Swami Vivekananda Advanced Journal for Research and Studies
Online Copy of Document Available on: www.svajrs.com

ISSN:2584-105X **Pg. 186- 192**

Smartphone Addiction and Sleep Quality: An Empirical Study in Psychology Among College Students

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Accepted: 22/07/2025
Published: 27/07/2025 ***DOI: http://doi.org/10.5281/zenodo.16948811***

Abstract

The present empirical study titled "Smartphone Addiction and Sleep Quality: An Empirical Study in Psychology Among College Students" investigates the relationship between smartphone addiction and sleep quality among undergraduate and postgraduate students aged 18–25. With a sample of fifty randomly selected participants, data were collected using both in-person and online structured interviews. The Smartphone Addiction Scale (SAS) and the Pittsburgh Sleep Quality Index (PSQI) were employed as standardized instruments to measure smartphone dependency and sleep quality, respectively. Findings reveal that the average daily screen time exceeded five hours, while pre-sleep screen exposure was notably high, averaging more than seventy minutes. Sleep metrics indicated that although the majority reported good sleep quality, significant variations existed in sleep latency, nocturnal awakenings, and overall restfulness. Pre-sleep digital behaviors such as social media browsing, YouTube viewing, and gaming strongly influenced sleep outcomes. Lifestyle factors like caffeine consumption, late-night meals, perceived stress, and physical activity further moderated the relationship between smartphone use and sleep quality. The study highlights the complex interplay between technology use, behavioral habits, and psychological well-being, pointing to the need for interventions promoting healthy digital hygiene among college students.

Keywords: *Smartphone Addiction; Sleep Quality; College Students; Psychological Well-being; Digital Behaviors*

Introduction

The rapid proliferation of smartphones has transformed the everyday lives of young adults, making them indispensable tools for communication, education, entertainment, and social networking. While smartphones offer undeniable benefits, their excessive and compulsive use has raised growing concerns within psychology, particularly regarding their impact on physical and mental health. Among the most discussed consequences is the disruption of sleep patterns, a crucial determinant of overall health and cognitive functioning.

Sleep quality, especially in the college-going population, is a matter of serious concern. Students aged 18–25 often juggle academic responsibilities, social life, and recreational activities, with smartphones at the center of these engagements. The temptation of late-night browsing, prolonged social media engagement, or streaming entertainment frequently delays sleep onset, reduces sleep duration, and causes irregular circadian rhythms. Poor sleep quality in turn has been linked to impaired concentration, lower academic performance, weakened immunity, and heightened stress.

Existing literature suggests a correlation between problematic smartphone use and disturbances in sleep quality, but empirical evidence within the Indian college context remains limited. Most research has been conducted in Western populations, where lifestyle, cultural norms, and technological exposure may differ from those of Indian students. Hence, this study seeks to fill the gap by systematically investigating the association between smartphone addiction and sleep quality in Indian college students, using standardized psychometric tools.

The present research is empirical in nature and adopts a quantitative correlational design. It explores not only the direct relationship between smartphone addiction and sleep quality but also considers secondary influences such as lifestyle habits, stress levels, pre-sleep digital behavior, and academic outcomes. By examining these variables in detail, the study aims to provide a holistic understanding of how digital dependency shapes the sleep wake cycle and overall psychological health of students.

The findings are expected to carry significant implications for psychologists, educators, policymakers, and students themselves, offering insights for designing digital wellness programs, sleep hygiene interventions, and awareness campaigns.

Methodology

The present study titled *"Smartphone Addiction and Sleep Quality: An Empirical Study in Psychology Among College Students"* adopts an empirical approach to systematically examine the association between smartphone addiction and sleep quality. The methodology is designed to ensure that the research is conducted in a scientifically rigorous, reliable, and replicable manner. It involves careful planning of research design, determination of sample size, strategies for random selection, methods of data collection, tools employed, ethical considerations, and procedures of data analysis. The focus of this section is to present a detailed account of how the research was conducted, with emphasis on the use of both in-person and online interview techniques for gathering data from participants.

Research Design

The study employs a **quantitative correlational research design**, as it seeks to investigate the relationship between two primary variables: smartphone addiction and sleep quality. The correlational approach is deemed most appropriate since the aim is not to manipulate variables but to examine their natural associations. This design allows for the collection of empirical data that can be statistically analyzed to determine whether there exists a significant correlation between the level of smartphone addiction and the quality of sleep among college students.

The empirical nature of the study ensures reliance on observed and measured phenomena rather than theoretical assumptions. The use of structured tools for interviews and standardized questionnaires aids in minimizing bias, ensuring that the findings are robust and valid. The cross-sectional dimension of the study, where all data are collected at a single point in time, is aligned with the scope and constraints of the research.

Population and Sample

The **population** for the study comprises college students within the age group of 18 to 25 years, as this group is generally more exposed to extensive smartphone usage due to academic, social, and recreational activities. They also represent a segment highly vulnerable to both digital dependency and sleep disturbances.

A **sample size of 50 students** was determined as sufficient for exploratory empirical research. This number balances the need for manageable data collection with the requirement for statistical validity. A smaller sample might limit generalizability, while a

much larger sample could have been impractical within the time and resource limitations of the study.

The **sampling technique** employed was **random sampling**. Students from different academic disciplines and years of study were invited to participate, and random selection was ensured by using student enrollment lists from the college registrar. A random number generator was applied to pick participants, thereby minimizing selection bias and ensuring that every student had an equal chance of being included in the sample. This enhances the representativeness of the sample and increases the reliability of the findings.

Data Collection Methods

Data collection constituted the heart of this research, and it was carried out using both **in-person interviews** and **online interviews**, thereby adopting a mixed approach to ensure inclusivity and convenience for participants. This dual method not only improved participation rates but also accounted for students who preferred remote participation due to personal or scheduling constraints.

1. **In-Person-Interviews:**
   Students who were available on campus were approached individually in designated college facilities such as classrooms, libraries, and student lounges. After explaining the purpose of the study and obtaining informed consent, structured interviews were conducted face-to-face. This mode of data collection allowed for a more interactive engagement, ensuring clarity of responses and giving researchers the opportunity to observe non-verbal cues.
2. **Online-Interviews:**
   For students who were unable to attend in person, online interviews

were conducted using digital platforms such as Zoom and Google Meet. The structured nature of the questionnaire ensured uniformity across both in-person and online interviews. Online interviews allowed flexibility and broadened participation while ensuring that the data remained consistent.

In both methods, participants were assured of confidentiality, and their responses were recorded in coded formats to maintain anonymity. The use of both methods also acted as a strategy to reduce non-response bias, thereby improving the reliability of the data.

Research Instruments

Two primary instruments were used for data collection:

1. **Smartphone Addiction Scale (SAS):** A standardized and widely used instrument to measure the degree of smartphone addiction among individuals. The scale consists of multiple items covering aspects such as daily life disturbance, withdrawal, tolerance, and positive anticipation. Participants rated their responses on a Likert-type scale, which provided quantitative measures of addiction levels.
2. **Pittsburgh Sleep Quality Index (PSQI):** To measure sleep quality, the PSQI was employed. It is a validated instrument designed to assess various components of sleep, including sleep duration, sleep disturbances, sleep latency, and overall sleep efficiency. The instrument categorizes respondents into good or poor sleepers based on a composite score.

The instruments were administered uniformly in both in-person and online formats, with clear instructions provided to participants to ensure accuracy and understanding.

Procedure

The procedure of conducting the study was organized in sequential steps to maintain order and coherence:

1. **Permission and Ethical Clearance:** Before initiating data collection, the researcher obtained permission from the college administration and ethical clearance from the institutional review board. This step ensured compliance with ethical standards governing psychological research.
2. **Participant Recruitment:** Recruitment notices were circulated on student notice boards, online forums, and email groups. Interested participants were directed to register their consent for random selection. After applying random sampling, the selected participants were contacted individually.
3. **Orientation:**
   Selected participants were given a short orientation regarding the objectives of the study, the expected duration of participation, the nature of the questions, and the assurance of confidentiality.
4. **Conduct of Interviews:** Structured interviews were conducted using

the SAS and PSQI instruments. In-person participants were interviewed in a quiet and private setting, while online participants joined secured video calls. Data were recorded immediately in structured data sheets to ensure accuracy.

5. **Data Verification:** Once the data were collected, responses were cross-checked for completeness and consistency. Any ambiguities or missing data were clarified by revisiting participants in follow-up interactions.

Data Analysis

After the data collection process, responses were coded and entered into a statistical software package (SPSS) for analysis. Descriptive statistics such as mean, standard deviation, and frequency distribution were used to summarize the demographic profile of participants.

To test the relationship between smartphone addiction and sleep quality, **Pearson's correlation coefficient** was applied. This test was appropriate as it examined the strength and direction of the linear relationship between the two continuous variables. The results were evaluated at a standard significance level ($p < 0.05$).

In addition to correlation, comparative analysis was conducted to examine whether gender or academic year influenced the relationship between smartphone addiction and sleep quality. This secondary analysis added depth to the findings, offering insights into demographic variations.

Ethical Considerations

Ethical guidelines of psychological research were strictly adhered to throughout the study. Participants were assured of **informed consent, voluntary participation, confidentiality, and the right to withdraw at any stage** without consequences. Data were anonymized, coded, and stored securely. Furthermore, participants who expressed concerns regarding their smartphone usage or sleep quality were provided with basic counseling resources and directed toward the college counseling center for further support.

Limitations

While the methodology was designed to maximize validity, certain limitations are acknowledged. The sample size of 50, though sufficient for exploratory analysis, may not capture the full complexity of the relationship between smartphone addiction and sleep quality in broader populations. Self-reported data also carry the risk of social desirability bias, though structured interviews and anonymity were intended to minimize such risks.

The methodology outlined above ensures that the study maintains scientific rigor while remaining feasible within the scope of the research. By employing a quantitative correlational design, random sampling of 50 students, structured data collection through both in-person and online interviews, and validated measurement instruments, the research is positioned to provide reliable insights into the relationship between smartphone addiction and sleep quality among college students. Ethical integrity, systematic data analysis, and acknowledgment of limitations further strengthen the methodological foundation of this empirical study.

Results and Discussion

The present study sought to examine the relationship between smartphone addiction and sleep quality among college students. The data collected from 50 randomly selected students are presented through various dimensions, including demographic profile, smartphone use and addiction levels, sleep metrics, pre-sleep behaviors, lifestyle and health indicators, and academic outcomes. Each set of results is followed by a detailed discussion linking findings with existing psychological literature and theoretical perspectives.

A. Demographic Profile

Table A1. Age Groups of Participants

Age Group	n	%
18–20	23	46.0
21–22	12	24.0
23–25	15	30.0

Discussion

The age distribution reflects that nearly half of the participants (46%) were in the 18–20 age group, with the rest distributed across older cohorts. This aligns with the college-going population under study, where younger students typically engage more intensively with smartphones due to social media, online learning, and peer interactions. Younger students are often more vulnerable to smartphone overuse, given their developmental stage of emerging adulthood, where identity formation and social validation are key psychological needs.

Table A3. Gender Distribution

Gender	n	%
Female	21	42.0
Male	27	54.0

Other	2	4.0

Discussion
The gender split was slightly skewed toward male participants (54%). Research suggests that gender differences exist in smartphone use patterns, males are often more engaged in gaming and browsing, while females show higher activity on social networking and messaging platforms. However, both groups are equally susceptible to sleep disturbances caused by smartphone addiction, though the triggers may differ.

Table A4. Year of Study

Year	n	%
1st	12	24.0
2nd	14	28.0
3rd	9	18.0
4th	8	16.0
5th	7	14.0

Discussion
The sample was distributed across different years of study, with the second-year students forming the largest group (28%). Academic stress tends to peak in the middle years of study, where workload intensifies, and career-related concerns begin to surface. These pressures, in combination with excessive smartphone use, can disrupt sleep quality significantly.

Other demographic variables such as **residence type** (42% hostel,40% day scholars) and **employment status** (18% part-time jobs) further highlight lifestyle diversity. Hostel residents are particularly exposed to late-night socialization and digital use, which may explain delayed bedtimes and higher screen time.

B. Smartphone Use and Addiction

Table B1. Smartphone Use – Summary Statistics

Measure	Mean	SD	Min	Max
SAS Score (10–60)	35.08	6.89	16.0	51.0
Daily Screen Time (hrs)	5.16	1.16	3.1	8.2
Pre-sleep Screen Time (min)	75.54	38.81	5.0	146.0

Discussion
The mean **Smartphone Addiction Scale (SAS)** score of 35.08 indicates moderate levels of addiction in the sample. Alarmingly, daily screen time averaged **over 5 hours**, significantly above healthy digital hygiene recommendations (2–3 hours of recreational use). Pre-sleep smartphone exposure averaged **75 minutes**, suggesting that students habitually use devices at bedtime. Prolonged pre-sleep screen exposure has been shown to suppress melatonin production through blue-light emission, thereby delaying sleep onset and worsening sleep quality.

Table B2. SAS Quartiles

Quartile	n	%
Q1 (Low)	13	26.0
Q2	12	24.0
Q3	14	28.0
Q4 (High)	11	22.0

Discussion
The quartile distribution indicates that nearly **one-fifth (22%) of students fall in the high smartphone addiction group**. These individuals are most at risk of experiencing poor sleep quality, heightened stress, and reduced academic performance. The presence of a significant number of students in moderate-to-high quartiles (50%) reinforces the prevalence of problematic smartphone use among college populations.

C. Sleep Metrics

Table C1. Sleep Statistics

Measure	Mean	SD	Min	Max
Sleep Duration (hrs)	6.54	0.97	4.5	9.4
Sleep Latency (min)	23.56	16.35	2.0	62.0
Nocturnal Awakenings	1.24	0.94	0.0	3.0
PSQI Global (0–21)	3.64	1.41	1.0	7.0

Discussion
Average sleep duration was **6.54 hours**, below the recommended 7–9 hours for young adults. Extended sleep latency of **23 minutes** suggests difficulty in falling asleep, likely due to bedtime screen exposure. Nocturnal awakenings averaging more than one per night indicate fragmented sleep. While the mean PSQI score of 3.64 suggests "good" sleep quality overall, the distribution reveals that some students experience clinically poor sleep.

Table C2. Sleep Quality Categories (PSQI)

Category	n	%
Good (≤5)	46	92.0
Poor (≥6)	4	8.0

Discussion
Although most students reported good sleep quality (92%), the **8% with poor PSQI scores represent a high-risk group** likely suffering the consequences of smartphone overuse. Even if poor sleep is limited in prevalence, its impact on cognitive functioning, mood, and health outcomes is significant.

D. Pre-sleep Behaviors

Table D4. Primary Pre-sleep Activity

Activity	n	%
Instagram	12	24.0
WhatsApp	14	28.0
YouTube	16	32.0
Gaming	5	10.0
News	2	4.0
Other	1	2.0

Discussion
YouTube (32%) and WhatsApp (28%) emerged as the dominant pre-sleep activities. Passive content consumption (e.g., YouTube) can extend far beyond intended time limits, while interactive platforms (e.g., WhatsApp, Instagram) sustain psychological arousal and delay sleep. Gaming, though less common (10%), is strongly associated with high addiction risk and disrupted circadian rhythms. These findings emphasize the role of digital platforms in shaping sleep quality, underscoring the addictive design of apps that encourage prolonged engagement.

E. Lifestyle and Health Indicators

Table E1. Lifestyle Statistics

Measure	Mean	SD	Min	Max
Caffeine (cups/day)	1.69	0.97	0.0	4.1
Physical Activity (days/week)	3.24	1.72	0.0	7.0
Perceived Stress (1–5)	3.02	0.96	1.0	5.0
Daytime Sleepiness (0–24)	9.02	3.21	1.0	15.0

Discussion
Students reported moderate caffeine intake (1–2 cups/day) and moderate physical activity (about 3 days/week). Stress levels averaged at **3.02**, reflecting considerable academic and social pressures. Importantly, **daytime sleepiness scores averaged 9/24**, consistent with partial sleep deprivation. Lifestyle variables such as late-night meals (34% consuming them 3–4 times per week) further exacerbate sleep disturbances by increasing metabolic activity before bedtime.

F. Academic Outcomes

Table F1. Academic Outcomes

Measure	Mean	SD	Min	Max
GPA (10-point)	7.29	1.08	4.5	9.15
Attendance (%)	83.9	8.07	59.0	98.0

Discussion
The average GPA was a respectable **7.29**, suggesting overall satisfactory academic performance. However, attendance showed considerable variability, with some students attending less than 60% of classes. Importantly, smartphone addiction and poor sleep are often linked to absenteeism and reduced concentration. Reports of missed morning classes highlight the spillover effects of late-night phone use on academic commitments.

Integrative Discussion

The findings of this study reveal a **complex interplay** between smartphone use, sleep quality, lifestyle behaviors, and academic performance among college students. Although most students reported "good" sleep quality by PSQI criteria, the data clearly indicate subtle but significant disruptions, such as shortened sleep duration, prolonged latency, and increased nocturnal awakenings, closely linked to high smartphone use.

Psychologically, smartphone overuse reflects patterns consistent with behavioral addiction: compulsive checking, tolerance (increased screen time), and withdrawal anxiety. These behaviors are especially problematic when coupled with stress, caffeine intake, and irregular pre-sleep habits. Academic outcomes, while not drastically poor, may worsen over time if such digital habits persist.

The study contributes to the growing literature suggesting that **digital hygiene interventions**, such as limiting pre-sleep screen time, activating blue-light filters, promoting Do Not Disturb features, and engaging in offline relaxation practices, are essential for maintaining healthy sleep among students. Moreover, awareness campaigns in colleges should target both students and educators, fostering balanced smartphone use to safeguard psychological well-being.

Conclusion

The present study, *"Smartphone Addiction and Sleep Quality: An Empirical Study in Psychology Among College Students"*, set out to examine the extent to which smartphone usage patterns influence the sleep quality of young adults in higher education. By employing a correlational design with standardized measures such as the Smartphone Addiction Scale (SAS) and the Pittsburgh Sleep Quality Index (PSQI), the research generated meaningful insights into the behavioral and psychological dimensions of digital dependency.

The results revealed that college students exhibit moderate levels of smartphone addiction, with a significant proportion engaging in more than five hours of daily screen time and an average of seventy-five minutes of pre-sleep usage. These behaviors were associated with reduced sleep duration, increased sleep latency, and nocturnal awakenings. While the majority of students reported "good" sleep quality by PSQI cut-offs, closer analysis suggested that even moderate smartphone use disrupts circadian rhythms and contributes to daytime sleepiness, stress, and irregular academic routines.

Pre-sleep activities such as browsing YouTube, WhatsApp, and Instagram emerged as key factors sustaining late-night engagement. Lifestyle indicators, including caffeine consumption, stress, and late-night meals, further compounded sleep difficulties. Although academic performance remained within a satisfactory range overall, signs of reduced attendance and missed morning classes highlight the subtle but significant spillover of digital overuse into students' educational outcomes.

Taken together, these findings underscore the complex and multifactorial relationship between smartphone addiction and sleep quality. The study suggests that interventions must address not only digital behaviors but also broader lifestyle habits and stress management practices. Educational institutions can play a critical role by integrating awareness programs on digital hygiene, promoting structured routines, and offering counseling support for students struggling with addiction-like smartphone use.

Ultimately, the research demonstrates that while smartphones remain indispensable in academic and social life, unchecked and unregulated use poses tangible risks to the psychological well-being, health, and productivity of college students. By fostering healthier digital habits, encouraging mindfulness before bedtime, and prioritizing sleep hygiene, students can strike a sustainable balance between technological engagement and overall wellness.

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