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Original Research Article

Prevalence of Smartphone Addiction and Its Correlation with Sleep Disturbances among Undergraduate Medical Students: A Cross-Sectional Study

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Abstract:

Background: Smartphone usage has rapidly increased among young adults, particularly medical students, raising concerns about smartphone addiction and its potential adverse effects on sleep quality. Poor sleep has significant implications for academic performance, psychological well-being, and long-term health outcomes.

Objectives: To determine the prevalence of smartphone addiction and poor sleep quality among undergraduate medical students and to analyze the correlation between the two.

Methods: A cross-sectional study was conducted among 250 MBBS students in a tertiary care medical college over three months. Smartphone addiction was assessed using the Smartphone Addiction Scale–Short Version (SAS-SV), and sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI). Demographic details and daily smartphone usage were also recorded. Data were analyzed using descriptive statistics, chi-square test, and Pearson's correlation. A p-value <0.05 was considered statistically significant.

Results: The prevalence of smartphone addiction was 42.4%, with higher rates in males (48.5%) compared to females (37.6%) ($p = 0.03$). Poor sleep quality (PSQI > 5) was observed in 61.2% of students. Poor sleep was more common among students with smartphone addiction (79.2%) compared to those without addiction (47.9%) ($p < 0.001$). A significant dose–response relationship was observed between hours of smartphone use and poor sleep, with prevalence rising from 38.4% in students using smartphones less than 3 hours per day to 82.3% in those using more than 5 hours ($p < 0.001$). Pearson's correlation showed a significant positive relationship between smartphone addiction scores and sleep disturbance scores ($r = 0.42$, $p < 0.001$).

Conclusion: Smartphone addiction and poor sleep quality are highly prevalent among undergraduate medical students and show a strong positive correlation. Male students and those with higher daily smartphone usage were more vulnerable. The findings underscore the urgent need for awareness programs, counseling, and digital wellness initiatives to promote healthier technology use and sleep hygiene in medical undergraduates.

Keywords: Smartphone addiction, Sleep quality, Medical students, SAS-SV, PSQI.

Introduction

The rapid evolution of technology over the past decade has made smartphones an indispensable part of daily life, offering instant communication, educational resources, entertainment, and social networking at one's fingertips. [1] While these devices have undeniable advantages, excessive and uncontrolled use has led to concerns regarding a new form of behavioral addiction known as smartphone addiction, characterized by compulsive usage, inability to regulate time spent, neglect of academic and social responsibilities, and withdrawal-like symptoms on deprivation. [2] Medical students are particularly vulnerable because of their heavy academic workload, constant reliance on online study materials and applications, social networking needs, and the stress inherent to medical training, which together normalize prolonged smartphone use. [3] At the same time, sleep—an essential biological process required for cognitive functioning, memory consolidation, and psychological well-being—is increasingly being compromised in this population. [4] Poor sleep quality and reduced duration have been linked to impaired academic performance, psychiatric morbidity, and long-term health risks. [5] Excessive smartphone use, especially during late-night hours, contributes to these disturbances by delaying sleep onset, exposing students to blue

light that suppresses melatonin secretion, and increasing psychological arousal through social media, gaming, and other stimulating activities. [6] Previous studies in India have reported a high prevalence of both smartphone addiction and poor sleep quality among medical undergraduates, with higher daily screen exposure being strongly associated with disturbed sleep patterns. [7] Despite growing concern, there remains limited data on the direct correlation between smartphone addiction and sleep disturbances in undergraduate MBBS students, who represent a high-risk group due to both academic and psychosocial factors. [8 9] Therefore, the present study was conducted to determine the prevalence of smartphone addiction and sleep disturbances among medical undergraduates and to analyze their interrelationship using validated tools, with the aim of generating evidence that may guide interventions to promote healthier digital habits and better sleep hygiene in future healthcare professionals.

Material and Methods

This was a cross-sectional, questionnaire-based study conducted among 250 undergraduate MBBS students of a tertiary care medical college over a period of three months after obtaining institutional ethical clearance and informed consent from participants. All students owning and using a smartphone for at least six months and willing to participate were included, while those with pre-existing psychiatric illness, chronic sleep disorders, or on medications affecting sleep were excluded. Data collection was carried out using two validated tools: the Smartphone Addiction Scale–Short Version (SAS-SV) to assess smartphone addiction and the Pittsburgh Sleep Quality Index (PSQI) to evaluate sleep quality. The SAS-SV is a 10-item Likert scale, with higher scores indicating greater addiction, and cut-off values of ≥31 for males and ≥33 for females were used to classify addiction. The PSQI is a 19-item questionnaire that measures subjective sleep quality across seven domains, with a global score greater than 5 indicating poor sleep quality. Along with these instruments, basic demographic data such as age, gender, year of study, and average daily duration of smartphone use were also collected. Data were entered into Microsoft Excel and analyzed using SPSS version 25. Descriptive statistics were expressed in terms of mean, standard deviation, and percentages. The chi-square test was applied to compare categorical variables, and Pearson's correlation coefficient was used to determine the relationship between smartphone addiction scores and sleep quality scores. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 250 undergraduate MBBS students participated in the study, with 120 males (48%) and 130 females (52%). The mean age of participants was 20.3 ± 1.4 years, and most were in their first and second years of MBBS. The overall prevalence of smartphone addiction, as assessed by the Smartphone Addiction Scale–Short Version, was 42.4% (106 out of 250 students). When stratified by gender, addiction was significantly higher among males, with 48.5% fulfilling the criteria compared to 37.6% of females ($p = 0.03$).

Table 1: Association of Smartphone Addiction with Sleep Quality

Smartphone Addiction	Total Students	Poor Sleep Present	% with Poor Sleep
Yes (n=106)	106	84	79.2%
No (n=144)	144	69	47.9%

Sleep quality assessment revealed that 61.2% of participants (153 out of 250) had poor sleep, defined by a PSQI score greater than 5.

Poor sleep was significantly more common in the smartphone-addicted group ($p < 0.001$). Further analysis showed that students who reported predominantly late-night smartphone use were more likely to have delayed sleep onset, reduced total sleep duration, frequent nighttime awakenings, and daytime fatigue, highlighting the adverse effect of irregular usage patterns on sleep hygiene.

Table 2: Average Daily Smartphone Use and Poor Sleep Quality

Daily Smartphone Use	Total Students	Poor Sleep Present	% with Poor Sleep
< 3 hours	73	28	38.4%
3–5 hours	84	50	59.5%
> 5 hours	93	77	82.3%

When analyzed by average daily usage hours, poor sleep was most prevalent among students using smartphones for more than five hours per day.

As shown in Table 2, the difference was statistically significant ($p < 0.001$), emphasizing a clear dose-response relationship between higher smartphone usage and worsening sleep quality.

Correlation analysis demonstrated a significant positive relationship between smartphone addiction scores and sleep disturbance scores, with a Pearson's correlation coefficient of $r = 0.42$ ($p < 0.001$).

This indicates that increasing levels of smartphone addiction were directly associated with poorer sleep quality in the study population.

Discussion

The present study assessed the prevalence of smartphone addiction and its correlation with sleep disturbances among undergraduate MBBS students. Our findings revealed that nearly half of the students were addicted to smartphones, while more than sixty percent experienced poor sleep quality, with a significant positive correlation between the two variables. These results highlight the growing concern of problematic smartphone use and its detrimental effect on sleep hygiene in young adults pursuing medical education. As medical students are expected to maintain optimal physical and mental health for effective learning and future patient care, the presence of such high prevalence rates emphasizes the urgent need for awareness, early intervention, and incorporation of digital wellness strategies in this population.

Our finding of 42.4% smartphone addiction is closely in line with Chatterjee et al. (2021) [10], who reported a prevalence of approximately 46.2% in males and 33.3% in females among 224 Indian medical undergraduates, underscoring a similar trend of high addiction rates among this demographic. A systematic review by Leow et al. (2023) [11] estimated the pooled prevalence of smartphone addiction in medical students to be around 39% (95% CI: 30–50%), placing our data well within global norms. These similarities indicate that the prevalence observed in our study is consistent with both national and international findings.

In the present study, 61.2% of students had poor sleep quality. This aligns with Chatterjee et al. (2021) [10], who found 63.4% of medical students to be poor sleepers. Similarly, Leow et al. (2023) [11] estimated a pooled prevalence of poor sleep as approximately 57% (95% CI: 48–66%). These consistent findings across different cohorts highlight the pervasive nature of sleep disturbances among medical undergraduates.

Our study showed significantly higher smartphone addiction in males (48.5%) compared to females (37.6%). This pattern is echoed by Dhamija et al. (2021) [12], who observed higher addiction rates in male medical students in India. Another Indian study by Chatterjee et al. (2021) [10] also reported a notably higher prevalence in males (46.2%) than females (33.3%). However, Nikolić et al. (2023) [13] conducted a global study and found no significant gender difference in addiction rates among medical students. These mixed findings suggest gender-related variations in smartphone addiction may depend on cultural, behavioral, or social factors. We observed a clear dose–response relationship: poor sleep quality rose from 38.4% in < 3 h/day users to 82.3% in > 5 h/day users. This mirrors findings in several studies: Chatterjee et al. (2021) also reported significant association between long duration of smartphone use and sleep disturbances. Additionally, Dhamija et al. (2021) [12] found that smartphone addiction was significantly linked to sleep disturbance among medical college students. These parallels reinforce the importance of limiting screen time to improve sleep quality.

Our significant positive correlation ($r = 0.42$) echoes previous observations. For instance, Leow et al. (2023) [11] reported a correlation index of approximately 0.30 between smartphone addiction and poor sleep in their meta-analysis. A more recent Indian study by Deivendran et al. (2025) [14] found an even stronger correlation ($r = 0.60$, 95% CI: 0.50–0.70) between SAS-SV scores and poor sleep quality. Moreover, in a study of medical students in North India, Chatterjee et al. (2021) [10] also reported a significant positive correlation between SAS-SV and PSQI scores. These consistent correlations across studies affirm the robust link between smartphone addictions and sleep disturbances.

Conclusion

The present study demonstrates that smartphone addiction is highly prevalent among undergraduate MBBS students, with over two-fifths of participants meeting the criteria for addiction, while nearly two-thirds experienced poor sleep quality, and a significant positive correlation was observed between the two. Male students showed higher rates of addiction, and prolonged daily smartphone use, especially beyond five hours, was strongly associated with poor sleep. These findings, consistent with other Indian and international studies, indicate that excessive smartphone use is not merely a lifestyle issue but a significant public health concern that can negatively impact sleep hygiene, academic performance, and overall well-being of future healthcare professionals.

However, the study has certain limitations, as it was conducted in a single institution with self-reported questionnaires, which may introduce recall bias and limit generalizability, and the cross-sectional design prevents establishing causality. Despite these limitations, the results underscore the urgent need for awareness programs, digital wellness initiatives, and strategies to promote

healthier technology use and better sleep hygiene among medical students.

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