital habits for improved sleep patterns.

Keywords: Smartphone addiction, Sleep quality, Medical student, Social media

INTRODUCTION

In today's technology-centric era, smartphones have become an essential component of daily life, offering unmatched ease and connectivity. Over the past decade, their widespread use has raised increasing concerns regarding excessive and potentially detrimental usage patterns. Recent findings highlight behavioural tendencies linked to smartphone use that resemble those observed in addiction.[1]

As outlined in the most recent edition of the diagnostic and statistical manual of mental disorders (DSM-5), gambling addiction—a recognized behavioural addiction—is included under "substance-related and addictive disorders".[2] Research has shown that smartphone addiction shares several core features with these substance-related disorders, namely: compulsive usage, impairment in daily functioning, withdrawal symptoms, and tolerance. Consequently, psychologists have identified the irrational and excessive use of smartphones as a form of addiction, which is believed to be among the most widespread behavioural addictions today.[3]

Young individuals, especially undergraduate students, are considered digital natives who have grown up in a smartphone-driven world. This close integration of smartphones into their daily routines makes them more

susceptible to developing smartphone addiction compared to older age groups.[3]

This study aims to determine the prevalence of smartphone addiction among medical students in a government medical college and to examine its association with sleep quality within this group.

METHODS

This cross-sectional study was done in 1st year MBBS students of Government Medical College Nagpur during May to July 2023 using universal sampling method. Institutional ethics committee approval was obtained. Those participants fulfilling the inclusion and exclusion criteria were recruited. Inclusion criteria were age >18 years, currently using smartphones and those who gave consent for study. Those participants with a past history of psychiatric illness, those students who were absent on the day of survey and those who don't gave consent were excluded from the study.

228 participants were selected out of 250. A semi-structured proforma was used to obtain demographic details. Smartphone addiction scale-short version (SAS-SV) was used to assess smartphone addiction in the participants. Sleep quality was assessed using Pittsburgh's sleep quality index (PSQI).

Smartphone addiction scale short version

This instrument to examine smartphone addiction was developed by Kwon et al.[4] This scale consisted of six factors (daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, and tolerance from the original version of the smartphone addiction scale) with ten items each, rated using the six-point Likert scale (1: strongly disagree, 2: disagree, 3: weakly disagree, 4: weakly agree, 5: agree, and 6: strongly agree). The scoring of SAS-SV was done by adding the scores altogether which yields a total score (numerical data). A cut-off value of 31 and 33 was advised for boys and girls, respectively; a higher score indicated a higher risk of addiction and a lower score indicated a lower risk of addiction.

Pittsburgh sleep quality index

The PSQI was developed by Buysse, Reynolds, Monk, Berman, and Kupfer. According to Buysse et al, the PSQI was used to provide a reliable, valid, and standardized measure of sleep quality, and to distinguish between good and poor sleepers among test takers.[5] The PSQI consisted of seven components (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep mediation, and daytime dysfunction) with scores from 19 items. Each of the seven components was equally weighted on a scale ranging from 0 to 3. The total score was compiled and those respondents who scored 5 or less PSQI global score were classified as

good sleepers, while higher scores represented poor sleepers.

After obtaining informed consent, participants were recruited. The participants were administered a semi-structured pro forma to assess the demographic details. Following which, SAS-SV and PSQI were administered to the participants and the results were computed.

Descriptive statistics were carried out in the form of percentages and mean for the demographic data, smartphone usage, and sleep quality. Comparative analysis between gender was carried out by Chi-square test and unpaired t-test based on the distribution of the variables. Odds ratio (OR) was used to assess the association between smartphone usage and sleep quality.

RESULTS

A total of 228 medical students voluntarily participated in this study. Among the participants, 121 (53.07%) were males and 107 (46.93%) were females (Table 1).

Table 1: Gender distribution of participants.

Gender	Total number of the study participants, n (%)
Male	121 (53.07)
Female	107 (46.93)
Total number	228

The total mean score (standard deviation) of SAS-SV among participants was 33.43 (±10.22). The mean score among male students was 33.65 (±10.2), whereas it was lower in female students, i.e., 33.18 (±10.28) although no significant difference could be made out between the gender (p=0.765) (Table 2).

Table 2: Mean scores of the study participants in the smartphone addiction scale based on gender.

Scale	Mean (SD)			P*
	Total score	Gender		
		Male	Female	
Smartphone addiction scale	33.43 (10.19)	33.65 (10.16)	33.18 (10.22)	0.765

*Unpaired t-test, SD – standard deviation

Among the participants, 129 (56.58%) qualified for smartphone addiction based on the cutoffs provided for the SAS-SV. Gender-wise analysis revealed that 70 (57.8%) male students and 59 (55.1%) female students qualified for smartphone addiction although no statistically significant difference could be made out (p=0.680) (Table 3).

158 (69.3%) reported poor quality of sleep and rest 70 (30.7%) had a good quality of sleep (Table 4). Smartphone addiction was statistically significantly associated with

poor sleep quality in the participants (OR: 3.16 with p<0.001) (Table 5).

Table 3: Smartphone addiction scale based on the gender of the study participants.

Gender	Addiction present, n (%)	No addiction, n (%)	P*
Male	70 (57.8)	51 (42.2)	
Female	59 (55.1)	48 (44.9)	0.680
Total	129 (56.58)	99	

*Chi-square test

Table 4: Quality of sleep (Pittsburgh's sleep quality index) based on the gender of the study participants.

Gender	Poor quality sleep, n (%)	Good quality sleep, n (%)	Total
Male sleep issue	84 (69.4)	37 (30.6)	121
Female sleep issue	74 (69.2)	33 (30.8)	107
Total	158	70	228

Table 5: Association between smartphone addiction and quality of sleep (Pittsburgh's sleep quality index) and among the study participants.

Mobile phone addiction	Poor quality sleep, n(%)	Good quality sleep, n (%)	Total
Present	103 (79.85)	26 (20.15)	129
Absent	55 (55.56)	44 (44.44)	99
Total	158	70	228

DISCUSSION

The study was done in 228 1st year MBBS student. It was found that there was no statically significant gender difference in smartphone addiction whereas in study done by Chatterjee et al male medical students (46.15%) were at risk of higher usage and more significant addiction to smartphones than female students (33.33%).[8] Whereas, some reported similar result, no gender predilection.[7]

Smartphone addiction due to higher every-day usage is detrimental to sleep quality and quantity in medical students. This relationship between over-use of smartphones and sleep quality is reported in several studies.[9,10]

Higher smartphone addiction rates lead to more time spent on smartphones at night, thereby impairing sleep quality. This positive correlation between PSQI and SASSV scores was also published in several other Indian studies.[9,11]

We also found a significant association between the PSQI and SAS-SV scores, similar to studies in medical students in India, Saudi Arabia, and China.[12-14]

Limitations

This study is cross-sectional in nature and is limited to a small population of medical students in a college in Nagpur. It is thus limited in terms of generalizability. The history of psychiatric/neurological illness was obtained by self-reports, which may have led to a limitation in adequately excluding all such cases. The fact that only one self-reported scale was used to assess smartphone addiction is certainly a limitation to the accuracy of the results.

CONCLUSION

This cross-sectional study underscores a strong association between excessive smartphone usage and compromised sleep patterns. The findings emphasize the need for awareness and intervention strategies to mitigate smartphone addiction's negative effects on the well-being and academic performance of medical students. It is imperative for medical institutions to address this issue proactively and promote healthier smartphone usage habits to ensure the overall health and success of future healthcare professionals.

REFERENCES

1. Sohn SY, Krasnoff L, Rees P, Kalk NJ, Carter B. The Association Between Smartphone Addiction and Sleep: A UK Cross-Sectional Study of Young Adults. Front Psychiatry. 2021;12:629407.
2. Williams JB, First M. Diagnostic and statistical manual of mental disorders. In: Encyclopedia of social work. 2013. Available at: https://oxfordre.com/socialwork/view/10.1093/acrefore/9780199975839.001.0001/acrefore-9780199975839-e-104. Accessed on 17 May 2025.
3. Nowreen N, Ahad F. Effect of smartphone usage on quality of sleep in medical students. Nat J Physiol Pharm Pharmacol. 2018;8(9):1366.
4. Kwon M, Kim DJ, Cho H, Yang S. The smartphone addiction scale: development and validation of a short version for adolescents. PloS One. 2013;8(12):e83558.
5. Buysse DJ, Reynolds III CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193-213.
6. Rathakrishnan B, Bikar Singh SS, Kamaluddin MR, Yahaya A, Mohd Nasir MA, Ibrahim F, et al. Smartphone addiction and sleep quality on academic

performance of university students: An exploratory research. Int J Env Res Public Health. 2021;18(16):8291.

7. Kumar VA, Chandrasekaran V, Brahadeeswari H. Prevalence of smartphone addiction and its effects on sleep quality: A cross-sectional study among medical students. Industrial Psychiatry J. 2019;28(1):82.

8. Chatterjee S, Kar SK. Smartphone addiction and quality of sleep among Indian medical students. Psychiatry. 2021;84(2):182-91.

9. Prasad S, Harshe D, Kaur N, Jangannavar S, Srivastava A, Achanta U, et al. A Study of Magnitude and Psychological Correlates of Smartphone Use in Medical Students: A Pilot Study with A Novel Telemetric Approach. Indian J Psychol Med. 2018;40(5):468-75.

10. Soni R, Upadhyay R, Jain M. Prevalence of smart phone addiction, sleep quality and associated behaviour problems in adolescents. Int J Res Med Sci. 2017;5(2):515-9.

11. Prasad M, Patthi B, Singla A, Gupta R, Saha S, Kumar JK, et al. Nomophobia: A Cross-sectional Study to Assess Mobile Phone Usage Among Dental Students. J Clin of Diagn Res. 2017;11(2):ZC34-9.

12. Chen B, Liu F, Ding S, Ying X, Wang L, Wen Y. Gender differences in factors associated with smartphone addiction: A cross-sectional study among medical college students. BMC Psychiatry 2017;17:341.

13. Ibrahim NK, Baharoon BS, Banjar WF, Jar AA, Ashor RM, Aman AA, et al. Mobile phone addiction and its relationship to sleep quality and academic achievement of medical students at King Abdulaziz University, Jeddah, Saudi Arabia. J Res Health Sci. 2018;18:e00420.

14. Dharmadhikari SP, Harshe SD, Bhide PP. Prevalence and correlates of excessive smartphone use among medical students: A cross-sectional study. Indian J Psychol Med. 2019;41(6):549-55.