

Excess Screen Time and Its Impact on Sleep Quality Among Medical Students of a Tertiary Care Hospital in Southern Kerala.

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Abstract

Background: Digital device usage has become indispensable in medical education. However, excessive screen exposure may adversely affect sleep. Medical students are particularly vulnerable due to academic stress, irregular schedules, and prolonged device use. **Objectives:** To assess the impact of excess screen time on sleep quality among undergraduate medical students and to determine the association between screen time parameters and sleep quality using the Pittsburgh Sleep Quality Index (PSQI). **Materials and methods:** An institution-based cross-sectional study was conducted among 339 undergraduate medical students of Travancore Medical College, Kollam, from April to September 2024. Data was collected using a structured online questionnaire capturing sociodemographic details, screen usage patterns, and sleep quality assessed by PSQI. A global PSQI score >5 indicated poor sleep quality. Data were analyzed using SPSS version 22. Associations were tested using Chi-square test, with $p < 0.05$ considered statistically significant. **Result:** The mean sleep duration was 6.06 ± 1.11 hours. Overall, 36.6% of students had poor sleep quality. Screen time ≥ 6 hours/day was significantly associated with poor sleep quality (62.5% vs 30.5%; $p < 0.001$). Use of multiple digital devices was also significantly associated with poor sleep quality (42.0% vs 25.0%; $p = 0.002$). Students who perceived screen time as negatively affecting productivity were more likely to have poor sleep quality ($p = 0.017$). **Conclusion:** Excess screen time, particularly prolonged daily use and multiple device usage, is significantly associated with poor sleep quality among medical students. Interventions promoting screen-time regulation and sleep hygiene are essential to improve student well-being and academic performance.

Keywords: Screen time; Sleep quality; Medical students; Pittsburgh Sleep Quality Index; Digital devices.



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INTRODUCTION

Sleep is a fundamental biological process essential for physical restoration, cognitive functioning, emotional regulation, and overall well-being [1]. Adequate sleep is particularly important for medical students, who must sustain high levels of concentration, memory and decision-making during their training [2]. In recent years, sleep disturbances have become increasingly prevalent among medical students raising concerns regarding their health, academic performance and professional competence [3].

The rapid expansion of digital technology has profoundly transformed education and daily life. Screen time refers to the duration spent using electronic devices such as smartphones, laptops, tablets, computers, televisions and gaming consoles [4]. Among college students, smartphones and laptops have become indispensable tools for communication, academic learning, entertainment and social networking [5]. While these devices provide educational benefits, excessive screen exposure particularly during evening and nighttime hours has been associated with several adverse health outcomes [6].

Medical students represent a unique population with extensive reliance on digital devices for academic activities including online lectures, reference materials and exam preparation [7]. In addition to academic usage, non-academic activities such as social media browsing, streaming and gaming further increase daily screen exposure. This overlap between academic and recreational screen use often leads to prolonged and uninterrupted screen engagement [8].

Several biological mechanisms explain the relationship between screen time and sleep disturbances. Blue light emitted from electronic screens suppresses melatonin secretion, a hormone critical for regulating circadian rhythms and sleep-wake cycles [9]. Suppression of melatonin delays sleep onset, shortens total sleep duration, and impairs sleep quality. Additionally, engaging digital content increases cognitive and emotional arousal, making it difficult to transition into sleep [10].

Poor sleep quality among medical students has been associated with impaired attention, memory deficits, mood disturbances, anxiety, depression and reduced academic performance [11]. Chronic sleep deprivation may also contribute to long-term health consequences such as metabolic disorders, cardiovascular disease, and weakened immunity [12]. From a professional perspective, sleep-deprived medical students may exhibit reduced clinical judgment and empathy potentially affecting patient care [13].

Studies worldwide have reported a high prevalence of poor sleep quality among medical students, often exceeding 50% [14,15]. Excess screen time has been identified as a major contributing factor, although variations exist based on cultural context and academic structure [16]. In India, rapid smartphone penetration and increased reliance on online learning especially after the COVID-19 pandemic have further amplified screen exposure among students [17].

Despite growing evidence, region-specific data among medical students in Kerala remain limited [18]. Kerala has high literacy and digital penetration, making it particularly relevant to study the impact of screen usage on student health. Understanding local patterns of screen use and their association with sleep quality can aid in developing targeted interventions and institutional policies.

Therefore, this study was conducted with the objective

1. to assess the impact of excess screen time on sleep quality among undergraduate medical students of a tertiary care hospital in Southern Kerala, using a standardized sleep assessment tool
2. to analyse the association between screen time parameters and sleep outcomes.

MATERIALS AND METHODS

Study design and setting

Institution-based cross-sectional study conducted at Travancore Medical College, Kollam, and Kerala.

Study population

Undergraduate MBBS students from first year to final year.

Inclusion criteria

All undergraduate medical students who provided informed consent.

Exclusion criteria

Students with known sleep disorders due to medical illness or those on medication for insomnia.

Sample size and sampling

Sample size calculated as 330 based on prevalence of poor sleep quality of 73%, 95% confidence interval, and 5% precision. A total of 339 students participated using convenience sampling.

Ethical considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of Travancore Medical College, Kollam. Participation in the study was voluntary. Informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity of the participants were strictly maintained and the collected data were used solely for research purposes

Data collection tool

A structured online questionnaire consisting of:

1. Sociodemographic profile
 2. Screen usage patterns
 3. Sleep quality assessment using Pittsburgh Sleep Quality Index (PSQI)
- Global PSQI score >5 indicated poor sleep quality.

Statistical analysis

Data were analyzed using SPSS version 25. Categorical variables were expressed as proportions. Associations were assessed using Chi-square test. $p < 0.05$ was considered statistically significant.

RESULTS

Table 1: Sociodemographic profile of study participants (n=339) in a study on excess screen time and its impact on medical students in Southern Kerala.

Variable	Category	n (%)
Age	<20 years	17 (5.0)
	20–22 years	250 (73.8)
	>22 years	72 (21.2)
Gender	Male	104 (30.7)
	Female	235 (69.3)
Residence	Hosteller/PG	304 (89.7)
	Day scholar	35 (10.3)

This describes the sociodemographic characteristics of the 339 undergraduate medical students who participated in the study. The majority of the participants belonged to the age group of 20–22 years (73.8%, n = 250), followed by students aged more than 22 years (21.2%, n = 72). Only 5.0% (n = 17) of the participants were below 20 years of age. Female students constituted the majority (69.3%, n = 235), while male students accounted for 30.7% (n = 104) of the study population. Regarding residence, a large proportion of students were hostellers or staying in paying guest accommodations (89.7%, n = 304), whereas only 10.3% (n = 35) were day scholars. The study population predominantly consisted of female students aged 20–22 years, residing in hostels or PG accommodations.

Table 2: Screen use pattern of study participants in a study on excess screen time and its impact on medical students in Southern Kerala.

Parameter	Category	n (%)
Screen time/day	<6 hours	275 (81.1)
	≥6 hours	64 (18.9)
Devices used	Single	108 (31.9)
	Multiple	231 (68.1)
Primary device	Smartphone	318 (93.8)
	Others	21 (6.2)

With respect to daily screen time, 81.1% (n = 275) of students reported using electronic devices for less than 6 hours per day, while 18.9% (n = 64) reported screen time of 6 hours or more per day, indicating a substantial subgroup with prolonged screen exposure. When the number of devices used was assessed, 68.1% (n = 231) of participants reported using multiple digital devices, whereas 31.9% (n = 108) used a single device.

Smartphones were the most commonly used device, reported by 93.8% (n = 318) of the participants. Only 6.2% (n = 21) reported other devices such as laptops or tablets as their primary device.

Table 3: Sleep quality based on global PSQI score among study participants in a study on excess screen time and its impact on medical students in Southern Kerala.

Sleep quality	n	%
Good (≤5)	215	63.4
Poor (>5)	124	36.6

A PSQI score of ≤5 was considered indicative of good sleep quality, while a score of >5 indicated poor sleep quality. Among the 339 students, 63.4% (n = 215) had good sleep quality, whereas 36.6% (n = 124) were classified as having poor sleep quality. This finding indicates that more than one-third of the study population experienced poor sleep quality.

Table 4: Association between screen time and sleep quality among study participants in a study on excess screen time and its impact on medical students in Southern Kerala.

Screen time	Good sleep n (%)	Poor sleep n (%)	p-value
<6 hours	191 (69.5)	84 (30.5)	<0.001
≥6 hours	24 (37.5)	40 (62.5)	

This shows the association between daily screen time and sleep quality as assessed by the PSQI. Among students who reported screen time of less than 6 hours per day, 69.5% (n = 191) had good sleep quality, while 30.5% (n = 84) had poor sleep quality.

In contrast, among students with screen time of 6 hours or more per day, only 37.5% (n = 24) had good sleep quality, whereas a markedly higher proportion, 62.5% (n = 40), had poor sleep quality. The association between screen time and sleep quality was found to be statistically significant ($p < 0.001$). This indicates that students with prolonged screen exposure were significantly more likely to experience poor sleep quality compared to those with shorter screen duration.

DISCUSSION

This study assessed the association between excess screen time and sleep quality among undergraduate medical students in Southern Kerala. More than one-third of participants experienced poor sleep quality, highlighting sleep disturbance as a major concern. Similar prevalence rates have been reported in studies among medical students globally [14, 15].

The mean sleep duration of approximately 6 hours observed in this study is below the recommended 7–9 hours for young adults [1]. Comparable findings have been reported by previous literature suggesting that inadequate sleep is common among medical students due to academic workload and lifestyle factors contributing to reduced sleep duration among medical students [3,10].

A significant association was observed between screen time ≥ 6 hours/day and poor sleep quality. Students with higher screen exposure were more than twice as likely to have poor sleep. This finding aligns with earlier studies demonstrating a dose–response relationship between screen time and sleep disturbances [16,18]. Blue light exposure and increased cognitive arousal may delay sleep onset and disrupt circadian rhythms [9].

Multiple device usage was also significantly associated with poor sleep quality. Students using more than one device may experience prolonged exposure and increased mental stimulation, which interferes with sleep initiation [6,19].

Smartphones were the most commonly used device, consistent with previous studies [11,17]. Their portability encourages late-night use, particularly for social media and entertainment, contributing to delayed bedtime and poor sleep efficiency [20].

Overall, the findings underscore the importance of regulating screen time as a modifiable risk factor for improving sleep quality among medical students.

CONCLUSION

Excess screen time—particularly usage exceeding six hours per day and use of multiple digital devices—is significantly associated with poor sleep quality among medical students. Given the importance of sleep for academic performance and mental health, interventions promoting regulated screen use and good sleep hygiene are essential.

Strengths and Limitations

Strengths: Adequate sample size, inclusion of students from all academic years, and use of a validated sleep assessment tool.

Limitations: Single-institution study, cross-sectional design limiting causality, and reliance on self-reported data.

Recommendations

Based on the findings of the present study, it is recommended that medical students be encouraged to monitor and regulate their daily screen time, particularly limiting non-academic screen use during evening and nighttime hours. Educational institutions should incorporate structured sessions on sleep hygiene and the health effects of excessive screen exposure into the undergraduate medical curriculum. Students should be advised to avoid the use of electronic devices at least one hour before bedtime and to adopt alternative relaxation practices such as reading physical books, meditation, or light physical activity. Promoting regular physical exercise and offline recreational activities can help reduce screen dependence and improve sleep quality. Medical colleges should also develop institutional policies that balance digital learning with student well-being, including awareness programs and periodic screening for sleep disturbances, thereby fostering healthier digital habits and improving overall academic performance and mental health among medical students.

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