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Original Research Article

Impact of screen time on sleep quality and sleep quality assessment using Pittsburgh sleep quality index among college students in Kollam district- a cross-sectional study

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ABSTRACT

Background: Screen time can be defined as the time spent using electronic device with screen. Sleep length and quality are frequently linked to excessive screen usage and exposure to screens before bedtime causes delayed sleep onset, shorter sleep duration and poor sleep quality, behavioural issues, obesity, depression, anxiety, and poor academic results.
Methods: This was a cross-sectional study done among 303 college students from six different colleges in Kollam district. Data were collected using pre-designed pre-tested interviewer administered questionnaire and analysed using SPSS trial version 26. All Qualitative variables expressed as frequency and percentages and quantitative variables using mean and standard deviation. P value <0.05 was considered as statistical significance.
Results: Mean age of the study population was 20.43±1.60 years, with a majority (75.21%) of participants being in the 18-21 age group. 75.9% (230) were female, and 51.2% (155) resides in urban area. The average screen time observed was 2.49±0.75 hours with prevalence of increased screen time 44.88% and no significant association between increased screen time and PSQI score >5. Significant association was found between the time spent using electronic devices in bed before sleep and a higher PSQI score. The study observed that sleep latency was significantly associated with poor sleep quality. Overall, 60.4% (183) had a PSQI score of ≤5, indicating good sleep quality.
Conclusions: Sleep latency and time spent on bed using electronic device before sleep was significantly associated with poor sleep quality. Overall, a notable 39.6% of students experienced poor sleep quality, underscoring the prevalence of this issue. These findings emphasize the importance of mindful electronic device use before bedtime and addressing sleep latency to improve student sleep health.

Keywords: College students, Pittsburgh sleep quality index, Screen time, Sleep quality

INTRODUCTION

The pervasive use of electronic gadgets has become an essential aspect of daily life in today's technologically advanced society, significantly impacting the routines and habits of people of all ages. This has raised concerns about potential impact of prolonged screen exposure on various aspects of health particularly sleep patterns.

Screen time can be defined as the time spent on playing video games, working on a computer or laptop, watching television, or using social media. Spending more time using these than advised is known as excessive screen time.[1] Although 2 hours per day is the ideal amount of screen usage, this might vary depending on factors including age and work.[2]

Globally on an average individuals spend 6 hours and 38 minutes daily on internet connected screens, when added across the entire user base, equals about 5 billion days spent online. A recent data indicates people spend about 40% of their waking hours looking at screens, a figure that has grown by approximately 30 minutes each day since 2013.[3]

Findings from a recent report by Redseer Strategy Consultants indicate that the average daily smartphone usage in India is 7.3 hours, with a significant portion attributed to texting, social media engagement, and consumption on OTT platforms. Comparative studies suggest that Americans spend 7.1 hours and Chinese individuals approximately 5.3 hours on their smartphones per day.[4]

The widespread use of devices, especially at late night disrupts the body's natural sleep-wake cycle. Many people are having trouble shutting off their thoughts and go to sleep because of the light stimulation in the brain.[5] Exposure to screens before bedtime can lead to delayed sleep onset, shorter sleep duration and poor sleep quality. The convenience and portability of modern devices have worsened the issue, making it harder for individuals to maintain a consistent sleep schedule.[6] Getting enough sleep fuels teenagers' growth, supports their emotional balance, and boosts their cognitive function. Sleep deprivation, however, triggers behavioral issues, obesity, depression, anxiety, and poor academic results. Adolescents are especially vulnerable to these negative effects because of their development and the pressures of school.[6]

The unprecedented surge in digital life especially during the COVID-19 pandemic has been linked to increased levels of anxiety, sadness, and negative emotions such as irritability and aggression which in turn, may contribute to a rise in cybercrime and cyberattacks, further highlighting concerns about the impact of excessive screen time. Despite the global recognition of this issue, there is limited region-specific data and this research endeavors to elucidate the particular influence of screen time on the sleep quality of individuals residing in Kollam. This geographically specific understanding is essential for formulating focused interventions and public health strategies aimed at promoting healthy screen behaviors, such as public education programs, the utilization of blue light filters on devices, and the implementation of policies that support sleep health.

Objectives

Objectives were to assess the impact of screen time and quality of sleep using Pittsburgh sleep quality index (PSQI) among the college students in Kollam district, to find out the average screen time among the college students and to find out any association between sleep patterns with screen time usage among the study population.

METHODS

Study design and settings

A multi-centric cross-sectional study was conducted among 6 colleges in Kollam district, Kerala, India from June 2025 to December 2025 for a period of 6 months. This study assessed the impact of screen time and sleep quality using Pittsburgh sleep quality index among college students.

Study population and sample size

The sample was determined from the study done by Baria et al. among undergraduate students in Gujarat, the prevalence of PSQI scores >5 was 73% (p=73).[7] Using a 95% confidence interval and an allowable error of 5%, the sample size was calculated using the formula $4pq/d^2$, yielding a minimum requirement of 303 participants. Using Stratified sampling method, 6 selected colleges-each one from dental college, nursing college, engineering college, arts college, science college and law college was grouped as strata and 50 students were randomly selected and recruited for the study.

Inclusion criteria

College students between age group 18 to 25 years, who possessed and use any form of electronic gadgets (mobiles, laptop, TV, iPad) and those who are willing to give written informed consent were included.

Exclusion criteria

Those who had any major depressive or panic disorder and those who are undergoing medical treatment for any mental health disorders were excluded.

Data collection

A structured interviewer administered questionnaire managed through face-to-face interviews by principal investigator. The questionnaire covered sociodemographic details, screen time habits of study participants and sleep quality assessment using Pittsburgh sleep quality index (PSQI).[8,9]

Statistical analysis

Data were entered and analysed using IBM SPSS trial version 29.0. All Qualitative variables like gender, place of residence and primary type of screen used was expressed as frequency and percentages and quantitative variables like age, screen time per day using mean and standard deviation.

The association between screen time and sleep quality was assessed using Chi square test. A p value <0.05 was considered as statistically significant

Ethical considerations

Ethical approval was obtained from the institutional ethics committee. Written informed consent was obtained from all participants before data collection, ensuring confidentiality, voluntary participation, and the right to withdraw at any stage.

RESULTS

A total of 303 students from six different colleges in Kollam district, with 50 students each from law, arts, science, engineering, and nursing colleges, and 53 students from the dental college participated in the study with mean age of 20.43±1.6 years, ranging from 18 to 25 years. A majority of the participants (75.21%) were in the 18-21 years age group, followed by 24.21% in the 22-25 years age group. Females constituted 75.9% (230) of the participants, while 24.1% (73) were males. Additionally, 51.2% (155) of the students resides in urban areas (Table 1).

Table 1: Sociodemographic characteristics of study participants (n=303).

Sociodemographic details	Frequency	Percentage
Age group (years)		
18-21	228	75.2
22-25	75	24.8
Gender		
Male	73	24.1
Female	230	75.9
Place of residence		
Urban	155	51.2
Rural	148	48.8

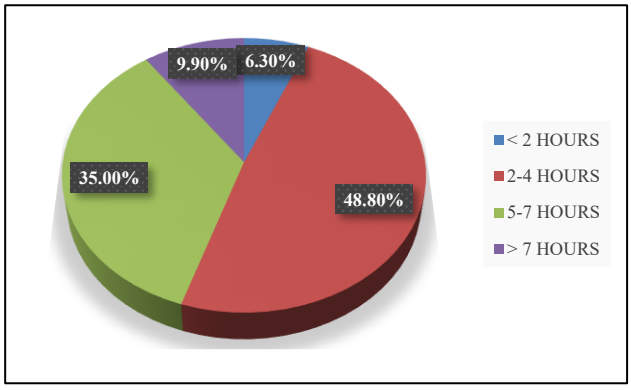

Figure 1: Distribution of study participants based on screen time usage per day (n=303).

The average screen time among the participants was 2.49±0.758 hours. Among them, 55.1% (167) reported a screen time of less than 5 hours, while 44.9% (136) had a screen time of 5 hours or more. The most common screen time duration was 2-4 hours (48.8%), followed by 5-7 hours (35%), and only 6.3% had less than 2 hours of screen exposure (Figure 1). The prevalence of increased screen time (≥5 hours) was found to be 44.88%. In this study, it was observed that there is no significant association between screen time of the participants and PSQI (p>0.005).

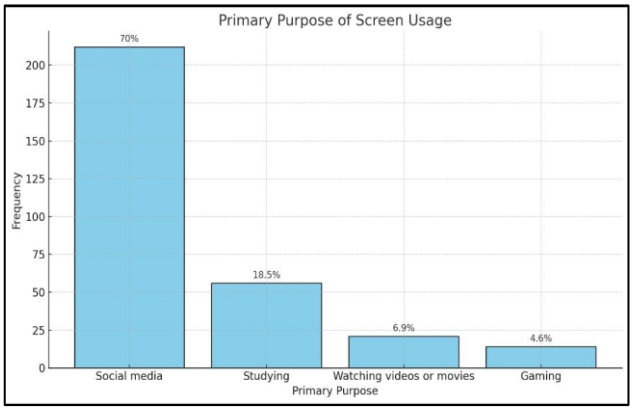

Figure 2: Primary purpose of screen usage among the study participants (n=303).

Smartphones were the most commonly used screen type among participants (89.8%), followed by computers (4%), televisions (3%), tablets (3%), and gaming devices (0.2%). Regarding the primary purpose of screen use, 70% used devices for social media, 18.5% for academic purposes, and the rest for other activities (Figure 2).

Table 2: Association between time spent on electronic device on bed before sleep and PSQI (n=303).

Time spent using electronic device on bed before sleep	PSQI less than or equals 5 (good sleep quality)	PSQI more than 5 (bad sleep quality)	P value
Less than or equals 30 minutes	119	45	0.000
More than 30 minutes	64	75	

When analyzing screen time before sleep, 54.1% of participants spent less than 30 minutes on electronic devices while in bed, whereas 45.9% spent more than 30 minutes. A statistically significant association was observed between screen use duration in bed before sleep and PSQI score (p=0.00) (Table 2). While 71.6% of participants believed that excessive screen time affects sleep, only 41.5% reported parental intervention to reduce their screen exposure.

Sleep quality assessment

Sleep quality assessment using Pittsburgh sleep quality index (PSQI) questionnaire (Table 3) revealed that 17.1% of participants rated their subjective sleep quality as fairly

bad or very bad. A majority (59.7%) reported a sleep duration of 5-7 hours per day, while 27.1% experienced sleep disturbances due to factors such as night-time awakenings, bathroom needs, or breathing difficulties.

Table 3: Sleep quality assessment of study participant based on Pittsburg sleep quality index (n=303).

Sleep quality assessment		
	Frequency (n=303)	**Percentage**
Component 1- subjective sleep quality score		
Good	251	82.9
Bad	58	17.1
Component 2- sleep latency score		
<15 minutes	123	40.6
16-30 minutes	116	38.3
30-60 minutes	48	15.8
>60 minutes	16	5.3
Component 3- sleep duration		
<5 hours	16	5.3
5-7 hours	187	59.7
>7 hours	100	33
Component 4- sleep efficiency		
>85%	192	63.4
65-84%	99	32.6
<65%	12	4
Component 5- sleep disturbance		
Yes	221	72.9
No	82	27.1
Component 6- use of sleep medication		
Yes	29	9.6
No	274	90.4
Component 7- daytime disfunction		
Yes	160	52.8
No	142	47.2

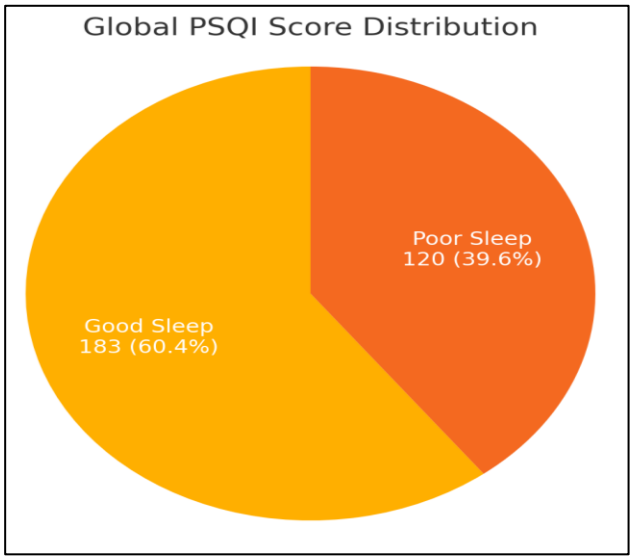

Figure 3: Global Pittsburg sleep quality index distribution (n=303).

Sleep medication usage was reported by 9.6% of the participants. Additionally, 52.8% reported daytime dysfunction due to poor sleep. Only 40.6% had a sleep latency of less than 15 minutes, and a significant association was observed between increased sleep latency and poor sleep quality (p=0.00).

Sleep efficiency below 65% was noted in only 4% of students. Based on PSQI scores, 60.4% (183) of participants had a score ≤5, indicating good sleep quality, while 39.6% had a score >5, reflecting poor sleep quality (Figure 3). The highest PSQI score observed was 16, and the lowest was 1. The prevalence of PSQI >5 in this study was found to be 39.6%.

DISCUSSION

This cross-sectional study evaluated the impact of screen time on sleep quality among college students in Kollam district using the Pittsburgh sleep quality index (PSQI). The findings reflect current trends among youth, where screen exposure is a dominant part of daily life and increasingly influences health outcomes.

In the present study, the average screen time was 2.49±0.758 hours, with nearly 45% reporting a screen time ≥5 hours. Although this figure is lower than the national average of 7.3 hours/day reported among Indian smartphone users, it still highlights considerable daily exposure.[4] These findings are consistent with John and Pokale, who reported a high prevalence of excess screen time among rural secondary school students, indicating that digital overuse spans across urban and rural regions.[2]

The smartphone was the most commonly used device (89.8%), primarily for social media use (70%), aligning with the screen time usage trends presented in the exploding topics report.[3] Similar findings were noted in studies from Andhra Pradesh and West Bengal, which identified smartphones as the dominant source of screen exposure among medical students.[1,5]

Interestingly, this study found no statistically significant association between total daily screen time and PSQI scores (p>0.005). A similar result was observed by Pradeep et al and Baria et al, where screen time did not significantly influence sleep quality.[1,7] In contrast, studies by Negi et al and Prashanthi et al reported a strong association between longer screen exposure and poor sleep quality, indicating that the effect may vary with context, screen content, or population characteristics.[10,11]

However, a statistically significant association was observed between screen time in bed before sleep and poor PSQI scores (p=0.000). Participants using screens for over 30 minutes before sleep had significantly worse sleep quality. This supports results from studies by Ghosh et al, Jain et al, and Bailam et al, who found that bedtime screen use delays sleep onset and worsens overall sleep patterns.[5,6,12] Mechanistically, this is thought to be due to

blue light exposure and mental stimulation, which disrupt circadian rhythms.[13]

Component-wise PSQI analysis further revealed key findings. While 82.9% rated their sleep quality as "good", a large proportion had suboptimal sleep duration (59.7% slept only 5-7 hours), increased sleep latency, and daytime dysfunction (52.8%). These reflect patterns reported by Haque et al, who documented sleep dissatisfaction and daytime fatigue among Indian medical students with high device use.[14] Our finding of a significant association between increased sleep latency and poor PSQI is in line with the results of Baria et al and Albalawi et al, highlighting how delayed sleep onset contributes heavily to poor sleep quality.[7,15]

Furthermore, the use of sleep medication (9.6%) and sleep disturbances (72.9%) suggest that many students are facing early signs of digital-related sleep disorders. Similar observations were made by Kumar et al in school-aged children and by Albalawi et al among Saudi college students, reinforcing the global concern of screen-induced sleep issues.[15,16]

Notably, only 41.5% of parents reported intervening in their children's screen habits despite 71.6% of students acknowledging its negative effect on sleep. This reflects the growing awareness-behavior gap, as seen in multiple Indian studies where students are aware of sleep disruption but fail to implement proper screen hygiene.[2,7,11]

The study has some limitations like self-reported screen time and sleep patterns may be subject to recall bias or social desirability bias. The study population was limited to college students in Kollam district and may not be generalizable to students in other geographic areas or different educational or socioeconomic backgrounds. The study did not account for confounding variables such as mental health status, academic workload, caffeine consumption, or physical activity levels that may influence sleep quality.

Future longitudinal and interventional studies are warranted to explore the causal relationship between screen time and sleep disturbances. Educational campaigns promoting awareness of sleep hygiene and screen-use behavior, particularly before bedtime, should be implemented among college students. Institutions should consider integrating digital wellness and mental health modules into student orientation or wellness programs. Parents and educators must be encouraged to engage in open discussions and provide support in limiting unnecessary screen exposure, especially during nighttime hours. Public health policies could explore the inclusion of screen time guidelines as part of adolescent and youth health strategies.

CONCLUSION

The study assessed the impact of screen time on sleep quality among college students in Kollam district using the Pittsburgh sleep quality index (PSQI). Overall, 39.6% of the study population had poor sleep quality (PSQI>5), highlighting the need for increased awareness and behavioral interventions focusing on sleep hygiene and healthy screen habits. The findings emphasize the importance of regulating bedtime screen usage rather than focusing solely on total screen time in promoting better sleep among college students. The majority of students relied on smartphones for screen-based activities, with social media being the most common use. Although a large number of students were aware of the negative impact of excessive screen time on sleep, parental intervention in limiting screen exposure was relatively low. Targeted interventions addressing these modifiable screen behaviors can potentially enhance sleep health and overall well-being among college students.

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