

Research Paper

## Blue Light, Sleepless Nights: The Influence of Pre-Bedtime Screen Use on Sleep Quality Among School Teachers

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### ABSTRACT

The growing use of digital screens in modern life has raised questions about their influence on sleep, especially among working professionals. This investigation explored how evening screen exposure affects sleep quality in a sample of 100 school teachers (28 males, 72 females) in India. Data were collected through a cross-sectional survey in which participants reported their average daily screen use, the time they stopped using screens before bed, and their sleep quality, assessed with the Pittsburgh Sleep Quality Index (PSQI). Descriptive and correlational analyses revealed a statistically significant but weak positive association between screen time and poor sleep quality, indicating that higher screen use was linked to slightly poorer sleep outcome. These findings suggest that screen exposure may have a modest influence on sleep among teachers, while other personal and lifestyle factors may also play an important role. The study is limited by its reliance on self-report measures, modest sample size, and cross-sectional design. Future research would benefit from longitudinal or experimental approaches, objective sleep tracking, and consider additional lifestyle and psychological factors that shape sleep quality.

**Keywords:** *Screen Time, Sleep Quality, PSQI, School Teachers, Sleep Hygiene, Digital Habits*

Over the past decade, the widespread availability of digital devices—including smartphones, tablets, and laptops—has drastically changed everyday patterns, including sleep habits. The prevalence of using screens right before bed has increased; according to estimates from throughout the world, more than 70% of adults spend an hour on electronic screens before going to bed (Kang et al., 2021). According to (Lemola et al., 2015), research continuously demonstrates that using screen-based devices right before bed causes sleep disruption by delaying the generation of melatonin, raising emotional and cognitive arousal and displacing overall sleep duration. According to Hale & Guan, (2015) evening exposure to blue light producing gadgets has been associated with increased daytime weariness, decreased sleep efficiency, and delayed sleep start. According to a recent extensive study by Zeytinoglu et al. (2023) using a smartphone right before bed was linked to more severe cases of insomnia and decreased sleep satisfaction, especially in those who accessed emotionally charged content on their devices.

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Despite increased awareness, most of the research on screen-related sleep disruption has concentrated on clinical groups, teenagers, or general adult populations. Nonetheless, this matter must be examined into particular occupational settings. Teachers are one such group, as their professional duties, such as lesson planning, grading, and online communication, frequently take place outside of conventional business hours. Research indicates that compared to other occupations, teachers are more likely to experience burnout, emotional exhaustion, and sleep difficulties (Allen et al., 2021). These dangers could be made worse by increased evening screen time, particularly for work-related purposes. For instance, compared to other professionals, instructors who used remote instruction reported more stress and more trouble falling asleep, according to a research by Salfi et al. (2022).

Moreover, in the post-pandemic educational context, digital work habits have become more deeply embedded in the teaching profession. Evening screen exposure—whether for preparing digital lessons, checking school apps, or browsing social media—may contribute to both physiological sleep disruption and psychological overstimulation, leading to poorer sleep quality and lower recovery from daily stressors. Yet, there is a noticeable absence of research focusing specifically on school teachers, particularly within non-Western contexts like India, where cultural, technological, and occupational factors may uniquely influence bedtime screen use.

This study intends to close that gap by investigating the connection between school teachers' sleep quality and screen time before bed, concentrating on the kind and timing of screen time, and placing it within the framework of their work obligations. The results could provide insightful information about sleep health.

### **REVIEW OF LITERATURE**

The negative impact of screen usage before bedtime on sleep quality has been repeatedly shown by recent studies. Using wearable cameras and actigraphy, Brosnan et al. (2024) found that using screens after bed, particularly interactive ones like gaming, resulted in a considerably delayed onset of sleep and a shorter length of sleep. Carter et al. (2016) provided support for this claim by doing a meta-analysis of 20 research and discovering that children and adolescents' sleep duration and quality were negatively impacted by the mere presence of screen-based gadgets in the bedroom, independent of their use. In a laboratory investigation, Chang et al. (2014) showed that using e-readers right before bed reduced melatonin, postponed REM sleep, and decreased alertness the following morning as a result of exposure to blue light. In a large adult sample, Exelmans and Van Den Bulck (2016) found that using a mobile phone right before bed, particularly for social media, was linked to shorter sleep duration, lower subjective sleep quality, and delayed sleep.

After reviewing several studies, Hale et al. (2018) determined that screen use disturbs children's and adolescents' sleep through four mechanisms: light exposure, time displacement, psychological stimulation, and physiological arousal. They emphasized the need to remove devices from the bedroom. In their analysis of data from more than 120,000 participants, Zhong et al. (2025) discovered that using a screen an hour before bed was associated with a 33% increase in poor sleep quality, with evening chronotypes exhibiting the most deficits. According to a study by Orzech et al. (2015), university students who used screens more frequently had shorter sleep durations overall, but the negative effects of music and internet surfing were more pronounced than those of other activities. According to Mireku et al. (2019) teenagers who use their phones in the dark right before bed are more

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likely to experience inadequate sleep and have a much lower quality of life in terms of their health. In a similar vein, Hartley et al. (2022) discovered that using screens after lights out raised the risk of sleep deprivation and symptoms of insomnia in teenagers, with the effects getting worse the longer or later the screen was used.

An Indian cross-sectional study during COVID-19 found that 85% of adults exceeded two hours of daily screen use, with 59% experiencing clinical insomnia, showing a strong association between screen exposure and poor sleep (Influence of Screen Time, 2020). In contrast, Chaudhry et al. (2024) found no significant relationship between smartphone use and sleep in a small sample of university students, though they noted that the findings were limited by sample size and design. Schrempft et al. (2024), in a population-based cohort study, reported that frequent bedtime screen users had twice the odds of going to bed after midnight and a 47% higher chance of daytime sleepiness, especially among those with better mental health. Fossum et al. (2013) found that students who used media in bed—especially mobile phones and computers—reported more insomnia symptoms but not increased daytime sleepiness, suggesting screen use mainly affects sleep onset rather than daytime alertness. Chkhaidze et al. (2024) tracked young adults using sleep trackers and found that device use before bed was linked to 20 minutes less self-reported sleep, although objective sleep metrics didn't show significant differences.

Tian et al. (2025) discovered that using smartphones for more than one hour before bed was associated with a 9.1% higher risk of anxiety symptoms, with this association stronger among women, suggesting a link between bedtime screen use, sleep, and emotional well-being. Hjetland et al. (2025), in a large sample of young adults, showed that every hour of in-bed screen uses reduced sleep by 24 minutes and increased the odds of insomnia by 59%, regardless of screen activity type. A second analysis by Zhong et al. (2025) echoed these results, showing consistent bedtime delays and reduced weekly sleep duration among adults who used screens nightly. Hale et al. (2018) reiterated that both active and passive screen exposure in bedrooms leads to later sleep times and reduced quality, especially in youth. Lastly, Schrempft et al. (2024) emphasized that bedtime screen use predicted insomnia and poor sleep outcomes more in mentally healthy individuals and recommended tailoring interventions based on individual vulnerability factors like chronotype and mental health status.

### ***Research gap***

In Selangor, Malaysia, for instance, 61% of secondary school teachers reported having poor sleep due to stress and prolonged work-related duties (such as entering test data late at night), despite research showing high rates of poor sleep quality among teachers. Strongly implicated—very few research have looked at the precise function of screen time before bed in this population. Another study of university professors found that emergency remote teaching during the COVID-19 epidemic increased screen use and was highly associated with insomnia and poor sleep, particularly for those using screens in the nighttime. According to a cross-sectional study conducted in Ahmedabad, screen time prior to bed was a major predictor of poorer sleep quality for persons between the ages of 18 and 40. Stress, physical activity, and napping habits also had a significant impact.

Despite these insights, no study has specifically targeted school teachers, who combine occupational screen exposure (lesson planning, grading, administrative systems) with heightened emotional stress and early start times. The current literature thus lacks

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investigation into how teachers' bedtime screen habits—particularly the timing (evening vs. late-night), type of activity (grading, lesson preparation, social media), and emotional content (work-related tasks versus personal use)—interact with occupational stress and impact sleep quality. Importantly, cultural context remains underexamined: there is a lack of data on Indian teachers, despite rapid digital adoption in education. This study is required to close these gaps by investigating the relationship between Indian school teachers' bedtime screen use and sleep quality while taking work related screen tasks, emotional stress and sleep hygiene techniques unique to this field and setting.

### **METHODOLOGY**

#### ***Procedure***

The study's participants were chosen from a variety of Indian public and government schools. An official letter outlining the study's goals, methods, and ethical guidelines was addressed to school principals in order to start the recruitment process. In roughly one week 12 school principals agreed to participate in the study. These schools comprised 108 eligible school teachers. The goal of the study, the fact that participation was voluntary, confidentiality precautions, and ethical standards in accordance with the declaration of Helsinki were all explained to the participants. Prior to participation, informed consent was acquired electronically. After giving their consent, participants received a secure online link to complete the Google Forms-hosted survey. The survey included two main elements and was self-administered. The initial segment gathered demographic information, including age, gender, and teaching level, in addition to thorough details about nightly screen usage trends. The second segment used approved psychometric measures to examine sleep behaviors and quality. The completeness of the responses and their compliance with the inclusion criteria were manually evaluated. Inconsistent or incomplete submissions were not included in the final analysis. Following data screening, 100 school instructors (72 females and 28 males) made up the final sample. all actively teaching and aged between 20 and 50 years. Data analysis was carried out using Jamovi statistical software (The Jamovi Project, 2022), a widely used, open-source platform for conducting robust statistical analysis in social sciences research.

#### ***Measures***

This investigation employed a structured self-report questionnaire to evaluate two primary domains: screen use before bedtime and sleep quality. These measures were adapted from previously validated tools and supported by literature linking screen behaviors with sleep health (Carter et al., 2016; Exelmans & Van den Bulck, 2016).

After 6 PM, participants were asked to report their screen-time habits including the duration of use and how close to bedtime they typically stopped using screens such as smartphones, laptops, or televisions. They also indicated the main reason of screen use from options including social media, watching videos or movies, reading, work-related activities, messaging or phone calls, and gaming. This information allowed the researchers to quantify both the intensity and context of screen use before bedtime.

#### **Pittsburgh Sleep Quality Index (PSQI)**

The Pittsburgh Sleep Quality Index (PSQI), a validated tool created by Buysse et al. (1989), was the main tool used to evaluate sleep quality. Nine components of sleep are measured by the 19 items in the PSQI: subjective measures of sleep length, latency, and quality, routine sleep efficiency, sleep disruptions, pharmaceutical use for sleep, and dysfunction during the

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day. A global PSQI score, which reaches from 0 to 22, is produced by adding these factors together; higher scores denote lower sleep quality. According to Carpenter and Andrykowski (1998), a score higher than five is typically seen as suggestive of clinically serious sleep issues. Participants also shared how long they slept on average throughout the previous month.

### **Covariates**

Demographic and environmental confounders were noted in order to control potential confounding influence on factors that might affect the association between screen time and sleep quality. This included teaching level (primary, secondary or higher secondary), gender (male, female, or other), and age (in years). These variables were factored into the analysis where relevant.

### **Statistical Analysis**

Jamovi statistical software (version 2.3) was used to analyze the data. Prior to performing any inferential analyses, the dataset was examined for accuracy, missing values, and outliers. Cases with significant missing or inconsistent data were excluded from the final sample. The normality of continuous variables was assessed through the Shapiro-Wilk test, along with visual inspections using Q–Q plots and histograms, to decide on the most suitable statistical methods.

Descriptive statistics were calculated to summarize demographic variables and primary study measures such as screen use duration, time of stop using screen and global PSQI scores. Measures such as mean, standard deviation, minimum values were used to describe the distribution of the data.

Furthermore, Spearman's rank-order correlation was applied to assess the strength and direction of relationships between screen-related factors (such as timing, purpose, and duration) and various sleep parameters. This method was selected because some variables were ordinal in nature and the data showed signs of non-normality. Together, the use of descriptive statistics, correlation, and regression analyses offered a well-rounded understanding of how evening screen habits relate to sleep health in school teachers.

## **RESULT**

The study included a total of 100 participants, comprising 28 males and 72 females. Descriptive statistics showed that the average number of hours spent on screens per day was 2.20 hours (SD = 0.816) with a median of 2.00 hours. The average time of stopping screen use before bedtime was 2.02 hours (SD = 1.13), with a median value of 2.00 hours. With regard to sleep quality, the mean Global Pittsburgh Sleep Quality Index (PSQI) score was 6.07 (SD = 2.78), and the median score was 6.00, indicating moderate sleep disturbance among the participants. Screen time ranged from 1 to 4 hours per day, while PSQI scores ranged from 1 to 14.

Hours on screen and time of stopping screen use, were not normally distributed ( $p < .001$ ). This justified the use of non-parametric tests for further analysis. Spearman's rho correlation indicated a significant positive association between screen time and PSQI scores ( $r = 0.225$ ,  $p = 0.024$ ), meaning longer screen exposure was associated with poorer sleep quality.

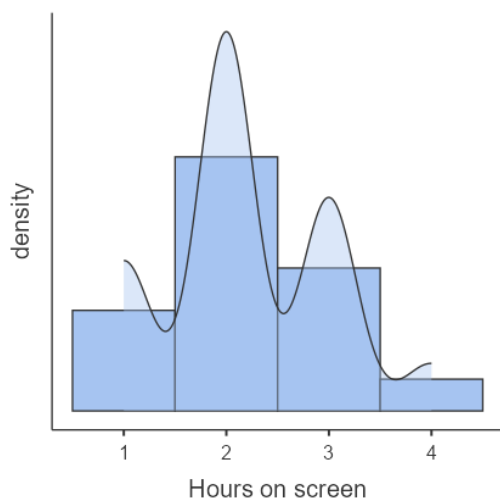
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**Table 1** Descriptives statistics for screen time and Global PSQI among school teachers.

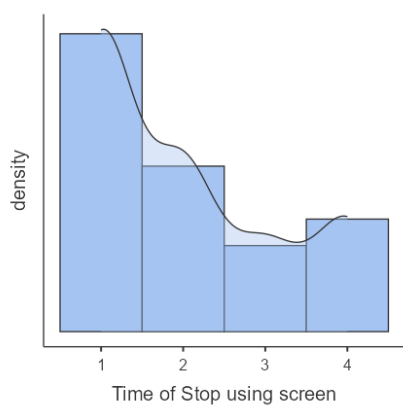
	Hours on screen	Time of Stop using screen	GLOBAL PSQI
<b>N</b>	100	100	100
<b>Missing</b>	0	0	0
<b>Mean</b>	2.20	2.02	6.07
<b>Median</b>	2.00	2.00	6.00
<b>Standard deviation</b>	0.816	1.13	2.78
<b>Minimum</b>	1	1	1
<b>Maximum</b>	4	4	14
<b>Skewness</b>	0.295	0.693	0.419
<b>Std. error skewness</b>	0.241	0.241	0.241
<b>Kurtosis</b>	-0.352	-0.958	0.147
<b>Std. error kurtosis</b>	0.478	0.478	0.478
<b>Shapiro-Wilk W</b>	0.858	0.788	0.969
<b>Shapiro-Wilk p</b>	<.001	<.001	0.020

Note. N = 100

**Figure 1** Distribution of Average screen time per day.

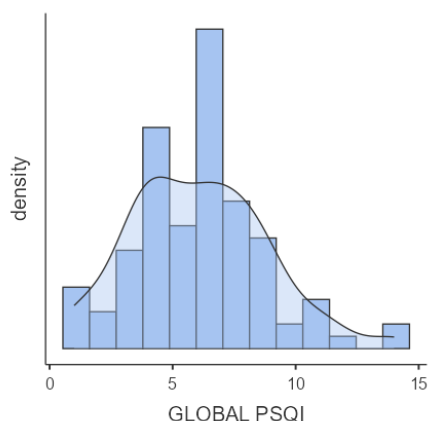


**Figure 2** Distribution of Time of stop using screen.



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**Figure 3** Distribution of Global PSQI score.



**Table 2** Correlation Matrix of Key Study Variables

		GLOBAL PSQI	Hours on screen
GLOBAL PSQI	Spearman's rho	—	
	df	—	
	p-value	—	
Hours on screen	Spearman's rho	0.225*	—
	df	98	—
	p-value	0.024	—

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### DISCUSSION

The findings of the present study provide meaningful insight into how screen time is related to sleep quality among school teachers. Result showed that teachers who spent more hours on screens tended to report slightly poorer sleep, as reflected in their PSQI score. This finding is consistent with previous literature, which has repeatedly shown that increased screen time is associated with sleep disturbances (Hale & Guan, 2014; Exelmans & Van den Bulck, 2015). Digital devices—especially when used for prolonged periods—emit blue light, which suppresses melatonin secretion and disrupts circadian rhythms (Chang et al., 2014). The regression analysis in this study further reinforces the claim that screen time, even when considered independently, has a measurable adverse impact on sleep.

Surprisingly, the time of stopping screen use prior to bedtime was not significantly associated with sleep quality. This contrasts with some earlier findings suggesting that screen use in the hour before sleep can negatively influence sleep latency and quality (Levenson et al., 2016). One possible explanation for this finding is that total daily screen exposure, rather than screen use specifically before bedtime may have a stronger impact on sleep quality just pre-sleep use, might play a more dominant role in disturbing sleep patterns—perhaps due to cumulative overstimulation or mental fatigue caused by prolonged screen use. Moreover, screen content (e.g., emotionally arousing or work-related material) may also mediate the link between screen use and sleep, which was not measured in the present study.

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Another notable point is that although females reported slightly poorer sleep quality than males, this difference was not statistically significant. Nevertheless, the finding aligns with broader epidemiological data indicating that women are more likely to experience sleep problems due to both biological (e.g., hormonal fluctuations) and psychosocial factors (Zhang & Wing, 2006). Furthermore, the significant correlation between gender and teaching level may reflect occupational differences within the teaching profession, potentially influencing stress levels, screen exposure, or sleep behavior.

The effect size observed in this study was small ( $R^2 = 0.039$ ), suggesting that screen time alone explains only a modest portion of the variability in sleep quality. This underlines the multifactorial nature of sleep health. As supported by prior research, factors such as work-related stress (Åkerstedt, 2006), mental health status (Alfonsi et al., 2020), physical activity (Kredlow et al., 2015), and dietary patterns also significantly impact sleep outcomes. Teachers face a high cognitive load, emotional demands, and digital workload, making them vulnerable to both prolonged screen use and sleep disruptions (Kim et al., 2023).

These results highlight the need to incorporate digital hygiene as part of overall sleep health interventions in educational settings. Strategies such as reducing total screen time, taking regular screen breaks, using blue light filters, and establishing screen-free routines before bedtime may help improve sleep quality among teachers. Future research should incorporate larger, more diverse samples and examine additional variables, such as screen content, occupational stress, and mental health, to gain a deeper understanding of how screen behavior influences sleep in working professionals.

### CONCLUSION

This study investigated the association between screen time and sleep quality in school teachers, revealing that longer screen use is significantly linked with poorer sleep outcomes. Although the timing of stopping screen use before bed did not show a significant effect, the total duration of screen exposure was a statistically meaningful predictor of sleep quality. These findings suggest that managing daily screen habits is crucial in promoting better sleep, especially in occupational groups like teachers who are subject to both digital workload and high cognitive demands.

Raising awareness of the negative effects of excessive screen use and encouraging healthier digital habits can be an essential component of wellness programs for educators. Recommendations include using screen time management tools, engaging in offline relaxation activities before bedtime, and integrating sleep education into professional development. Further studies should explore the interplay between screen behavior, psychological stress, and other lifestyle factors to design holistic interventions aimed at enhancing sleep health among teachers and other working professionals.

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### ***Conflict of Interest***

The author(s) declared no conflict of interest.

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