

EFFECT OF DAILY SCREEN TIME ON SLEEP DURATION AND QUALITY AMONG ADOLESCENT STUDENTS

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Abstract:

The rapid growth of digital technology has significantly increased the use of screen-based devices such as smartphones, laptops, tablets, and televisions among adolescents. While these technologies provide educational and social benefits, excessive screen exposure may negatively influence sleep patterns and overall health. The present study aims to examine the relationship between daily screen time and sleep duration and quality among adolescent students aged 12–25 years. A descriptive survey research design was adopted, and data were collected from 75 students using a structured questionnaire administered through Google Forms. The study analyzed screen usage patterns, sleep duration, sleep quality, physical activity, and stress levels. The collected data were analyzed using percentage, frequency distribution, and correlation analysis. The findings revealed that a majority of students spend 3–6 hours daily on screens, particularly smartphones. A significant proportion of respondents reported sleeping less than the recommended 8–9 hours. The correlation analysis indicated a moderate negative relationship ($r = -0.62$) between screen time and sleep duration, suggesting that increased screen exposure leads to reduced sleep duration. Additionally, screen use before bedtime was associated with poorer sleep quality and delayed sleep onset. The study concludes that excessive screen use, particularly during nighttime, negatively impacts adolescents' sleep patterns and well-being. Promoting healthy digital habits, limiting screen exposure before bedtime, and encouraging physical activity can help improve sleep quality among students.

Keywords: Screen Time, Sleep Duration, Sleep Quality, Adolescents, Digital Devices, Sleep Behavior

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Introduction:

In the modern digital era, electronic devices such as smartphones, laptops, tablets, and televisions have become an integral part of students' daily lives. Adolescents increasingly rely on digital devices for education, communication, entertainment, and social networking. While technology offers numerous benefits, excessive screen exposure has raised concerns about its potential impact on students' physical and psychological health. Sleep is a fundamental biological process essential for cognitive functioning, emotional stability, memory consolidation, and physical growth. Adolescents typically require 8–9 hours of sleep per night to maintain optimal health and academic performance. However, the increasing use of digital devices, particularly before bedtime, may interfere with normal sleep patterns. Exposure to blue light emitted by screens can suppress

melatonin production, which plays a crucial role in regulating sleep cycles. Additionally, engaging in stimulating activities such as social media browsing, gaming, or watching videos may delay sleep onset and reduce sleep duration. With the growing dependence on digital technology among adolescents, it is essential to understand how screen usage patterns influence sleep behavior. Therefore, the present study aims to investigate the relationship between daily screen time and sleep duration and quality among adolescent students.

Objectives of the Study:

1. To assess the average daily screen time of adolescent students.
2. To examine the sleep duration patterns among adolescent students.
3. To study the relationship between screen time and sleep quality.
4. To analyze the impact of screen use before bedtime.

Hypothesis:

H₀: There is no significant effect of daily screen time on sleep duration among adolescent students.

H₁: Daily screen time has a significant effect on sleep duration among adolescent students.

Review of Literature:

Several studies have examined the relationship between screen exposure and sleep patterns among adolescents. Research conducted in Brazil through the Pelotas Birth Cohort Study found that adolescents who spent more than 4–6 hours daily on screens experienced shorter sleep duration and poorer sleep quality. Similarly, studies conducted in New Zealand revealed that interactive screen activities such as gaming, social media engagement, and multitasking before bedtime delayed sleep onset and reduced overall sleep duration. The stimulating nature of digital media was identified as a major factor affecting sleep behavior. Research from Saudi Arabia and India also reported that excessive screen use among adolescents was associated with increased daytime sleepiness, fatigue, and reduced academic concentration. These studies further highlighted that physical activity plays a protective role in improving sleep quality. A systematic review of 67 studies concluded that the majority of research findings consistently show a negative relationship between excessive screen time and sleep health. The review emphasized the importance of limiting screen use before bedtime to maintain healthy sleep patterns among adolescents.

Limitation:

1. The study is limited to a specific group of adolescent students; therefore, the findings may not be generalizable to all adolescents.
2. The study does not differentiate between types of screen use (educational, social media, gaming, or entertainment), which may influence sleep differently.
3. The quality of sleep is measured through subjective assessment rather than clinical or physiological measures.

Research Gap:

Although many studies have investigated screen time and sleep patterns, several gaps remain in existing research. Many studies analyze screen time and sleep separately rather than examining multiple lifestyle factors together. Limited research integrates screen usage, sleep quality, stress levels, physical activity, and caffeine consumption

in a single study. Few studies include a broad age range of 12–25 years covering both school and college students. There is also limited primary survey-based research conducted in the Indian educational context. The present study attempts to address these gaps by analyzing multiple lifestyle factors associated with screen use and sleep behavior among adolescents.

Research Methodology:

The present study follows a descriptive survey research design. This design was selected because it allows the researcher to describe and analyze existing patterns of screen usage and sleep behavior among adolescent students without manipulating variables. The population of the study includes school and college students aged between 12 and 25 years. A total of 75 adolescent students participated in the study. Convenience sampling was used to select participants through an online survey. Data were collected using a structured questionnaire developed through Google Forms. The questionnaire consisted of demographic questions, screen usage patterns, sleep behaviors including bedtime and wake-up time, sleep duration, sleep quality, and lifestyle factors such as stress levels, physical activity, and caffeine intake. The main variables studied in the research include screen time as the independent variable and sleep duration and sleep quality as dependent variables.

Research Tool (Questionnaire) :

The primary research tool used was a structured questionnaire (Google Form) consisting of:

- Demographic questions (age, gender, grade, type of institution)
- Screen usage patterns (weekday/weekend usage, device type)
- Sleep-related behaviors (bedtime, wake-up time, sleep duration, sleep quality)
- Lifestyle factors (stress, physical activity, caffeine intake)

The questionnaire ensured anonymity and voluntary participation

Data Analysis:

The collected data were analyzed using percentage analysis, frequency distribution, and correlation analysis. Responses were categorized to identify trends related to duration of screen use, frequency of bedtime screen exposure, sleep duration, sleep quality, and daytime sleepiness. The quantitative analysis helped in understanding behavioral patterns among adolescent students and identifying relationships between screen exposure and sleep patterns.

Correlation Analysis:

The correlation analysis indicated several relationships between screen time and sleep variables. A moderate negative correlation ($r = -0.62$) was found between daily screen time and sleep duration, indicating that higher screen exposure reduces sleep duration. Screen use before bedtime also showed a moderate negative relationship with sleep quality ($r = -0.58$), suggesting that using screens before sleeping leads to poorer sleep quality. A moderate positive relationship ($r = +0.49$) was observed between daily screen time and daytime sleepiness, indicating that increased screen exposure results in greater fatigue during the day. Physical activity showed a positive correlation with sleep quality ($r = +0.41$), suggesting that students who engage in more physical activity

experience better sleep. Academic stress showed a weak negative relationship with sleep quality ($r = -0.36$), indicating that higher stress levels may slightly reduce sleep quality.

Correlation Table

Sr. No.	Variables Compared	Correlation Coefficient (R)	Type of Relationship	Interpretation
01.	Daily Screen Time & Sleep Duration	-0.62	Moderate Negative	As screen time increases, sleep duration decreases
02.	Screen Use Before Bedtime & Sleep Quality	-0.58	Moderate Negative	More screen use before sleep leads to poor sleep quality
03.	Daily Screen Time & Daytime Sleepiness	+0.49	Moderate Positive	More screen exposure increases daytime sleepiness
04.	Physical Activity & Sleep Quality	+0.41	Positive	Students with more physical activity show better sleep
05.	Academic Stress & Sleep Quality	0.36	Weak Negative	Higher stress slightly reduces sleep quality

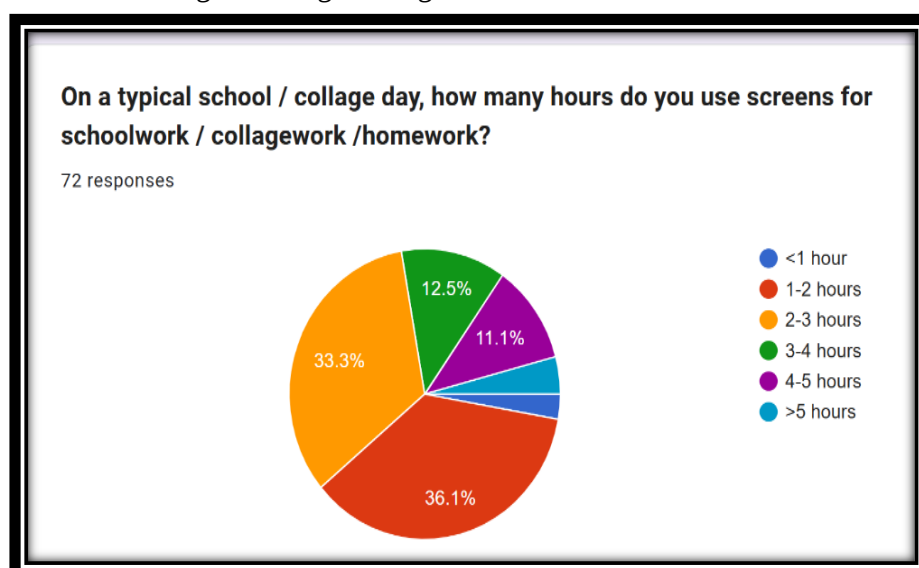
Link Results with Objectives :

1st Objective: To assess the average daily screen time of adolescent students.

Result: The survey data shows that a majority of students spend 3–6 hours per day on digital screens.

Smartphones were the most commonly used device among adolescents.

Screen usage was found to be higher during evening and leisure time.



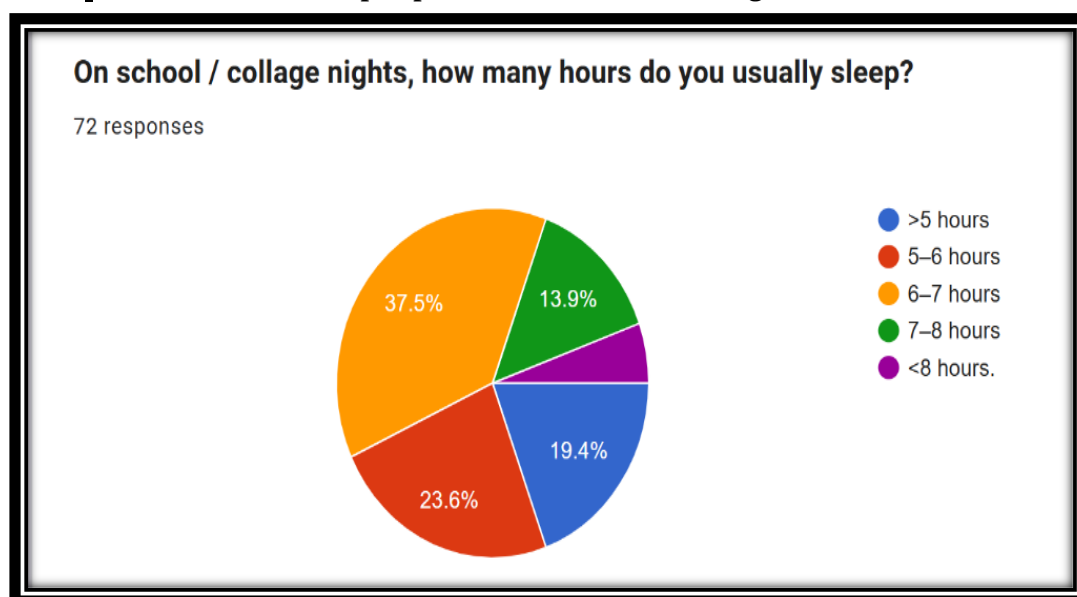
Objective 2: To examine sleep duration patterns

A large number of students reported **sleeping less than 7 hours per night**.

Many students reported going to bed **after 11:00 PM**.

The recommended sleep duration for adolescents is **8–9 hours**, which was not achieved by many respondents.

Interpretation: This indicates that **sleep deprivation is common among adolescent students**.

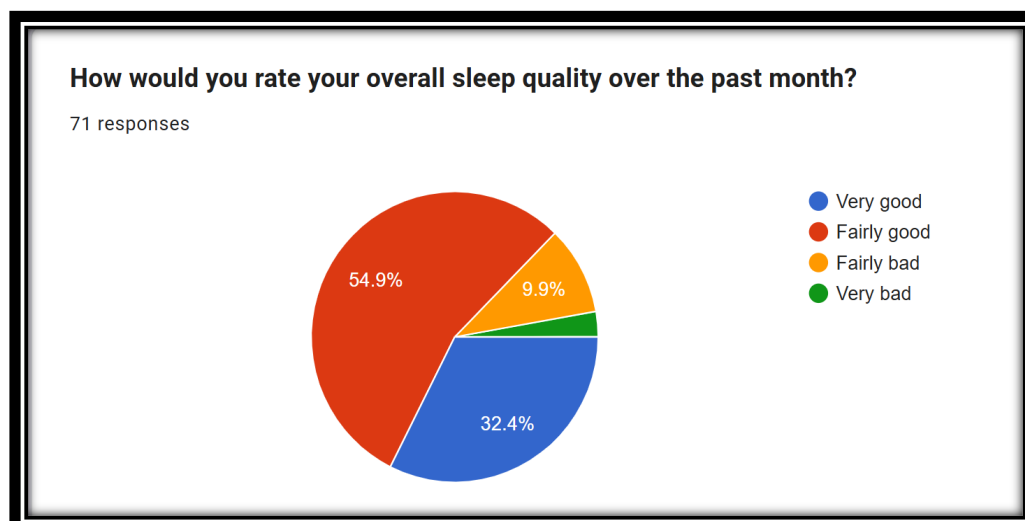


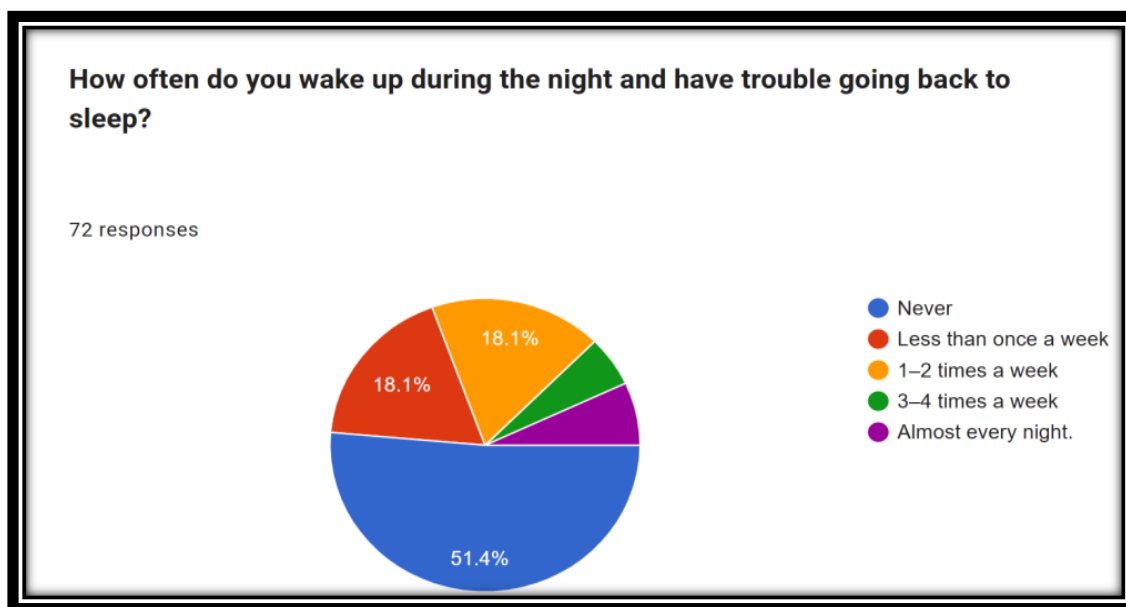
Objective 3: To study the relationship between screen time and sleep quality.

Result: Correlation analysis revealed a **negative relationship** between screen time and sleep duration ($r \approx -0.62$).

Students with higher screen exposure reported **poorer sleep quality** and **daytime fatigue**.

Interpretation: This suggests that **increased screen time negatively affects sleep quality among adolescents**.





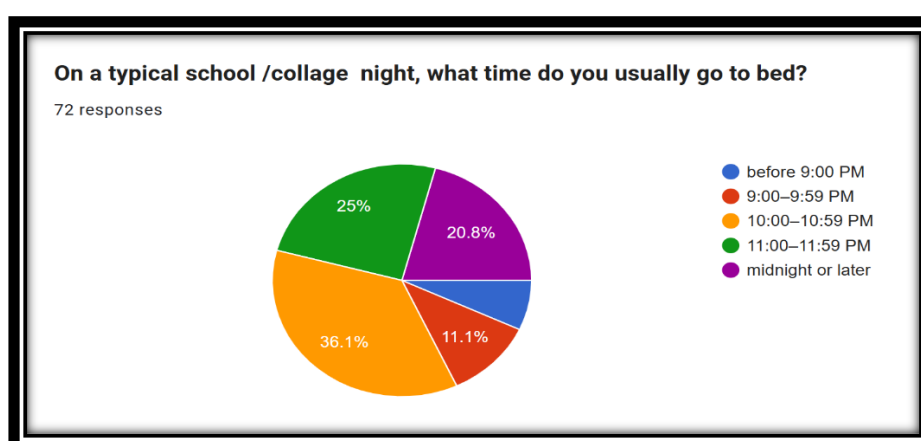
Objective 4: To analyze the impact of screen use before bedtime.

Result: Many students reported using **mobile phones** before sleeping.

Students who used screens before bedtime reported **delayed sleep onset** and **difficulty falling asleep**.

These students also experienced **reduced total sleep duration**.

Interpretation: Screen exposure before bedtime **interferes with normal sleep patterns**.



Discussion:

The results of the study indicate that increased screen exposure negatively affects sleep duration and quality among adolescents. Students who reported higher screen time, particularly during nighttime, experienced shorter sleep duration and delayed sleep onset. These findings are consistent with previous research which suggests that exposure to blue light from screens interferes with melatonin production and disrupts normal sleep cycles.

Furthermore, engaging in stimulating activities such as social media or gaming before bedtime can delay the body's natural sleep rhythm. The study also highlights that physical activity plays an important role in improving sleep quality, indicating that maintaining an active lifestyle may help reduce the negative effects of excessive screen time.

Findings:

The study revealed that a majority of students reported high daily screen exposure ranging between 3–6 hours. Smartphones were the most frequently used digital devices among respondents. Many students reported using screens before bedtime, which contributed to delayed sleep onset. A significant proportion of students reported sleeping less than seven hours per night, which is below the recommended duration for adolescents. Increased screen time was found to be associated with shorter sleep duration and poorer sleep quality. Several respondents also reported experiencing daytime sleepiness and fatigue.

Conclusion:

The findings of the study clearly indicate that excessive screen time negatively affects sleep duration and sleep quality among adolescent students. Screen exposure, particularly before bedtime, interferes with normal sleep patterns and leads to reduced total sleep duration. Addressing excessive screen use and promoting healthy digital habits is essential for improving sleep health and overall well-being among adolescents.

Recommendations:

Students should limit screen use at least one hour before bedtime in order to reduce sleep disturbances. Maintaining a consistent sleep schedule can help regulate the body's biological clock and improve sleep quality. Encouraging regular physical activity can also promote better sleep among adolescents. Schools and educational institutions should conduct awareness programs regarding responsible digital usage and the importance of healthy sleep habits. Parents should also guide students in maintaining balanced screen usage and adopting healthier daily routines.

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