

Prevalence of Smartphone Addiction and Sleep Irregularity Among Undergraduate Students in Gujarat, India: A Cross-Sectional Study

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ABSTRACT

Background: Smartphone use has become an essential part of students' academic and social lives. However, excessive smartphone use may lead to behavioural addiction and adversely affect sleep health. Although several studies have examined smartphone addiction and sleep quality, evidence on sleep regularity among undergraduate students in India remains limited. This study aimed to determine the prevalence of smartphone addiction and sleep irregularity among undergraduate students in Gujarat and examine the association between these variables.

Methods: A cross-sectional study was conducted among 381 undergraduate students of a private university in Gujarat, India. Participants were selected using a stratified multistage cluster sampling technique. Data were collected through a structured online questionnaire comprising socio-demographic characteristics, the Smartphone Addiction Scale–Short Version (SAS-SV), and the Sleep Regularity Questionnaire (SRQ). Descriptive statistics were used to estimate prevalence, while Pearson's Chi-square test was applied to assess the association between smartphone addiction and sleep regularity.

Results: Of the 381 participants, 49.6% exhibited moderate to severe smartphone addiction, while 47.0% demonstrated poor or very poor sleep regularity. Although students with higher smartphone addiction tended to report poorer sleep regularity, the association between smartphone addiction and sleep regularity was not statistically significant ($p = 0.098$).

Conclusion: Smartphone addiction and sleep irregularity were highly prevalent among undergraduate students. Although no statistically significant association was observed between these variables, the high prevalence of both conditions highlights the need for university-based interventions promoting responsible smartphone use, healthy sleep practices, and digital well-being. Further multicentre longitudinal studies are recommended to better understand the relationship between smartphone use and sleep health.

Keywords: Smartphone addiction; Sleep regularity; Undergraduate students; Prevalence; Cross-sectional study; Gujarat.

INTRODUCTION

Smartphones have become an indispensable part of modern life and are extensively used by university students for communication, learning, entertainment, and social networking. While smartphones have enhanced access to educational resources and digital communication, excessive and uncontrolled use has emerged as a growing public health concern. Problematic smartphone use has been associated with behavioural addiction, reduced academic performance, impaired concentration, musculoskeletal discomfort, psychological distress, and adverse sleep outcomes among young adults [1–3].

University students represent one of the most vulnerable groups for developing smartphone addiction because of their high dependence on digital technology for academic activities, social interaction, and recreation. Previous studies conducted among Indian undergraduate students have reported a substantial prevalence of smartphone addiction, reflecting the increasing integration of smartphones into students' daily routines. Ammati et al. reported that more than one-third of medical students met the criteria for smartphone addiction, while a recent study by Pomal et al. also highlighted the growing burden of problematic smartphone use among undergraduate medical students in India [1,4]. Similarly, Upadhyay described mobile phone addiction among Indian adolescents as an emerging public health concern requiring timely preventive interventions [5].

Adequate and regular sleep is essential for maintaining physical health, cognitive function, emotional well-being, and academic performance. Sleep health encompasses several dimensions, including sleep duration, quality, timing, and regularity. Disturbances in these dimensions have been associated with impaired memory, reduced concentration, excessive daytime sleepiness, mood disorders, and an increased risk of chronic health conditions. A systematic review conducted among university students in India reported that poor sleep quality affected between 25% and 72% of students, while excessive daytime sleepiness ranged from 17% to 44%, indicating that sleep-related problems are highly prevalent in this population [2].

Increasing evidence suggests that excessive smartphone use and poor sleep frequently coexist among university students. A systematic review and meta-analysis involving more than 9,000 medical students demonstrated that smartphone addiction was associated with poorer sleep outcomes and reported pooled prevalence estimates of 39% for smartphone addiction and 57% for poor sleep. The review concluded that prolonged smartphone use, particularly for social networking and entertainment, may adversely influence sleep through delayed bedtime, increased cognitive stimulation, and prolonged exposure to screen light [3]. Similarly, Nguyen et al. reported that smartphone addiction was significantly associated with poorer sleep quality and poorer mental health among Vietnamese undergraduate students, suggesting that sleep may play an important role in the relationship between excessive smartphone use and psychological well-being [6].

Despite the increasing number of studies examining smartphone addiction and sleep quality, relatively few investigations have focused on **sleep regularity**, an important but often overlooked dimension of sleep health that reflects the consistency of sleep and wake schedules. Furthermore, most Indian studies have been conducted among medical students, with limited evidence available from multidisciplinary undergraduate populations in private universities. Understanding the prevalence of smartphone addiction and sleep irregularity in this population is essential for planning evidence-based interventions aimed at promoting healthy digital behaviour and improving student well-being.

Therefore, the present study was undertaken to determine the prevalence of smartphone addiction and sleep irregularity among undergraduate students in Gujarat, India, and to examine the association between smartphone addiction and sleep regularity.

METHODOLOGY

Study Design and Setting: A cross-sectional study was conducted among undergraduate students enrolled at a private university in Gujarat, India. The study aimed to estimate the prevalence of smartphone addiction and sleep irregularity and to examine the association between these two conditions. Data were collected using a structured, self-administered online questionnaire distributed through Google Forms.

Study Population and Sampling: The study population comprised undergraduate students from four academic schools of the university. Students aged 17 years or older who were enrolled during the study period and provided informed consent were eligible to participate. Students who declined participation, submitted incomplete questionnaires, or provided duplicate responses were excluded from the analysis.

The required sample size was estimated using the OpenEpi sample size calculator with a 95% confidence level and a 5% margin of error. A stratified multistage cluster sampling technique was adopted to ensure proportional representation of students from each academic school. A total of **381 undergraduate students** completed the survey and were included in the final analysis.

Study Instrument: Data were collected using a structured questionnaire comprising three sections. The first section included socio-demographic information, specifically age and gender. The second section assessed smartphone addiction using the **Smartphone Addiction Scale–Short Version (SAS-SV)**, a validated 10-item questionnaire designed to measure problematic smartphone use. Responses were recorded using a Likert scale, with higher scores indicating greater levels of smartphone addiction. The third section assessed sleep regularity using the **Sleep Regularity Questionnaire (SRQ)**, a validated 10-item instrument that evaluates the consistency of sleep and wake schedules. Higher scores reflected better sleep regularity.

Data Collection Procedure: The questionnaire was administered electronically using Google Forms. Before accessing the questionnaire, participants were provided with information regarding the study objectives, voluntary participation, confidentiality of responses, and their right to withdraw at any stage without any consequences. Digital informed consent was obtained from all participants before data collection commenced.

Completed responses were downloaded into Microsoft Excel for data cleaning and coding before being imported into IBM Statistical Package for the Social Sciences (SPSS) for analysis.

Study Variables: The primary outcome variables were smartphone addiction and sleep regularity. The explanatory variables included age and gender.

Statistical Analysis: Data were analysed using IBM SPSS Statistics. Descriptive statistics were used to summarise participant characteristics and questionnaire responses. Categorical variables were presented as frequencies and percentages. Participants were classified according to the predefined scoring criteria for the Smartphone Addiction Scale–Short Version and the Sleep Regularity Questionnaire to estimate the prevalence of smartphone addiction and sleep irregularity. The association between smartphone addiction and sleep regularity was examined using Pearson's Chi-square test. A two-sided p -value of less than 0.05 was considered statistically significant.

Ethical Considerations: The study was conducted as an anonymous, questionnaire-based survey involving undergraduate students and posed minimal risk to participants. Prior permission to conduct the study was obtained from the concerned university authorities. Participation was voluntary, and informed consent was obtained electronically from all participants before completion of the questionnaire. Participants were informed about the purpose of the study, their right to decline participation, and the confidentiality of their responses. No personally identifiable information was collected, and all data were used exclusively for academic and research purposes.

RESULTS

Table 1. Socio-demographic characteristics of study participants (N = 381)

Variable	Frequency (n)	Percentage (%)
Age (years)		
17–20	213	55.9
≥21	168	44.1
Gender		
Male	131	34.4
Female	250	65.6

Participant Characteristics: A total of 381 undergraduate students participated in the study. More than half of the participants (55.9%) were aged 17–20 years, while the remaining 44.1% were aged 21 years and above. Female students constituted nearly two-thirds of the study population (65.6%), whereas males accounted for 34.4% (Table 1).

Table 2. Distribution of responses to the Smartphone Addiction Scale–Short Version (SAS-SV) among undergraduate students (N = 381)

SAS-SV Item	Strongly Disagree n (%)	Disagree n (%)	Weakly Disagree n (%)	Agree n (%)	Strongly Agree n (%)
Missing planned work due to smartphone use	25 (6.6)	58 (15.2)	57 (15.0)	203 (53.3)	38 (10.0)
Having difficulty concentrating while holding my smartphone	16 (4.2)	65 (17.1)	55 (14.4)	203 (53.3)	42 (11.0)
Feeling pain in the wrists or back of the neck while using a smartphone	37 (9.7)	113 (29.7)	40 (10.5)	168 (44.1)	23 (6.0)
Unable to stand not having a smartphone	52 (13.6)	151 (39.6)	45 (11.8)	107 (28.1)	26 (6.8)
Feeling impatient and fretful when not holding my smartphone	59 (15.5)	129 (33.9)	55 (14.4)	119 (31.2)	19 (5.0)
Thinking about my smartphone even when not using it	60 (15.7)	130 (34.1)	60 (15.7)	109 (28.6)	22 (5.8)
Never giving up smartphone use even when daily life is affected	51 (13.4)	138 (36.2)	76 (19.9)	99 (26.0)	17 (4.5)
Constantly checking smartphone to avoid missing conversations	28 (7.3)	99 (26.0)	76 (19.9)	151 (39.6)	27 (7.1)
Using my smartphone longer than intended	18 (4.7)	81 (21.3)	60 (15.7)	178 (46.7)	44 (11.5)
People tell me that I use my smartphone too much	43 (11.3)	112 (29.4)	68 (17.8)	136 (35.7)	22 (5.8)

Table 3. Distribution of responses to the Sleep Regularity Questionnaire (SRQ) among undergraduate students (N = 381)

SRQ Item	Strongly Disagree n (%)	Disagree n (%)	Weakly Disagree n (%)	Agree n (%)	Strongly Agree n (%)
I go to bed at about the same time each night	29 (7.6)	113 (29.7)	58 (15.2)	148 (38.8)	33 (8.7)
It takes me about the same amount of time to fall asleep each night	24 (6.3)	89 (23.4)	73 (19.2)	164 (43.0)	31 (8.1)
I wake up during the night at about the same time each night	45 (11.8)	117 (30.7)	79 (20.7)	117 (30.7)	23 (6.0)
I spend about the same amount of time awake during the night	44 (11.5)	115 (30.2)	72 (18.9)	124 (32.5)	26 (6.8)
I wake up at about the same time each morning	17 (4.5)	49 (12.9)	50 (13.1)	213 (55.9)	52 (13.6)
I get out of bed at about the same time each morning	16 (4.2)	46 (12.1)	50 (13.1)	216 (56.7)	53 (13.9)

I feel about equally refreshed upon waking each morning	41 (10.8)	104 (27.3)	84 (22.0)	130 (34.1)	22 (5.8)
I sleep for about the same amount of time each night	28 (7.3)	81 (21.3)	71 (18.6)	169 (44.4)	32 (8.4)
My sleep schedule is similar on weekdays and weekends	52 (13.6)	112 (29.4)	70 (18.4)	122 (32.0)	25 (6.6)
Overall, I consider my sleep schedule to be regular	34 (8.9)	96 (25.2)	72 (18.9)	151 (39.6)	28 (7.3)

Table 4. Prevalence of Smartphone Addiction and Sleep Regularity among Undergraduate Students (N = 381)

Variable	Category	Frequency (n)	Percentage (%)
Smartphone Addiction (SAS-SV)	Minimal–Mild	192	50.4
	Moderate–Severe	189	49.6
Sleep Regularity (SRQ)	Very Poor	62	16.3
	Poor	117	30.7
	Excellent	17	4.5

The association between smartphone addiction and sleep regularity was assessed using Pearson's Chi-square test. Although participants with moderate to severe smartphone addiction appeared to have a higher proportion of poor sleep regularity than those with minimal to mild smartphone addiction, the association was **not statistically significant** ($p = 0.098$). Therefore, no significant association was observed between smartphone addiction and sleep regularity among the undergraduate students included in this study.

DISCUSSION

The present study assessed the prevalence of smartphone addiction and sleep irregularity among undergraduate students in Gujarat and explored the association between these variables. Nearly half of the participants exhibited moderate to severe smartphone addiction (49.6%), while 47.0% reported poor or very poor sleep regularity. Although students with higher levels of smartphone addiction tended to have poorer sleep regularity, the association was not statistically significant ($p = 0.098$).

The prevalence of smartphone addiction observed in this study is consistent with previous research demonstrating that problematic smartphone use is common among university students. Studies conducted among Indian medical students have similarly reported a high burden of smartphone addiction, reflecting increasing dependence on smartphones for academic activities, communication, and social networking [1,5]. Likewise, Leow et al. reported a pooled prevalence of 39% among medical students, confirming that smartphone addiction has become an important public health concern in higher education [3].

Poor sleep regularity was also highly prevalent among the study participants. Although most previous studies have evaluated sleep quality rather than sleep regularity, the findings are comparable with the systematic review by Dunn et al., which reported a high prevalence of poor sleep among Indian university students and identified excessive internet use and irregular lifestyle behaviours as important contributing factors [2]. These findings suggest that sleep-related problems are widespread among university students.

Unlike several previous studies that demonstrated a significant association between smartphone addiction and poor sleep quality [3,4], the present study did not observe a statistically significant association between smartphone addiction and sleep regularity. This difference may be explained by the use of the Sleep Regularity Questionnaire (SRQ), which measures the consistency of sleep–wake schedules rather than subjective sleep quality. In addition, sleep behaviour is influenced by multiple factors, including academic workload, stress,

physical activity, and lifestyle habits, which were not assessed in the present study and may have affected the observed relationship [2].

Despite the absence of a statistically significant association, the coexistence of high levels of smartphone addiction and poor sleep regularity highlights the need for preventive interventions within universities. Awareness programmes promoting responsible smartphone use, digital well-being, and healthy sleep practices may help improve students' overall health and academic performance.

The study has several strengths, including the use of validated instruments and the inclusion of undergraduate students from multiple academic disciplines. However, the cross-sectional design limits causal inference, and the use of self-reported data may have introduced reporting bias. Furthermore, the findings are based on a single private university and may not be generalisable to all undergraduate students. Future multicentre longitudinal studies are recommended to better understand the relationship between smartphone addiction and different dimensions of sleep health.

CONCLUSION

This study demonstrated that smartphone addiction and sleep irregularity are common among undergraduate students in a private university in Gujarat, India. Nearly half of the participants exhibited moderate to severe smartphone addiction, while almost half reported poor or very poor sleep regularity, indicating that both conditions represent important health concerns within the university population. Although students with higher levels of smartphone addiction tended to report poorer sleep regularity, the association between the two variables was not statistically significant. The findings suggest that smartphone addiction and sleep irregularity may coexist among university students but are likely influenced by multiple behavioural, environmental, and psychological factors beyond smartphone use alone. Universities should prioritise strategies that promote responsible smartphone use, healthy sleep practices, and student well-being through awareness programmes, digital wellness initiatives, and counselling services. Further multicentre longitudinal studies are recommended to better understand the temporal relationship between smartphone use and sleep behaviour among young adults.

STRENGTHS AND LIMITATIONS

Strengths: The present study utilised two validated instruments, namely the Smartphone Addiction Scale–Short Version (SAS-SV) and the Sleep Regularity Questionnaire (SRQ), to assess smartphone addiction and sleep regularity. The inclusion of undergraduate students from multiple academic disciplines enhanced the diversity of the study population. Furthermore, few studies in India have specifically examined sleep regularity using the SRQ, making this study a valuable contribution to the existing literature on student health.

Limitations: The study has certain limitations. First, its cross-sectional design limits the ability to establish causal relationships between smartphone addiction and sleep regularity. Second, the findings were based on self-reported responses and may therefore be subject to recall and social desirability bias. Third, the study was conducted in a single private university, which may limit the generalisability of the findings to other educational settings. Finally, factors such as psychological stress, physical activity, caffeine consumption, mental health status, and hostel residence were not assessed and may have influenced sleep behaviour.

Public Health Implications and Recommendations

The high prevalence of smartphone addiction and sleep irregularity observed in this study highlights the need for comprehensive health promotion strategies within universities. Institutions should incorporate digital well-being and sleep hygiene education into student orientation programmes and health promotion activities. Regular awareness campaigns, counselling services, and workshops focusing on responsible smartphone use, stress management, and healthy sleep practices may help reduce behavioural risk factors among students. Universities should also encourage balanced technology use by promoting offline recreational activities, physical activity, and time-management skills. Future research should include multicentre longitudinal studies involving students from diverse educational institutions to better understand the determinants of smartphone addiction and sleep regularity and to evaluate the effectiveness of targeted interventions.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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