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Screen Time and Its Association with Sleep Disorders in Adults: A Cross-Sectional Study

Taqqadus Azad[1], Muhammad Hadi Khan[2], Muhammad Sufyan Ullah[3], Sarah Chaudhry[4], Hafiz Usama Ahmad[5], Huzaifa Hijazi[3]

[1]Department of Anaesthesia, PAF Hospital, Islamabad, Pakistan
[2]Department of Surgery, St. Luke's General Hospital, Kilkenny, Ireland.
[3]Shaikh Khalifa Bin Zayed Al Nahyan Medical and Dental College, Lahore, Punjab, Pakistan.
[4]Department of Surgery, Sheikh Zaid Hospital, Lahore, Punjab, Pakistan.
[5]Department of Internal Medicine, Bolan Medical Complex Hospital, Quetta, Balochistan, Pakistan.

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Correspondence to: Muhammad Hadi Khan,
Department of Surgery, St. Luke's General Hospital, Kilkenny, Ireland.
Email: hadikhanniazi@gmail.com

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ABSTRACT

Background: Prolonged use of electronic devices has become a routine part of daily life and is increasingly recognized as a contributor to poor sleep health. Sleep disturbances linked to screen exposure are an emerging public health concern. **Objective:** To assess the association between screen time and sleep disorders among adults. **Methods:** A cross-sectional study was conducted from January 2024 to January 2025 on 82 adults at Services Hospital, Lahore. Data were collected using a structured questionnaire that included demographic characteristics, screen time patterns, and sleep-related variables. Standardized instruments such as the Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS) were used. Statistical analysis was performed using chi-square tests and t-tests, with $p < 0.05$ considered significant. **Results:** The majority of participants (62.2%) reported poor sleep quality, while 35.4% slept less than six hours daily. Excessive screen exposure was strongly associated with disturbed sleep. Participants with more than six hours of daily screen use showed a 94.7% prevalence of poor sleep quality compared with 21.4% among those with less than two hours ($p = 0.001$). Smartphone use and pre-bedtime screen exposure were significantly correlated with delayed sleep onset and daytime sleepiness. **Conclusion:** Excessive screen time, particularly in the evening, is significantly associated with poor sleep quality and reduced sleep duration in adults. Reducing screen exposure before bedtime may help improve sleep hygiene and overall health.

INTRODUCTION

Sleep is a fundamental biological process essential for physical, cognitive, and emotional well-being. Despite its importance, sleep disturbances are increasingly prevalent worldwide, partly due to the rapid integration of technology into everyday life. The widespread availability of smartphones, laptops, and other digital devices has altered lifestyle patterns, particularly among younger and working-age adults [1, 2]. One consequence of this digital shift is the extension of screen use into evening hours, which has been linked to disrupted circadian rhythms and reduced melatonin production[3].

Evidence from multiple studies indicates that prolonged screen exposure is associated with shorter sleep duration, delayed sleep onset, and poor subjective sleep quality. Studies reported that exposure to light-emitting devices before bedtime suppresses melatonin and increases alertness, delaying the onset of sleep [4, 5]. Similarly, study emphasized that both the duration and timing of screen use are critical determinants of sleep quality, with excessive nighttime exposure contributing to insomnia symptoms [6].

While much of the research on screen use and sleep has focused on adolescents and young adults, adults across all age groups are also vulnerable to these effects. Busy work schedules, social media engagement, and entertainment consumption often extend screen exposure late into the night, potentially leading to chronic sleep disruption. Such disturbances not only impair daily functioning and productivity but may also increase the risk of long-term health problems, including cardiovascular disease, obesity, and mental health disorders [7-9].

In this context, the current investigation was undertaken to evaluate the relationship between screen time and sleep disorders in adults. The study focuses on quantifying daily screen exposure, identifying device-specific patterns, and analyzing their associations with key sleep outcomes such as sleep duration, sleep quality, and daytime sleepiness. By examining these associations, the

study contributes to the growing body of evidence on the health implications of technology use in modern society.

METHODOLOGY

This research was designed as a cross-sectional study conducted over a period of twelve months, from January 2024 to January 2025. The study aimed to assess the association between screen time and sleep disorders among adults. Ethical approval was obtained from the institutional review board prior to data collection. Written informed consent was obtained from each participant. Anonymity and confidentiality were ensured throughout the process, and participation was voluntary with the option to withdraw at any stage without penalty.

The study was carried out at Services Hospital, Lahore , which provided access to a diverse adult population suitable for community-based health research.

A total of 82 adult participants were enrolled. The sample size was calculated considering the expected prevalence of sleep disturbances among screen users, with a margin of error of 5% and a 95% confidence interval. Participants were selected using a convenient sampling technique, including individuals who met the eligibility criteria and consented to participate during the study period.

- **Inclusion criteria:** Adults aged 18 years and above, both male and female, who owned or used electronic devices such as smartphones, laptops, computers, or televisions, and were willing to provide informed consent.
- **Exclusion criteria:** Individuals with diagnosed psychiatric illness, chronic neurological disorders, shift workers, or those on medications known to influence sleep patterns were excluded to reduce confounding effects.

Data were collected using a structured questionnaire developed after reviewing relevant literature and validated through expert consultation. The tool comprised three main sections:

1. Demographic profile: Age, gender, marital status, education, occupation, and socioeconomic status.
2. Screen time assessment: Average daily screen time, type of device used, purpose of use, and timing of screen use before sleep.
3. Sleep characteristics: Sleep duration, sleep quality, sleep onset latency, nighttime awakenings, and presence of daytime sleepiness.

Standardized tools such as the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale (ESS) were incorporated for objective assessment of sleep outcomes.

Data were entered into SPSS version 26 for analysis. Continuous variables such as age and sleep duration were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. The association between screen time and sleep-related outcomes was tested using the Chi-square test for categorical variables, while independent t-tests were applied where appropriate. A p-value of <0.05 was considered statistically significant.

RESULTS

The study included 82 adults with a mean age of 34.6 ± 9.8 years, representing a predominantly young and middle-aged population. The gender distribution was equal, with males and females each comprising 50% of participants. A majority were married (59.8%), while 34.1% were single and 6.1% were divorced or widowed. In terms of education, nearly half (47.6%) had completed graduation, 26.8% were postgraduates, and 25.6% had secondary or lower education. Regarding occupation, 56.1% were employed, 29.3% were students, and 14.6% were unemployed or retired. None of these demographic variables showed significant associations with sleep disorders (p > 0.05).

Table 1

Demographic Characteristics of Participants (n = 82)

Variables	Categories	Frequency (n)	Percentage (%)	P-value
Age (years)	Mean ± SD = 34.6 ± 9.8	–	–	–
Gender	Male	41	50.0	0.62
	Female	41	50.0	
Marital status	Single	28	34.1	0.44
	Married	49	59.8	
	Divorced/Widowed	5	6.1	
Education level	Secondary or less	21	25.6	0.39
	Graduate	39	47.6	
	Postgraduate	22	26.8	
Occupation	Employed	46	56.1	0.51
	Student	24	29.3	
	Unemployed/Retired	12	14.6	

Patterns of screen use indicated that the majority of participants (34.1%) reported using screens for 2–4 hours daily, followed by 28.0% with 4–6 hours, and 20.8% exceeding 6 hours per day. Only 17.1% managed to keep screen exposure below 2 hours. Smartphones were the most frequently used devices (56.1%), with laptops or computers (26.8%) and televisions (17.1%) being less common. Importantly, 67.1% reported using screens before bedtime, a behavior significantly associated with poorer sleep quality (p = 0.02). Prolonged screen time overall showed a strong association with sleep disturbances (p = 0.001).

Table 2

Screen Time Patterns of Participants

Variables	Categories	Frequency (n)	Percentage (%)	p-value
Average daily screen time	<2 hours	14	17.1	0.001*
	2–4 hours	28	34.1	
	4–6 hours	23	28.0	
	>6 hours	17	20.8	
Device type used	Smartphone	46	56.1	0.03*
	Laptop/Computer	22	26.8	
	Television	14	17.1	
Screen use before bed	Yes	55	67.1	0.02*
	No	27	32.9	

When sleep patterns were assessed, 51.2% of adults reported sleeping 6–8 hours per night, while 35.4% slept less than 6 hours, and only 13.4% exceeded 8 hours. More

than half (62.2%) reported poor sleep quality, a finding that was statistically significant (p = 0.003). Sleep onset latency was prolonged in 57.3% of individuals, who took more than 30 minutes to fall asleep (p = 0.04). Daytime sleepiness was reported by 46.3%, which also showed significant association with prolonged screen exposure (p = 0.02).

Table 3

Sleep Characteristics of Participants

Variable	Categories	Frequency (n)	Percentage (%)	p-value
Sleep duration	<6 hours	29	35.4	0.001*
	6–8 hours	42	51.2	
	>8 hours	11	13.4	
Sleep quality	Good	31	37.8	0.003*
	Poor	51	62.2	
Sleep onset latency	<30 minutes	35	42.7	0.04*
	>30 minutes	47	57.3	
Daytime sleepiness	Yes	38	46.3	0.02*
	No	44	53.7	

A strong inverse relationship was found between screen exposure and sleep quality. Among participants with screen use less than 2 hours per day, the majority (**78.6%**) reported good sleep quality. By contrast, at **4–6 hours of screen time**, **78.3%** reported poor sleep, and at more than 6 hours, this proportion rose to **94.7%**, leaving only one participant with good sleep. The trend was highly significant (p = 0.001), confirming that longer screen exposure was closely associated with disturbed sleep quality in adults.

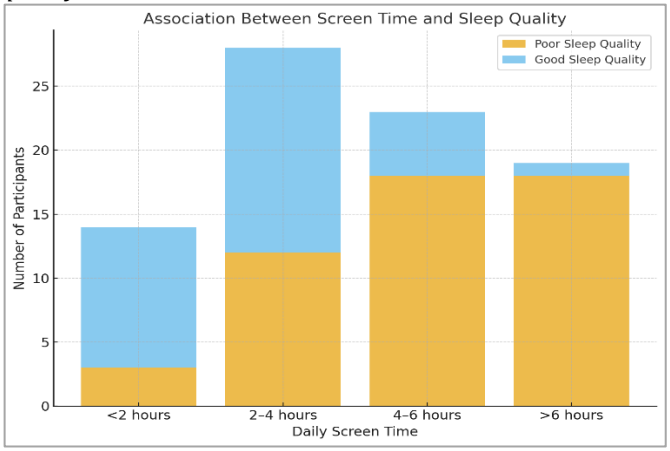
Table 4

Association Between Screen Time and Sleep Outcomes

Screen Time (hrs/day)	Poor Sleep Quality (n=51)	Good Sleep Quality (n=31)	p-value
<2 hours	3	11	0.001*
2–4 hours	12	16	
4–6 hours	18	5	
>6 hours	18	1	

Figure 1

stacked bar graph showing the association between daily screen time and sleep quality. It highlights that as screen time increases, the proportion of participants with poor sleep quality rises sharply, while those with good sleep quality decrease.



DISCUSSION

The findings highlight a significant association between prolonged screen exposure and disturbed sleep patterns among adults. The majority of participants reporting more than four hours of daily screen use experienced poor sleep quality, shorter sleep duration, and increased daytime sleepiness. These results align with earlier evidence indicating that excessive screen engagement disrupts circadian rhythms and delays melatonin secretion, both of which are crucial for maintaining healthy sleep cycles [10-12].

Research has consistently demonstrated that evening screen use, especially involving smartphones and tablets, contributes to delayed sleep onset and reduced sleep efficiency. For example, a studies conducted among young adults showed that late-night mobile phone use was strongly linked to sleep disturbances and impaired alertness during the day [13-15]. Similarly, review confirmed that screen-based media use is associated with shorter sleep duration and increased risk of poor sleep quality across different populations [16, 17]. The present findings reinforce these observations, as a significant proportion of participants using screens before bedtime reported delayed sleep initiation and suboptimal sleep quality.

The type of device used also played an important role, with smartphone users showing a higher likelihood of disturbed sleep compared to television or computer users. This may be attributed to the portability and interactive nature of smartphones, which promote prolonged engagement and exposure to blue light. Consistent with this, a studies reported that increased smartphone dependency among adults was associated with insomnia symptoms and reduced overall sleep satisfaction [18, 19].

Another important observation is the presence of daytime sleepiness among nearly half of the participants, suggesting that sleep disruptions have a direct impact on daily functioning and wellbeing. This is supported by findings by study, who reported that adults with excessive screen exposure were more likely to experience fatigue, poor concentration, and lower productivity during the day [20].

The dose response relationship between screen time and sleep quality is particularly noteworthy. Participants with more than six hours of daily screen exposure showed the highest prevalence of poor sleep, a pattern consistent with the results of study, who emphasized that the longer the screen time, the greater the adverse impact on sleep outcomes [21].

Despite the strength of these associations, it is important to recognize potential limitations. The cross-sectional design restricts the ability to infer causality, and confounding factors such as caffeine use, physical activity, or psychological stress could also influence sleep outcomes. Nevertheless, the findings add to the growing body of literature underscoring the detrimental effect of prolonged screen exposure on adult sleep health.

CONCLUSION

Excessive screen time, particularly during evening hours, is strongly associated with poor sleep quality, reduced sleep duration, and increased daytime sleepiness among

adults. Smartphone use and pre-bedtime screen exposure were identified as significant contributors to these disturbances. The evidence suggests that interventions aimed at limiting screen exposure, especially before bedtime, could play an essential role in improving sleep hygiene and overall health in adult populations.

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