Section: Miscellaneous

Original Research Article

PREVALENCE OF SMARTPHONE ADDICTION (SELF-PERCEIVED) AND ASSOCIATED USE-PATTERNS AMONG UNDERGRADUATE MEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

Alpeshkumar Parmar[1], Ranjeetsingh L. Maliwad[2], Rahi Sutaria[3], Mevada Mouni Suresh[4], Siddharth B. Patel[3], Ladla Neha N[4]

[1]*Assistant Professor, Department of Community Medicine, GMERS Medical College, Himmatnagar, Gujarat, India*
[2]*Junior Resident, Department of Biochemistry, GMERS Medical College, Himmatnagar, Gujarat, India*
[3]*Junior Resident, Department of Pharmacology, GMERS Medical College, Himmatnagar, Gujarat, India*
[4]*Final year MBBS Student, GMERS Medical College, Himmatnagar, Gujarat, India*
[5]*Intern Doctor, GMERS Medical College, Himmatnagar, Gujarat, India*

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Corresponding Author:
Dr. Alpeshkumar Parmar,
Assistant Professor, Department of Community Medicine, GMERS Medical College, Himmatnagar, Gujarat, India.
Email: alpeshpaemar.512@gmail.com

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ABSTRACT

Background: Smartphones are widely used by medical students for education and communication, but uncontrolled use may lead to behavioural dependence. Estimating self-perceived smartphone addiction and its correlates can inform targeted preventive strategies in this population. The objective is to estimate the prevalence of self-perceived smartphone addiction among undergraduate medical students and examine its association with demographic characteristics, average daily screen time, and smartphone use patterns.

Materials and Methods: A cross-sectional, questionnaire-based study was conducted among undergraduate medical students (first year MBBS to internship) at a medical college in India. Data were collected using a structured, self-administered electronic questionnaire. Smartphone addiction was assessed by self-perception on a Likert scale and operationally defined as "often/always." Associations were tested using the Chi-square test, followed by multivariable logistic regression to identify independent predictors. Statistical significance was set at $p < 0.05$.

Results: Among 480 participants, 33.9% (163/480) reported self-perceived smartphone addiction (often/always). Addiction was significantly more common among students with screen time >4 hours/day (41.96% vs 22.16%, $p < 0.001$), those reporting social media as the most used activity (40.94% vs 20.00%, $p < 0.001$), and those with frequent smartphone use before sleep (40.29% vs 18.57%, $p < 0.001$). On multivariable analysis, independent predictors of smartphone addiction included screen time >4 hours/day (aOR 1.96; 95% CI 1.26–3.03; $p = 0.003$), social media as most used (aOR 2.07; 95% CI 1.29–3.31; $p = 0.002$), and smartphone use before sleep (aOR 2.13; 95% CI 1.29–3.52; $p = 0.003$). Age, gender, and academic year were not independently associated.

Conclusion: Smartphone addiction affected about one-third of undergraduate medical students and was mainly associated with modifiable usage behaviors, particularly higher screen time, social media–dominant use, and bedtime smartphone use.

Keywords: Smartphone addiction; Medical students; Screen time; social media; Sleep behaviour; Cross-sectional study.

INTRODUCTION

Smartphones have become an integral part of daily life, offering instant access to communication, information, and entertainment. While these devices provide substantial educational and social benefits, their excessive and uncontrolled use has raised concerns regarding behavioural dependence,

commonly referred to as smartphone addiction. This phenomenon is particularly relevant among medical students, who experience high academic demands, psychological stress, and prolonged screen exposure as part of their training.[1,2]

Smartphone addiction is characterized by compulsive use, difficulty in controlling usage, and continued use despite awareness of negative consequences. Medical students represent a vulnerable population due to their reliance on smartphones for academic resources, social networking, and leisure activities.[3,4] Previous studies,[1,2,5] have suggested that excessive smartphone use among medical students may be associated with reduced productivity, impaired concentration, and adverse psychosocial outcomes.

Despite growing literature on smartphone addiction, there remains variability in its assessment, with many studies relying on self-perception and behavioural indicators. Evaluating self-perceived smartphone addiction provides valuable insight into students' awareness of their usage patterns and perceived dependence.[6,7] Furthermore, identifying associated sociodemographic and use-pattern factors can guide targeted preventive strategies.

Therefore, the present study was conducted to estimate the prevalence of self-perceived smartphone addiction among undergraduate medical students and to examine its association with demographic characteristics, average daily screen time, and primary smartphone use-patterns.

MATERIALS AND METHODS

Study Design, Setting, and Duration: A cross-sectional, questionnaire-based observational study was conducted among undergraduate medical students of a medical college in India. Data were collected over a defined study period using an electronic survey platform.

Study Population and Eligibility Criteria: The study population comprised undergraduate medical students from first year MBBS to internship who were active smartphone users. Students aged 18 years or older who provided informed consent and completed the questionnaire in full were included, while those who declined consent or submitted incomplete or duplicate responses were excluded. Only complete responses were considered for the final analysis.

Sample Size and Sampling Technique: The sample size was calculated using the single-proportion formula:

n=Z^2 pq/d^2, where Z = 1.96 for a 95% confidence level, p = assumed prevalence of smartphone addiction of 50%, q = 1 − p, and d = absolute precision of 5%. The minimum required sample size was 384. To account for incomplete responses and improve precision, a larger number of students were approached. After exclusion of incomplete entries, data from 480 participants were analyzed. A convenience sampling technique was employed, with voluntary participation through electronic survey dissemination.

Study Tools: Data were collected using a structured, self-administered questionnaire developed after reviewing relevant literature on smartphone addiction and usage patterns among students. The questionnaire was administered through Google Forms and consisted of sections on sociodemographic characteristics, smartphone usage patterns, behavioral usage characteristics, and self-perceived smartphone addiction.

Operational Definitions: Smartphone addiction: Self-perceived addiction assessed using a Likert-scale item with responses never, rarely, sometimes, often, and always. Addiction was operationally defined as responses "often" or "always."

Non-addiction: Responses "never," "rarely," or "sometimes."

High screen time: Average daily smartphone use exceeding four hours.

Primary smartphone use: The activity reported as "most used" among listed domains.

Frequent behavioral use: Behavioral smartphone use reported as "often" or "always."

Measurements: The questionnaire recorded age, gender, academic year, average daily smartphone screen time, primary purpose of smartphone use (social media, educational applications, OTT platforms, gaming, web surfing, calls, online shopping, adult content, and business-related use), and behavioral usage patterns such as smartphone use before sleep, immediately after waking, during meals, while walking, and during lectures. All measurements were self-reported. The questionnaire was reviewed by subject experts to ensure content validity and was pretested among a small group of students for clarity and face validity prior to final administration.

Data Collection Procedure: The survey link was circulated electronically to eligible students after providing information regarding the study objectives. Informed consent was obtained electronically before participation. Responses were recorded anonymously, and no personally identifiable information was collected. Data collection was standardized across participants and completed in a single sitting.

Outcome Measures: The primary outcome was the prevalence of self-perceived smartphone addiction. Secondary outcomes included associations between smartphone addiction and demographic variables, average daily screen time, primary smartphone use patterns, and behavioral usage characteristics.

Ethical Considerations: The study was conducted following approval from the Institutional Ethics Committee. Participation was voluntary, and electronic informed consent was obtained from all participants. Confidentiality and anonymity of responses were maintained throughout the study, and data were used solely for research purposes.

Statistical Analysis: Data were cleaned and analyzed using Microsoft Excel and statistical software.

Categorical variables were summarized as frequencies and percentages. Associations between smartphone addiction and explanatory variables were assessed using the Chi-square test. Variables demonstrating statistical significance in bivariate analysis were included in a multivariable logistic regression model to identify independent predictors of smartphone addiction. Results were expressed as adjusted odds ratios with 95% confidence intervals. A p-value < 0.05 was considered statistically significant.

RESULTS

The present study assessed the prevalence of smartphone addiction among undergraduate medical students and its association with smartphone use patterns. The findings indicate that smartphone addiction is common and is mainly influenced by usage behaviour.

Table 1: Demographic and Academic Profile of Participants (N = 480)

Variables	n (%)
Age	
Below 18	13 (2.71)
18–20	334 (69.58)
21–22	125 (26.04)
23–24	7 (1.46)
Above 24	1 (0.21)
Gender	
Male	300 (62.50)
Female	180 (37.50)
Academic year	
First year MBBS	176 (36.67)
Second year MBBS	137 (28.54)
Third year MBBS	166 (34.58)
Internship	1 (0.21)
Average daily screen time	
< 2 hours	13 (2.71)
2–3 hours	58 (12.08)
3–4 hours	123 (25.63)
4–5 hours	120 (25.00)
5–6 hours	64 (13.33)
> 6 hours	102 (21.25)

[Table 1] shows that most study participants were young undergraduate medical students, with nearly 70% in the 18–20-year age group and a higher proportion of males (62.5%). Smartphone exposure was considerable, as around 60% of students reported using smartphones for more than 4 hours daily, indicating prolonged screen use in the study population.

Table 2: Prevalence of Self-Perceived Smartphone Addiction (N = 480)

Self-Perceived Smartphone use	n (%)
Never	41 (8.54)
Rarely	79 (16.46)
Sometimes	196 (40.83)
Often	94 (19.58)
Always	69 (14.38)

[Table 2] demonstrates that 33.9% (163 out of 480) students reported frequent smartphone addiction, defined as feeling addicted often or always. While many students acknowledged occasional addictive behaviour, nearly one-third perceived persistent addiction, reflecting a notable prevalence of smartphone addiction.

Table 3: Smartphone Usage Pattern and Behavioural Context (N = 480)

Primary smartphone use (Most used)	n (%)
Social media	320 (66.67)
Educational apps	258 (53.75)
Gaming	106 (22.08)
OTT platforms	100 (20.83)
Web surfing	96 (20.00)
Calls	63 (13.13)
Online shopping	48 (10.00)
Adult content	21 (4.38)
Business/stock market	13 (2.71)
Behavioural context (Often/Always)	
Within 30 min before sleep	340 (70.83)
While eating	194 (40.42)

Immediately after waking	192 (40.00)
While walking	155 (32.29)
During lectures	128 (26.67)
In washroom	83 (17.29)

[Table 3] indicates that smartphone use was primarily driven by social media (about two-thirds of students) and educational applications (over half of students). Behavioral patterns showed that smartphone use was commonly integrated into daily routines, particularly around sleep, with more than 70% reporting smartphone use before bedtime, and a substantial proportion using smartphones during meals and soon after waking.

Table 4: Association Between Smartphone Addiction and Selected Variables (N = 480)

Variable	Addiction present (n=163)	Addiction absent (n=317)	p-value
Age			
Below 18	8 (61.54)	5 (38.46)	0.220
18–20	106 (31.74)	228 (68.26)	
21–22	47 (37.60)	78 (62.40)	
23–24	2 (28.57)	5 (71.43)	
Above 24	0 (0.00)	1 (100.00)	
Gender			
Male	105 (35.00)	195 (65.00)	0.637
Female	58 (32.22)	122 (67.78)	
Academic year			
First year MBBS	61 (34.66)	115 (65.34)	0.562
Second year MBBS	43 (31.39)	94 (68.61)	
Third year MBBS	58 (34.94)	108 (65.06)	
Internship	1 (100.00)	0 (0.00)	
Screen time			
≤ 4 hours	43 (22.16)	151 (77.84)	<0.001
> 4 hours	120 (41.96)	166 (58.04)	
Social media			
Most used	131 (40.94)	189 (59.06)	<0.001
Not most used	32 (20.00)	128 (80.00)	
OTT platforms			
Most used	45 (45.00)	55 (55.00)	0.025
Not most used	118 (31.05)	262 (68.95)	
Bedtime use			
Often/Always	137 (40.29)	203 (59.71)	<0.001
Others	26 (18.57)	114 (81.43)	

[Table 4] shows that smartphone addiction was not significantly associated with age, gender, or academic year. In contrast, addiction was significantly more common among students with daily screen time exceeding 4 hours, those who primarily used smartphones for social media, and those who reported frequent smartphone use before sleep, highlighting the role of usage behaviour rather than demographic factors.

Table 5. Multivariable Logistic Regression for Smartphone Addiction (N = 480)

Predictor	Adjusted OR	95% CI	p-value
Screen time > 4 hours	1.96	1.26 – 3.03	0.003
Social media (most used)	2.07	1.29 – 3.31	0.002
Smartphone use before sleep	2.13	1.29 – 3.52	0.003
OTT platforms (most used)	1.48	0.92 – 2.37	0.103
Male gender	0.99	0.65 – 1.51	0.978

[Table 5] confirms that these usage-related factors remained important after adjustment. Higher screen time, social media-dominant use, and frequent bedtime smartphone use independently increased the likelihood of smartphone addiction, whereas demographic variables did not show an independent association.

DISCUSSION

In the present study, smartphone addiction was identified in approximately one-third of undergraduate medical students, indicating that problematic smartphone use is a common behavioural concern in this population. The analysis showed that smartphone addiction was strongly associated with behavioural usage characteristics, particularly prolonged daily screen time, social media–dominant smartphone use, and frequent smartphone use before sleep. In contrast, sociodemographic variables such as age, gender, and academic year did not demonstrate a significant or independent association with smartphone addiction.

The prevalence of smartphone addiction observed in the present study (33.9%) is comparable to several Indian and international studies conducted among

medical and university students. Gangadharan et al.8 reported a prevalence of 33.0% among Indian adolescents, closely mirroring the magnitude observed in the present study. Similarly, Verma et al,[9] documented smartphone addiction in 34.8% of medical students in North India, supporting the consistency of findings within the Indian medical student population Higher prevalence figures have been reported in some studies using standardized addiction scales, such as Phukan et al,[10] who observed smartphone addiction in 44.1% of undergraduate medical students in Assam, and Gunasekar et al.,8 who reported addiction in 47.8% of medical students in Tamil Nadu Conversely, studies employing broader university populations or different assessment approaches have shown variability, with Liu et al,[11] reporting a prevalence of 39.7% among first-year medical students in China. These differences likely reflect variation in study populations, assessment tools, and operational definitions of smartphone addiction rather than true epidemiological discordance.

Consistent with the present findings, multiple studies have demonstrated a strong association between smartphone addiction and prolonged screen time. Phukan et al,[10] reported that students using smartphones for more than five hours per day were nearly six times more likely to be addicted compared to minimal users. Gangadharan et al,[12] similarly observed significantly higher mean screen time among addicted participants. The lack of a consistent association between gender and smartphone addiction in the present study aligns with findings reported by Gangadharan et al,[12] and Umarji et al,[13] both of whom observed no significant gender difference in addiction prevalence, although other studies have reported male or female predominance depending on cultural and behavioural contexts.

The strong association between smartphone addiction and prolonged screen time observed in the present study is biologically and behaviourally plausible. Extended smartphone use increases exposure to reward-based digital content, particularly social media platforms designed to reinforce repetitive engagement through intermittent reinforcement mechanisms. Frequent smartphone use before sleep may further exacerbate addictive behaviours through circadian rhythm disruption caused by blue-light exposure and heightened cognitive arousal. These mechanisms have been widely described in prior literature and are consistent with findings reported by Liu et al. and summarized in the systematic review by Achangwa et al,[14] which highlighted sleep disturbance and behavioural dysregulation as key consequences of smartphone addiction

Strengths and Limitations: The strengths of this study include a relatively large sample size, inclusion of students across all academic years, and evaluation of multiple behavioural dimensions of smartphone use. However, the study is limited by its cross-sectional design, which precludes causal inference. Smartphone addiction and usage patterns were self-reported, introducing the possibility of reporting bias. Additionally, the use of a self-perceived addiction measure rather than a standardized diagnostic scale may have influenced prevalence estimates, although this approach has been widely used in similar epidemiological studies.

CONCLUSION

In conclusion, the present study demonstrates that smartphone addiction is a common behavioural concern among undergraduate medical students and is largely driven by usage patterns such as prolonged screen time, social media–dominant use, and frequent bedtime smartphone engagement. Addressing these modifiable behaviours may play a key role in promoting healthier digital practices within medical student populations.

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