

Original Research Article

ELECTRONIC GADGET USE, SLEEP DISTURBANCES, AND PERCEIVED STRESS AMONG MEDICAL COLLEGE STUDENTS IN RAICHUR

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ABSTRACT

Background: Electronic gadgets have become an essential part of students' daily lives for academic, communication, and recreational purposes. Excessive gadget use has been increasingly associated with sleep disturbances, psychological stress, and adverse health outcomes, particularly among medical students who are exposed to high academic demands. **Objectives:** To assess electronic gadget use and its association with sleep disturbances and perceived stress among medical college students in Raichur.

Materials and Methods: A cross-sectional study was conducted among 400 medical students in a medical college at Raichur. Data were collected using a pretested semi-structured questionnaire. Sleep disturbances were assessed using the Pittsburgh Sleep Quality Index (PSQI), and perceived stress was evaluated using the Perceived Stress Scale (PSS). Data were analyzed using descriptive and inferential statistics. Chi-square test was used to assess associations, and $p < 0.05$ was considered statistically significant.

Results: The mean age of participants was 19.9 ± 1.4 years, and 62.5% were females. Most students (69.5%) possessed two or fewer gadgets, while 29.5% reported gadget use exceeding six hours per day. Sleep disturbances were observed in 4.0% of students. The prevalence of sleep disturbances was significantly higher among students using gadgets for more than six hours daily compared with those using gadgets for six hours or less (8.5% vs. 2.1%; $p = 0.003$). High perceived stress was present in 64.0% of participants. Students using gadgets for more than six hours daily had significantly higher odds of experiencing high stress (OR=2.90; 95% CI: 1.73-4.88; $p < 0.001$). Students with sleep disturbances were also more likely to experience high perceived stress (OR=3.78; 95% CI: 1.12-12.74; $p = 0.011$).

Conclusion: Excessive electronic gadget use among medical students was significantly associated with sleep disturbances and elevated perceived stress levels. Promoting responsible gadget use, sleep hygiene practices, and stress management interventions may improve the overall well-being of medical students.

Keywords: Electronic gadgets; Sleep disturbances; Perceived stress.

INTRODUCTION

Electronic gadgets such as smartphones, laptops, tablets, and other internet-enabled devices have become an integral part of daily life, particularly among young adults and college students. The rapid advancement in information and communication

technology, coupled with increased internet accessibility, has transformed the way students learn, communicate, and entertain themselves. In India, the implementation of the Digital India initiative and widespread availability of affordable smartphones and internet services have further accelerated gadget usage among students. Medical

students constitute a unique population due to their demanding academic schedules, frequent use of digital learning resources, online classes, e-books, and social networking platforms.^[1]

While electronic gadgets offer numerous educational advantages, excessive and prolonged use has raised concerns regarding their impact on physical and mental health. Studies have reported that extended screen time may adversely affect sleep quality, circadian rhythm, concentration, academic performance, and psychological well-being. Exposure to blue light emitted from electronic screens, especially during nighttime, suppresses melatonin secretion and delays sleep onset, resulting in sleep disturbances and poor sleep quality. Sleep deprivation among medical students has been associated with reduced cognitive performance, daytime fatigue, mood disturbances, and impaired academic achievement. Furthermore, excessive gadget use has been linked to increased levels of stress, anxiety, social isolation, and behavioral addiction.^[2]

Medical education itself is recognized as a highly stressful environment due to intensive coursework, examinations, and clinical responsibilities. The additional burden of prolonged gadget exposure may exacerbate perceived stress among students. Perceived stress refers to the degree to which individuals evaluate situations in their lives as stressful and beyond their coping abilities. Previous studies have demonstrated significant associations between excessive smartphone use, poor sleep quality, and elevated stress levels among university students.^[3]

However, the magnitude and pattern of these associations vary across populations and sociocultural settings. Limited data are available regarding the combined influence of electronic gadget use on sleep disturbances and perceived stress among medical students in Raichur. Understanding these relationships is important for developing appropriate interventions aimed at promoting healthy technology use and improving student well-being. Therefore, the present study was conducted to assess electronic gadget use and its association with sleep disturbances and perceived stress among medical college students in Raichur.^[4,5]

Aim

To assess electronic gadget use and its association with sleep disturbances and perceived stress among medical college students in Raichur.

Objectives

1. To determine the pattern and duration of electronic gadget use among medical college students.
2. To assess the prevalence of sleep disturbances among medical college students using electronic gadgets.
3. To evaluate the association between electronic gadget use, sleep disturbances, and perceived stress among medical college students.

MATERIALS AND METHODS

Source of Data

Data were collected from undergraduate medical students studying in different academic years at the medical college in Raichur using a predesigned and pretested questionnaire.

Study Design

A cross-sectional observational study was conducted.

Study Location

The study was conducted at a medical college in Raichur, Karnataka.

Study Duration

The study was conducted over a period of four months from August 2023 to January 2024.

Sample Size

A total of **400 medical students** were included in the study.

Sampling method

Systematic sampling method. Alternate students according to their attendance register were selected for the study.

Inclusion Criteria

1. Undergraduate medical students present during the data collection period.
2. Students who provided written informed consent for participation.
3. Students using at least one electronic gadget such as a smartphone, laptop, tablet, or similar device.

Exclusion Criteria

1. Students who did not provide informed consent.
2. Students with incomplete questionnaire responses.

Procedure and Methodology

Prior approval was obtained from the Institutional Ethics Committee before commencement of the study. Permission was obtained from the college authorities and respective class coordinators. The purpose and objectives of the study were explained to the students, and written informed consent was obtained.

A pretested semi-structured questionnaire was administered to all participants in their classrooms. Information regarding socio-demographic characteristics, type and duration of electronic gadget use, frequency of gadget usage before bedtime, and health-related effects was collected.

Sleep quality and sleep disturbances were assessed using the Pittsburgh Sleep Quality Index (PSQI). Perceived stress was assessed using the Perceived Stress Scale (PSS-10), a validated instrument widely used for measuring psychological stress.

Participants completed the questionnaires anonymously to ensure confidentiality and minimize reporting bias.

Sample Processing

Completed questionnaires were checked for completeness and consistency on the same day of collection. Data were coded and entered into

Microsoft Excel. The dataset was cleaned and validated before statistical analysis.

Statistical Methods

Data were analyzed using Epi Info version 6.0 and Microsoft Excel. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated. Associations between categorical variables were assessed using the Chi-square test. Continuous variables were summarized using mean $\pm$ standard deviation. A p-value of less than 0.05 was considered statistically significant.

Data Collection

Data collection was carried out using a structured self-administered questionnaire comprising three sections:

1. **Socio-demographic details** (age, gender, academic year).
2. **Electronic gadget usage profile** (type of gadget, number of gadgets owned, duration of use per day, and bedtime gadget use).
3. **Assessment scales**
Pittsburgh Sleep Quality Index (PSQI) for evaluation of sleep disturbances and sleep quality.
Perceived Stress Scale (PSS-10) for assessment of perceived stress levels.
All responses were collected anonymously and maintained confidentially throughout the study.

RESULTS

Table 1: Baseline Characteristics of Medical Students and Electronic Gadget Use (N=400)

Variable	Value n (%) / Mean $\pm$ SD	Test Statistic	95% CI	p-value
Age (years)	19.9 $\pm$ 1.4	t=284.29	19.76-20.04	<0.001*
Male	150 (37.5)	$\chi^2=25.00$	32.9-42.4	<0.001*
Female	250 (62.5)		57.6-67.1	
Age $\leq$ 18 years	66 (16.5)	$\chi^2=154.72$	13.1-20.5	<0.001*
Age 19-20 years	190 (47.5)		42.6-52.4	
Age 21-22 years	114 (28.5)		24.2-33.2	
Age >22 years	30 (7.5)		5.3-10.6	
Number of gadgets $\leq$ 2	278 (69.5)	$\chi^2=61.00$	64.8-73.8	<0.001*
Number of gadgets >2	122 (30.5)		26.2-35.2	
Daily gadget use $\leq$ 6 hours	118 (29.5)	$\chi^2=67.24$	25.2-34.2	<0.001*
Daily gadget use >6 hours	282 (70.5)		65.8-74.8	

Table 1 presents the baseline characteristics of the 400 medical students included in the study. The mean age of the participants was 19.9 $\pm$ 1.4 years (95% CI: 19.76-20.04), which was statistically significant (t=284.29, p<0.001). Female students constituted the majority of the study population, accounting for 250 (62.5%) participants, while 150 (37.5%) were males ($\chi^2=25.00$, p<0.001). Regarding age distribution, the largest proportion of students

belonged to the 19-20 years age group (47.5%), followed by 21-22 years (28.5%), $\leq$ 18 years (16.5%), and >22 years (7.5%). Most students possessed two or fewer electronic gadgets (69.5%), whereas 30.5% owned more than two gadgets ($\chi^2=61.00$, p<0.001). In terms of duration of gadget use, 282 (70.5%) students reported using gadgets for $\leq$ 6 hours per day, while 118 (29.5%) used gadgets for more than 6 hours daily ($\chi^2=67.24$, p<0.001).

Table 2: Pattern and Duration of Electronic Gadget Use among Medical Students (N=400)

Variable	n (%)	Test Statistic	95% CI	p-value
Possessed $\leq$ 2 gadgets	278 (69.5)	$\chi^2=61.00$	64.8-73.8	<0.001*
Possessed >2 gadgets	122 (30.5)		26.2-35.2	
Gadget use $\leq$ 6 hours/day	282 (70.5)	$\chi^2=67.24$	65.8-74.8	<0.001*
Gadget use >6 hours/day	118 (29.5)		25.2-34.2	
Male students using gadgets >6 hrs/day	94/150 (62.7)	$\chi^2=126.94$	54.7-70.0	<0.001*
Female students using gadgets >6 hrs/day	24/250 (9.6)		6.6-13.7	
Male students using gadgets $\leq$ 6 hrs/day	56/150 (37.3)		30.0-45.3	
Female students using gadgets $\leq$ 6 hrs/day	226/250 (90.4)		86.3-93.4	

Table 2 describes the pattern and duration of electronic gadget use among medical college students. A majority of participants, 278 (69.5%), possessed two or fewer gadgets, whereas 122 (30.5%) owned more than two devices ($\chi^2=61.00$, p<0.001). Similarly, 70.5% of students reported using gadgets for $\leq$ 6 hours per day, while 29.5% used them for more than 6 hours daily ($\chi^2=67.24$, p<0.001). A significant gender difference was

observed in the duration of gadget use. Among male students, 62.7% (94/150) reported using gadgets for more than 6 hours per day compared to only 9.6% (24/250) of female students. Conversely, 90.4% of females and 37.3% of males reported gadget use of $\leq$ 6 hours per day. This association between gender and prolonged gadget use was highly significant ($\chi^2=126.94$, p<0.001).

Table 3: Prevalence of Sleep Disturbances among Medical Students Using Electronic Gadgets (N=400)

Variable	n (%)	Test Statistic	95% CI	p-value
No sleep disturbance	384 (96.0)	$\chi^2=340.56$	93.5-97.5	<0.001*
Sleep disturbance present	16 (4.0)		2.5-6.5	
Sleep disturbance among students using ≤ 6 hrs/day gadgets	6/282 (2.1)	$\chi^2=8.73$	0.9-4.6	0.003*
Sleep disturbance among students using >6 hrs/day gadgets	10/118 (8.5)		4.7-14.9	
Students without sleep disturbance using ≤ 6 hrs/day gadgets	276/282 (97.9)		95.4-99.1	
Students without sleep disturbance using >6 hrs/day gadgets	108/118 (91.5)		85.1-95.3	

Table 3 depicts the prevalence of sleep disturbances among medical students using electronic gadgets. Overall, 384 (96.0%) students reported no sleep disturbances, whereas 16 (4.0%) experienced sleep-related difficulties ($\chi^2=340.56$, $p<0.001$). The prevalence of sleep disturbance varied according to the duration of gadget use. Among students using gadgets for ≤ 6 hours per day, only 6 of 282 (2.1%) reported sleep disturbances. In contrast, among

those using gadgets for more than 6 hours daily, 10 of 118 (8.5%) experienced sleep disturbances. The association between prolonged gadget use and sleep disturbances was statistically significant ($\chi^2=8.73$, $p=0.003$). Furthermore, the proportion of students without sleep disturbances was higher among those using gadgets for ≤ 6 hours per day (97.9%) compared to those using gadgets for >6 hours per day (91.5%).

Table 4: Association between Electronic Gadget Use, Sleep Disturbances, and Perceived Stress among Medical College Students (N=400)

Variable	Less Stress n (%)	High Stress n (%)	Test Statistic	95% CI	p-value
Gadget use ≤ 6 hrs/day (n=282)	120 (42.6)	162 (57.4)	$\chi^2=17.82$	OR=1.00 (Reference)	<0.001*
Gadget use >6 hrs/day (n=118)	24 (20.3)	94 (79.7)		OR=2.90 (1.73-4.88)	
Total (N=400)	144 (36.0)	256 (64.0)		31.3-40.9 / 59.1-68.7	
Sleep disturbance present (n=16)	2 (12.5)	14 (87.5)	$\chi^2=6.41$	OR=3.78 (1.12-12.74)	0.011*
No sleep disturbance (n=384)	142 (37.0)	242 (63.0)		Reference	

Table 4 shows the association between electronic gadget use, sleep disturbances, and perceived stress among medical college students. Overall, 256 (64.0%) students experienced high perceived stress, while 144 (36.0%) reported lower stress levels. Among students using gadgets for ≤ 6 hours per day, 57.4% experienced high stress compared to 79.7% among those using gadgets for more than 6 hours daily. Students with prolonged gadget use had 2.9 times higher odds of experiencing high stress compared with those using gadgets for ≤ 6 hours per day (OR=2.90; 95% CI: 1.73-4.88; $\chi^2=17.82$, $p<0.001$). Sleep disturbances were also significantly associated with perceived stress. Among students reporting sleep disturbances, 87.5% had high stress levels compared with 63.0% among those without sleep disturbances. Students with sleep disturbances had 3.78 times higher odds of experiencing high perceived stress than those without sleep disturbances (OR=3.78; 95% CI: 1.12-12.74; $\chi^2=6.41$, $p=0.011$).

DISCUSSION

In the present study, the mean age of medical students was 19.9 ± 1.4 years, with the majority belonging to the 19-20 years age group. Female students were more in number than males. Similar age distribution was reported by Busa et al. (2023),^[1] and Garg et al. (2023)^[2], where most medical students were young adults in the early years of medical training. The present study found that 69.5% of students possessed ≤ 2 gadgets, while 30.5% possessed >2 gadgets, suggesting that electronic gadget ownership is now common among

medical students. This finding is comparable with Anissa et al. (2024),^[4] who reported high electronic device use among health-care students, mainly for academic learning, communication, and entertainment. Increased dependence on smartphones and electronic devices among medical students has also been noted by Chatterjee and Kar (2021),^[3] who emphasized that medical students use smartphones extensively due to academic demands and easy access to digital learning resources.

Regarding duration of gadget use, 29.5% of students in the present study used gadgets for more than 6 hours/day, while 70.5% used them for ≤ 6 hours/day. Male students showed significantly higher prolonged use, with 62.7% of males using gadgets for >6 hours/day compared with only 9.6% of females. This finding is supported by Vaidya and Deshpande (2021),^[11] who reported that smartphone addiction and excessive use were more common among male medical students. Similarly, Sultana et al. (2025),^[6] found problematic smartphone use among medical students and observed its association with sleep quality, depression, anxiety, and stress. Utomo et al. (2025),^[7] also reported that smartphone overuse among university students was associated with poor sleep quality and academic-related problems. The higher gadget use among males in the present study may be due to greater use of gaming, social media, online videos, and recreational applications.

In the present study, sleep disturbance was reported by 4.0% of students, and the prevalence was higher among students using gadgets for >6 hours/day compared with those using gadgets for ≤ 6 hours/day. This association was statistically

significant. Similar findings were reported by Chatterjee and Kar (2021),^[3] who observed that smartphone addiction was positively associated with sleep disturbances among medical students. Anissa et al. (2024),^[4] also found that mobile phone use among medical students was linked with poor sleep quality. Shanmugasundaram et al. (2019),^[8] reported that high screen exposure, especially before sleep, was significantly associated with poor sleep quality among undergraduate medical students. These findings may be explained by late-night gadget use, exposure to blue light, delayed sleep onset, increased alertness, and psychological stimulation before bedtime.

The present study also demonstrated that high perceived stress was common among medical students, affecting 64.0% of participants. Students using gadgets for >6 hours/day had significantly higher odds of high stress compared with those using gadgets for ≤6 hours/day (OR=2.90; 95% CI: 1.73-4.88). This is consistent with Jha et al. (2025),^[9] who reported a close relationship between perceived stress and excessive screen usage among health-science students. Sayuti and Irfan (2024),^[16] also found that prolonged gadget use was associated with increased stress levels among adolescents and young adults. Sultana et al. (2025),^[6] further reported that mobile phone addiction was associated with perceived stress through psychological mechanisms and poor mental health outcomes. These findings suggest a bidirectional relationship, where stressed students may use gadgets excessively as a coping mechanism, while excessive gadget use may further increase stress through poor sleep, reduced academic concentration, and social comparison.

In the present study, students with sleep disturbance had 3.78 times higher odds of high perceived stress compared with those without sleep disturbance. This finding agrees with Busa et al. (2023),^[1] who reported a significant association between perceived stress and poor sleep quality among health science students. Garg et al. (2023),^[2] also observed that students with higher internet gaming disorder, perceived stress, and poor sleep quality experienced greater psychological distress. Vaidya and Deshpande (2021),^[11] found that burnout, perceived stress, sleep quality, and smartphone use were interrelated among medical students. Similarly, Al Hadi et al. (2025),^[15] reported that students exposed to greater nighttime gadget screen exposure had poorer sleep quality and higher academic stress, while Sayuti and Irfan (2024),^[16] highlighted sleep disturbance as an important link between gadget use and psychological problems.

CONCLUSION

The present study demonstrated that electronic gadget use is highly prevalent among medical college students in Raichur, with a considerable

proportion of students spending more than six hours daily on electronic devices. Prolonged gadget use was significantly associated with sleep disturbances and higher levels of perceived stress. Male students were more likely to engage in extended gadget use compared to female students. Students using gadgets for more than six hours per day had significantly greater odds of experiencing high stress and sleep-related difficulties. Furthermore, sleep disturbances were strongly associated with elevated perceived stress levels. These findings highlight the potential adverse impact of excessive electronic gadget use on the psychological well-being and sleep health of medical students. Awareness programs, promotion of healthy digital habits, stress management strategies, and sleep hygiene education may help reduce the negative consequences of excessive gadget use among medical students.

Limitations of the Study

1. The cross-sectional design of the study limits the ability to establish causal relationships between gadget use, sleep disturbances, and perceived stress.
2. Data were collected using self-reported questionnaires, which may be subject to recall bias and reporting bias.
3. The study was conducted in a single medical college, which may limit the generalizability of the findings to other student populations.
4. Information regarding the specific purpose of gadget use (academic versus recreational) was not assessed separately.
5. Sleep quality and stress levels were measured at a single point in time and may have been influenced by temporary academic or personal factors.
6. Potential confounding variables such as caffeine intake, physical activity, mental health status, and socioeconomic factors were not evaluated.
7. The study did not assess objective measures of screen time or sleep parameters using digital tracking devices.

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