



ORIGINAL ARTICLE

Effect of Bedtime Mobile Phone Scrolling on Sleep Latency and Dream Recall among Paramedical Students

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Abstract

Background: Excessive use of mobile phones before bedtime has emerged as a growing concern among young adults, particularly students, due to its potential impact on sleep quality and circadian rhythm. Exposure to screen-based light and cognitive stimulation during the pre-sleep period may delay sleep onset and alter sleep-related experiences such as dream recall. **Objectives:** To assess the effect of bedtime mobile phone use on sleep latency, dream recall, and subjective sleep quality among paramedical students. **Methods:** A descriptive cross-sectional study was conducted among 180 paramedical students aged 18–25 years. Data were collected using a structured, pre-tested questionnaire adapted from validated sleep assessment tools. Information regarding mobile phone usage patterns, sleep latency, dream recall, and perceived sleep quality was obtained. Data were analyzed using descriptive statistics and chi-square tests to determine associations. **Results:** A majority of participants (78%) reported using mobile phones within 30 minutes before sleep. Prolonged sleep latency (>30 minutes) was significantly more common among pre bedtime phone users compared to non-users (44% vs. 16%; $p < 0.01$). Participants who used mobile phones before bedtime also reported higher frequency of dream recall and poorer subjective sleep quality. Only 14% of phone users reported feeling refreshed on waking compared to 38% of non-users. **Conclusion:** Bedtime mobile phone use is significantly associated with delayed sleep onset, increased dream recall, and poorer sleep quality among paramedical students. Promoting healthy digital habits and limiting screen exposure before sleep may improve sleep outcomes and overall well-being in this population.

Keywords: Mobile phone use, Sleep latency, Dream recall, Sleep quality, Paramedical students, Screen time

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Graphical Abstract

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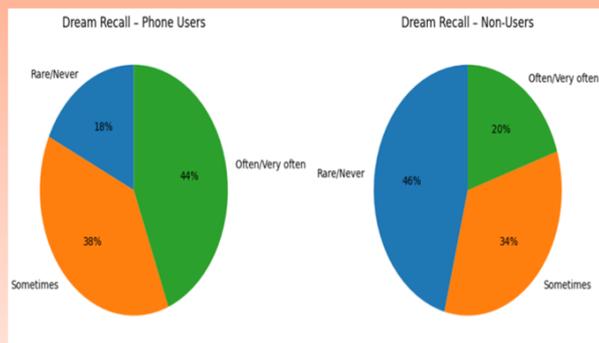
Background

Excessive use of mobile phones before bedtime has emerged as a growing concern among young adults, particularly students, due to its potential impact on sleep quality and circadian rhythm. Exposure to screen-based light and cognitive stimulation during the pre-sleep period may delay sleep onset and alter sleep-related experiences such as dream recall.

Methods

A descriptive cross-sectional study was conducted among 180 paramedical students aged 18–25 years. Data were collected using a structured, pre-tested questionnaire adapted from validated sleep assessment tools. Information regarding mobile phone usage patterns, sleep latency, dream recall, and perceived sleep quality was obtained. Data were analyzed using descriptive statistics and chi-square tests to determine associations.

Dream Recall Frequency



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Conclusions Bedtime mobile phone use is significantly associated with delayed sleep onset, increased dream recall, and poorer sleep quality among paramedical students. Promoting healthy digital habits and limiting screen exposure before sleep may improve sleep outcomes and overall well-being in this population.

Introduction

Sleep is a vital physiological process that plays a fundamental role in maintaining physical health, cognitive efficiency, emotional regulation, and overall well-being [1–3]. Adequate and good-quality sleep is essential for optimal brain functioning, including memory consolidation, learning, attention, and executive functioning [1,4]. In addition, sleep supports metabolic regulation, immune competence, cardiovascular health, and psychological stability [2,5]. Disruption of normal sleep architecture has been linked to a wide range of adverse health outcomes, including impaired academic performance, mood disturbances, metabolic dysregulation, and increased susceptibility to mental health disorders [3,6].

In recent decades, rapid technological advancements and the widespread availability of smartphones have significantly transformed lifestyle patterns, particularly among adolescents

and young adults [7]. Smartphones have become indispensable tools for communication, entertainment, education, and social interaction. However, their pervasive use—especially during nighttime hours—has raised increasing concern regarding their impact on sleep behavior. Students often engage in prolonged smartphone use before bedtime for activities such as social media browsing, video streaming, online gaming, and academic work, frequently extending screen exposure into late-night hours [7,8].

One of the primary mechanisms through which nighttime smartphone use affects sleep is exposure to short-wavelength blue light emitted from electronic screens. Blue light has been shown to suppress melatonin secretion by the pineal gland, thereby delaying circadian phase onset and increasing sleep latency [9]. In addition to photic effects, cognitive and emotional stimulation from digital content activates cortical arousal pathways, further delaying the transition from

wakefulness to sleep. The combined effects of circadian disruption and heightened arousal contribute to reduced sleep duration, fragmented sleep architecture, and poor sleep quality [4,9].

Beyond its effects on sleep onset, pre-sleep smartphone use may also influence dream-related processes. Dreaming predominantly occurs during rapid eye movement (REM) sleep, a stage that plays a crucial role in emotional processing, memory consolidation, and neural integration [1,10]. Alterations in REM sleep timing or continuity can affect both the frequency and vividness of dream experiences. Furthermore, cognitive theories of dreaming propose that dream content often reflects waking-life experiences, emotional concerns, and recent sensory inputs—a phenomenon described as “day residue” [10].

Paramedical students represent a particularly vulnerable population with respect to sleep disturbances. Academic demands, early morning clinical postings, irregular schedules, examination-related stress, and prolonged screen exposure for both educational and recreational purposes predispose this group to chronic sleep deprivation. Poor sleep quality among healthcare trainees has been associated with reduced attention, impaired learning, emotional dysregulation, and diminished academic performance, all of which may ultimately affect patient care and professional competence [3,6,8].

Despite growing evidence linking smartphone use to sleep disturbances, limited research has specifically explored the combined effects of bedtime mobile phone usage on sleep latency and dream recall among students pursuing healthcare-related education. Understanding this relationship is important not only for

promoting healthy sleep practices but also for developing targeted educational interventions aimed at improving sleep hygiene within this academically demanding population [7–10].

Aims and Objectives

The primary aim of this study is to assess the effect of bedtime mobile phone use on sleep latency among paramedical students.

In addition, the study aims to examine the association between mobile phone use before sleep and dream recall frequency.

Another important objective is to assess subjective sleep quality in relation to nighttime screen exposure. This includes evaluating individuals’ perception of sleep depth, restfulness upon awakening, and overall sleep satisfaction.

Finally, the study aims to identify patterns of mobile phone usage that contribute to altered sleep behavior among paramedical students.

Materials and Methods

Study Design

This study was designed as a descriptive cross-sectional study aimed at evaluating the association between bedtime mobile phone use, sleep latency, and dream recall among paramedical students. With the increasing dependence on smartphones for academic, social, and recreational purposes, prolonged screen exposure during nighttime has become a common behavioral pattern among young adults [11,12]. Such habits have been shown to delay sleep onset and interfere with normal sleep–wake regulation, thereby adversely affecting overall sleep health [13,14]. Understanding this relationship may provide insights into how pre-sleep mental

stimulation affects dream vividness and frequency. Previous research has demonstrated that excessive evening use of electronic devices is associated with poorer subjective sleep quality, increased sleep fragmentation, and daytime fatigue [15–17]. Exposure to emotionally arousing or cognitively stimulating digital content prior to sleep may influence dream generation and recall by altering pre-sleep cognitive activity and REM sleep processes [18]. Factors such as duration of use, type of digital content consumed, and timing of exposure will be examined to understand behavioral trends associated with poor sleep hygiene [11,16,19,20]. Identifying these patterns may help in developing targeted educational and behavioral interventions to promote healthier digital habits and improve sleep quality in this academically demanding population. A cross-sectional approach was considered appropriate to assess prevailing sleep-related behaviors and perceptions within a defined population at a single point in time [21].

Study Setting

The study was conducted among paramedical students from Sadvidya Paramedical College, Mandya District, Karnataka, India. Data collection was carried out within the academic campus environment to ensure accessibility and uniformity in participant recruitment.

Study Population

The study population consisted of undergraduate paramedical students aged between 18 and 25 years. This age group was selected as it represents young adults who are highly exposed to digital devices for both academic and recreational purposes and are therefore particularly

vulnerable to sleep disturbances related to screen use [22].

Sample Size and Sampling Technique

A total of 180 students participated in the study. Participants were selected using a convenience sampling technique based on availability and willingness to participate. Although probability sampling was not employed, efforts were made to include students from different academic years and disciplines to enhance representativeness, consistent with methodology used in similar behavioral sleep studies [23].

Inclusion Criteria

- Students aged between 18 and 25 years
- Enrolled in paramedical courses
- Regular users of smartphones for academic or personal purposes
- Willing to participate.

Exclusion Criteria

- Students with a previously diagnosed sleep disorder (e.g., insomnia, sleep apnea)
- Individuals currently using sedatives, hypnotics, or psychotropic medications
- Students with a known history of psychiatric illness, neurological disorders.
- Individuals engaged in shift work or night-duty schedules

Data Collection Tool

Data were collected after informed written consent from all participants using a structured, pre-tested, self-administered questionnaire developed after an extensive review of relevant literature. Institutional Ethical & Scientific committee clearance obtained. The questionnaire was designed to comprehensively assess mobile phone

usage patterns, sleep latency, dream recall, and subjective sleep quality. To enhance validity and reliability, components of the questionnaire were adapted from previously validated instruments used in sleep research [24].

Questionnaire Structure

Section 1: Demographic Information

This section collected basic participant details, including age, gender, academic course, and average duration of sleep per night. These variables were included to facilitate stratified analysis and comparison across subgroups.

Section 2: Mobile Phone Use and Sleep Latency

This section assessed patterns of mobile phone use before bedtime, including duration of use, timing relative to sleep onset, and type of digital content consumed. Items were adapted from validated tools assessing electronic media exposure and sleep latency, including components derived from established sleep behavior questionnaires [12,22].

Section 3: Dream Recall and Sleep Experience

This section focused on the frequency, vividness, and emotional tone of dream recall. Questions were designed based on previously validated dream recall and sleep experience instruments, evaluating the perceived influence of pre-sleep digital exposure on dream content [24].

Section 4: Sleep Quality Assessment

Subjective sleep quality was evaluated using selected components from the Pittsburgh Sleep Quality Index (PSQI) and the Sleep Hygiene Index (SHI). Participants reported perceived sleep depth,

restfulness upon awakening, and overall sleep satisfaction, as well as the perceived impact of mobile phone use on sleep quality [23,24].

Pilot Testing and Validity

The questionnaire was pilot-tested on a small group of students to assess clarity, relevance, and comprehensibility. Necessary modifications were made based on participant feedback. Participation was voluntary, informed consent was obtained prior to data collection, and confidentiality was strictly maintained throughout the study in accordance with ethical research standards [21].

Statistical analysis

Data were entered into Microsoft Excel and analyzed using SPSS software (version XX). Descriptive statistics were used to summarize demographic variables. Associations between categorical variables were assessed using Chi-square test. A p-value <0.05 was considered statistically significant.

Results

Demographic Characteristics of the Study Population

A total of 180 paramedical students participated in the study. Of these, 108 (60%) were female and 72 (40%) were male. The mean age of the participants was 20.8 ± 1.6 years, with the majority belonging to the 18–25 year age group. More than half of the participants (53.3%) reported an average sleep duration of less than 6 hours per night, indicating a high prevalence of inadequate sleep among the study population. Table 1 summarizes the demographic characteristics of the study participants.

Table 1. Demographic Characteristics of Participants (n = 180)

Variable	Frequency (%)
Gender	
Male	72 (40.0)
Female	108 (60.0)
Mean age (years)	20.8 ± 1.6
Average sleep duration < 6 hours	96 (53.3)
Average sleep duration ≥ 6 hours	84 (46.7)

Mobile Phone Usage Pattern Before Sleep

A majority of participants (78%) reported using their mobile phones within 30 minutes before going to bed. Among these, 51.1% reported scrolling for more than 30 minutes, while 26.9% used their phones for less than 30 minutes before sleep. The most commonly reported

activities included social media browsing, short video viewing, chatting, and entertainment-based content.

These findings indicate a high prevalence of bedtime mobile phone usage among paramedical students, reflecting habitual screen exposure during the pre-sleep period.

Table 2. Pattern of Mobile Phone Usage Before Sleep

Variable	Frequency (%)
Phone use within 30 min before sleep	140 (77.8)
No phone use before sleep	40 (22.2)
Duration < 30 minutes	48 (26.7)
Duration ≥ 30 minutes	92 (51.1)
Common content viewed	Social media, videos, messaging

Sleep Latency

A significant association was observed between bedtime mobile phone use and prolonged sleep latency. Among participants who reported using their mobile phones before sleep, 44% took more than 30 minutes to fall asleep. In contrast, only 16% of participants who did not use

their phones before bedtime experienced similar delays in sleep onset.

Statistical analysis using the chi-square test demonstrated a significant association between mobile phone usage before sleep and delayed sleep onset ($\chi^2 = 12.4, p < 0.01$), indicating that night time screen exposure is strongly associated with increased sleep latency.

Table 3. Association Between Mobile Phone Use and Sleep Latency

Sleep Latency	Phone Users (%)	Non-Users (%)
< 15 minutes	22	48
15–30 minutes	34	36
> 30 minutes	44	16

Dream Recall and Dream Vividness

Dream recall was notably higher among participants who used mobile phones before sleep. Approximately 44% of phone users reported frequent or vivid dreams, compared to only 20% among those who did not use mobile phones before bedtime. Many participants also reported that the content of their dreams appeared to

be influenced by material viewed on their phones prior to sleep, such as social media posts, videos, or conversations.

These findings suggest a possible association between pre-sleep cognitive stimulation and increased dream recall, supporting the concept of continuity between waking experiences and dream content (Table 4 and Figure 1).

Table 4. Dream Recall Frequency in Relation to Mobile Phone Use

Dream Recall Frequency	Phone Users (%)	Non-Users (%)
Rare/Never	18	46
Sometimes	38	34
Often/Very often	44	20

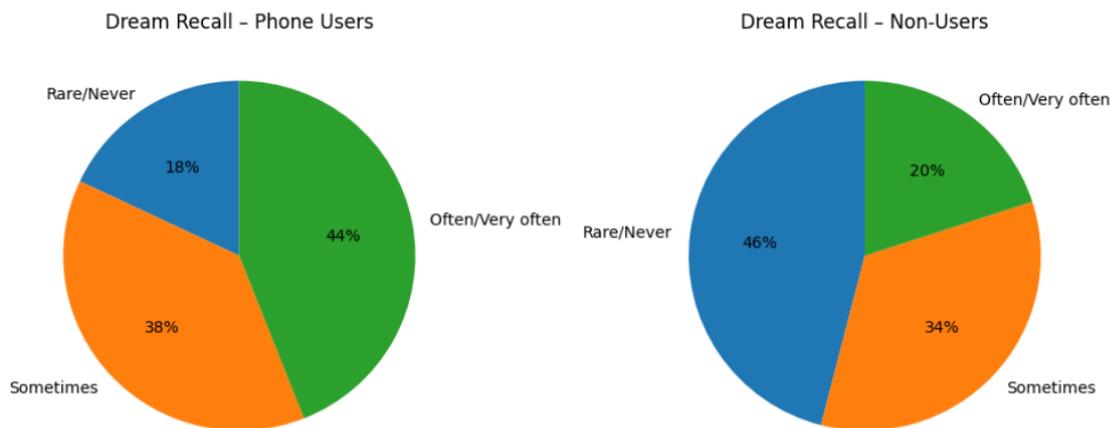


Figure 1. Dream Recall Frequency

Sleep Quality

Subjective sleep quality differed significantly between participants who used mobile phones before bedtime and those who did not. Only 14% of phone users reported feeling very refreshed upon waking, whereas 38% of non-users reported feeling refreshed. Additionally, increased

daytime sleepiness and fatigue were more commonly reported among participants with prolonged nighttime phone usage.

These findings indicate that bedtime mobile phone use is associated not only with delayed sleep onset but also with poorer overall sleep quality and reduced daytime alertness (Table 5 and Figure 2).

Table 5. Subjective Sleep Quality in Relation to Mobile Phone Use

Sleep Quality	Phone Users (%)	Non-Users (%)
Very refreshed	14	38
Moderately refreshed	32	40
Slightly tired	36	16
Very tired	18	6

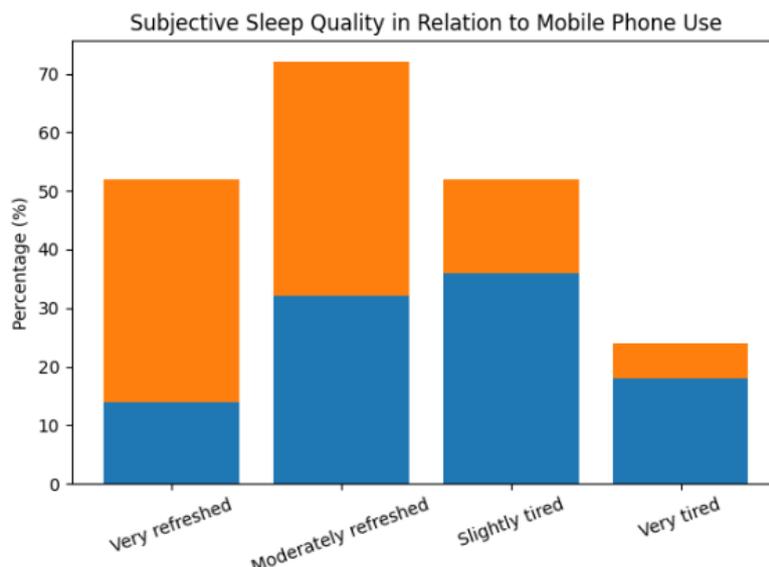


Figure 2. Subjective Sleep Quality. (Orange Bar represents Phone users in %; Blue Bar represents Non – users of Phone in %)

Discussion

The present study aimed to evaluate the relationship between bedtime mobile phone usage, sleep latency, dream recall, and overall sleep quality among paramedical students. The findings demonstrate a significant association between nighttime mobile phone use and adverse sleep outcomes, including prolonged sleep latency, increased dream recall, and poorer subjective sleep quality. These findings underscore the growing influence of digital behaviors on sleep health among young adults in academic environments [25].

A substantial proportion of participants reported using their mobile phones within 30 minutes of bedtime, with more than half engaging in screen use for over 30 minutes. This pattern is consistent with previous research indicating high prevalence of bedtime technology use among students and young adults, largely driven by academic demands, social connectivity, and entertainment needs [26]. The widespread use of smartphones during pre-sleep hours reflects a behavioral shift

that may compromise sleep hygiene in this population.

The present study demonstrated a significant association between bedtime mobile phone use and delayed sleep onset. Participants who used mobile phones before sleeping were more likely to experience prolonged sleep latency compared to non-users. This finding aligns with evidence suggesting that exposure to short-wavelength light emitted from electronic screens suppresses endogenous melatonin secretion and delays circadian phase timing, thereby impairing sleep initiation [9]. In addition, cognitive and emotional arousal induced by interactive digital content may further inhibit the physiological downregulation required for sleep onset.

An important observation in this study was the increased frequency of dream recall among participants who used mobile phones before bedtime. A higher proportion of these individuals reported vivid or frequent dreams compared to non-users. This supports the continuity hypothesis of dreaming, which proposes that waking

experiences—particularly emotionally stimulating or cognitively engaging activities—are incorporated into dream content. Increased nocturnal awakenings and lighter sleep stages associated with screen exposure may further enhance dream recall [27].

Furthermore, subjective sleep quality was significantly poorer among participants engaging in bedtime phone use. Many reported feeling unrefreshed upon waking and experiencing daytime sleepiness and fatigue. These findings are consistent with earlier studies demonstrating that excessive evening screen exposure negatively affects sleep depth, efficiency, and restorative quality. Poor sleep quality among paramedical students is of particular concern, as it may impair cognitive performance, attention, learning capacity, and clinical decision-making abilities [28].

The present findings underscore the cumulative impact of digital behaviors on sleep health. The combined effects of delayed sleep onset, fragmented sleep, increased dream recall, and reduced sleep quality may contribute to chronic sleep deprivation if such habits persist. Given that paramedical students represent future healthcare professionals, addressing these behavioral patterns is essential for maintaining both academic performance and long-term well-being.

Strengths

This study addresses an important and relevant issue among healthcare students like paramedical students, a population vulnerable to sleep disturbances due to academic stress and prolonged screen exposure. The use of a structured questionnaire adapted from validated sleep assessment tools enhances the reliability of

the findings. Inclusion of multiple sleep-related parameters such as sleep latency, dream recall, and subjective sleep quality provides a comprehensive evaluation of the impact of bedtime mobile phone use.

Limitations

The cross-sectional design limits causal interpretation of the findings. Data were self-reported, which may introduce recall and reporting bias. The study was conducted in a single institution using convenience sampling, which may limit generalizability. Objective sleep measurements and potential confounding factors such as stress and caffeine intake were not assessed. Despite these limitations, the study provides valuable insights into the relationship between mobile phone use and sleep-related outcomes in a population that is particularly vulnerable to sleep disturbances.

Future Scope

Future studies should employ longitudinal designs and objective sleep assessment tools to establish causality. Research involving larger, multi-center populations and interventional strategies focusing on reducing bedtime screen exposure may help develop effective sleep hygiene programs for students.

Conclusion

The present study demonstrates a significant association between bedtime mobile phone usage and adverse sleep outcomes among paramedical students. Increased screen exposure before sleep was associated with delayed sleep onset, higher frequency of dream recall, and poorer subjective sleep quality. These findings suggest that habitual night time mobile phone use may disrupt normal sleep

architecture and negatively impact restorative sleep.

Given the increasing reliance on smartphones in academic and personal life, there is a pressing need to promote awareness regarding healthy sleep practices among students. Educational interventions emphasizing reduced screen exposure before bedtime, digital detox strategies, and improved sleep hygiene may help mitigate sleep-related problems and enhance overall well-being. Future studies employing objective sleep assessment tools and longitudinal designs are recommended to further elucidate causal relationships and long-term consequences.

Statements and Declarations

Conflicts of interest

The authors declare that they do not have conflict of interest.

Funding

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