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The Relationship Between Excessive Screen Time And Sleep Quality Of Public Health Study Program Students At The Deli Husada Health Institute, Deli Tua, In 2025

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ABSTRACT

Screen time is the time individuals spend staring at electronic device screens such as cell phones, laptops, and tablets. Meanwhile, sleep is an important physiological need to maintain physical and mental health. Poor sleep quality can affect students' daily activities and learning concentration. This study aims to determine the relationship between excessive screen time and sleep quality of students at the Faculty of Public Health at the Deli Husada Deli Tua Health Institute in 2025. This study used a cross-sectional design with a sampling technique using the Lemeshow proportion formula, resulting in 79 students as respondents. Data were collected through questionnaires and analyzed using the Chi-Square test. The results showed that the majority of students had high screen time (73.4%) and poor sleep quality (74.7%). From the results of the statistical test, the Chi-Square value was 64.232 with ap value = 0.000, which indicates that there is a significant relationship between screen time and students' sleep quality. Based on these results, it can be concluded that the higher the duration of screen time, the worse the sleep quality experienced by students. Therefore, it is important to provide education to limit the time spent using electronic devices so that sleep quality can be maintained properly.

Keywords: Screen time, Sleep quality, Students

INTRODUCTION

The rapid advancement of digital technology has made digital devices a vital part of supporting various aspects of life, including education, particularly for students in the learning

process. Today, the function of mobile phones has evolved significantly, not only as a communication tool but also as a means of obtaining information, interacting on social media, accessing entertainment, and participating in digital-based learning. This situation has led to students increasingly engaging in screen-based activities (screen time).

However, high levels of screen time can negatively impact physical and mental health, lower productivity, and reduce learning effectiveness. This emphasizes the importance of time management and wise use of technology in educational settings to mitigate potential risks (Siregar, 2022). According to the World Health Organization (WHO), screen time is defined as the total time an individual spends using electronic devices with screens, such as televisions, computers, tablets, and mobile phones, especially when used passively, such as watching videos, playing games, or accessing content without engaging in physical activity.

According to data collected by the Indonesian Internet Service Providers Association (APJII) in 2023, the 19–25 age group in Indonesia is the most active internet user, accounting for 79.5% of the total population. The majority of this group uses digital devices for various purposes, such as accessing social media, studying, and entertainment, such as watching videos and playing games. This indicates that spending significant time in front of computers has become an important part of students' lives. It also demonstrates a shift towards digital in social interactions and learning patterns.

Excessive use of electronic devices, especially before bedtime, can disrupt the body's circadian rhythm and reduce the production of the hormone melatonin, which regulates sleep cycles. Decreased melatonin levels can lead to sleep disturbances, decreased sleep duration, and overall decreased sleep quality. These conditions can impact students' physical and mental health.

Both adolescents and adults are known to experience decreased sleep quality due to exposure to blue light from digital devices, especially around bedtime. This exposure disrupts the body's circadian rhythm and disrupts the onset of sleep and can potentially lead to long-term health problems. A reduced risk of death in adolescents and adults is associated with optimal sleep quality (Del Brutto, 2023).

Furthermore, research conducted by Smith (2023) shows a negative correlation between excessive smartphone use and students' sleep quality. Excessive smartphone use significantly

reduces sleep quality. Two main mechanisms are responsible for this phenomenon, known as screen time. First, excessive screen time can make it difficult to fall asleep and delay sleep onset. Second, the blue light from digital devices inhibits the production of the hormone melatonin, which is responsible for regulating the body's natural sleep cycle. The combination of these two mechanisms leads to poor sleep quality in students.

Among the many physiological functions the body performs, sleep regulates hormone release, cardiovascular activity, and glucose control. There is evidence that changes in sleep duration and quality significantly impact a person's morbidity. A person is considered sleep-deprived if they sleep less than 6 hours per night. This indicates insufficient sleep and a potential decline in overall sleep quality.

Lack of sleep can lead to varying degrees of sleep quality decline, including decreased duration, efficiency, and sleep disturbances. Poor sleep quality directly impacts students' daily activities, including decreased productivity, impaired learning, and impaired thinking and concentration abilities. During sleep, the brain clears out toxic substances produced by daily thinking activities. Consequently, poor sleep can slow recovery, impacting cognitive function the following day.

A previous study by Alimoradi (2022) found a positive association between high screen time and better sleep quality in students in the health sector. Dewi (2023) found similar results in Indonesia, showing that more than 60% of students who use electronic devices for more than five hours per day experience sleep disturbances. Insufficient sleep can reduce physical activity, disrupt vital signs, slow wound healing, and cause psychological problems such as stress, anxiety, and depression. Furthermore, people who sleep less than 7 hours are at risk of cardiovascular disease and death due to impaired cardiorespiratory function (Haryati, 2020; Saputra, 2019).

Public Health students frequently use electronic devices such as smartphones to support their academic activities, such as searching for lecture references, accessing information about diseases and their treatment methods, and interacting with others. However, if students spend too much time in front of screens, they risk experiencing the phenomenon of time displacement, which is the shift of time that should be used for sleep to time spent using digital devices. This can lead to decreased sleep duration and problems with sleep quality.

Although this phenomenon has been studied extensively, only a few studies have been conducted at the Deli Husada Health Institute in Deli Tua. Medical students at the University of North Sumatra (USU) also reported excessive use of electronic devices, especially before bedtime. A study by Ramadhani (2021) found that using devices for six to seven hours daily, especially before bedtime, was associated with mild to moderate insomnia symptoms. Students in the study reported late sleep (beginning later than 12:30 a.m. WIB), restless sleep, and daytime fatigue.

With this background in mind, this study aims to evaluate the relationship between healthy electronic device use and sleep quality among students in the Public Health Study Program at the Deli Husada Health Institute in Deli Tua. The results are expected to inform policy development that encourages healthy electronic device use and better sleep management among students.

RESEARCH METHODS

This research is a quantitative study with a cross-sectional approach, where measurements of screen time and sleep quality variables were carried out simultaneously.The research design used was observational analytic, aiming to identify and analyze the relationship between the two variables. The study will be conducted at the Deli Husada Health Institute in Deli Tua, with implementation scheduled for June to November 2025.

The data used in this study is primary data, including respondent identification information such as name, gender, and grade level. Data collection was conducted online using a questionnaire via the Google Forms platform. The instrument used to assess sleep quality consisted of 12 questions, while screen time was measured using 10 relevant questions.

The sample size was determined in two stages. Initially, the sample size was calculated using the Slovin formula, resulting in a sample size of 155 students. Next, the final sample size was determined using the Lemeshow formula for proportions, resulting in 79 respondents participating in the study.

The inclusion criteria included students in the Public Health Study Program at the Deli Husada Deli Tua Health Institute in 2025 who were present on campus during the study period and willing to participate by signing an informed consent form. Exclusion criteria included students

currently taking medications that affect sleep quality, such as sleeping pills, antidepressants, or tranquilizers; students who did not complete the questionnaire completely; and students who had been medically diagnosed with sleep disorders such as chronic insomnia or sleep apnea.

RESEARCH INSTRUMENT

The data used are sleep quality data measured using the globally validated Pittsburgh Sleep Quality Index (PSQI) questionnaire (Buysse, 2021). Screen time data will be measured using the Screen Time Questionnaire (STQ) (Rideout, 2022).

Information about Screen Time Units

The Screen Time Questionnaire (STQ) instrument is used to calculate a screen time score that combines:

- Frequency of use of electronic devices (cell phones, laptops, or tablets)
- Duration of daily use, categorized into a cumulative score.

- This research has two categories:
- Low screen time: score 10–24
- High screen time: score 25–40

This score is not calculated in hours, but is a combination of scores from various question items on the STQ with a certain value scale that indicates the intensity of exposure to digital screens.

RESULTS

Respondent Characteristics

Table 1 shows the distribution of respondent characteristics based on gender and education level.

Table 1. Distribution of Respondents by Gender and Education Level

Characteristics	Frequency (n)	Percentage (%)
Gender		

Man	15	18.99%
Woman	64	81.01%
Level		
Level 1	15	19.0%
Level 2	17	21.5%
Level 3	35	44.3%
Level 4	12	15.2%
Total	79	100%

The majority of respondents in this study were female, 64 people (81.01 percent), and male, 15 people (18.99 percent). The majority of respondents in this study were third-year students, namely 35 people (44.3%), followed by second-year students with 17 people (21.5%), first-year students with 15 people (19.0%), and fourth-year students with 12 people (15.2%). This indicates that the respondents most involved in this study were third-year students, who are academically in the active phase of lectures and field assignments, and have a greater possibility of experiencing high screen time exposure.

Frequency Distribution of Sleep Quality and Screen Time

Table 2. Distribution of Sleep Quality and Screen Time Categories

Sleep Quality	High Screen Time (25–40)	Low Screen Time (10–24)	Total
Bad	57 (96.6%)	2 (3.4%)	59
Good	1 (5.0%)	19 (95.0%)	20
Total	58 (73.4%)	21 (26.6%)	79
p-value = 0.0001			
OR = 541.5			

Most participants had high screen time (73.4%), but 96.6% of them had poor sleep quality. The relationship between screen time and sleep quality was analyzed using a chi-square test.

- Pearson Chi-Square value = 64.232
- p-value = 0.0001 ($p < 0.05$)

These results indicate a statistically significant relationship between screen time and sleep quality in college students. Students with high screen time were 541.5 times more likely to experience poor sleep quality than those with low screen time.

DISCUSSION

The sophistication of digital technology has transformed people's behavior, particularly students', regarding interactions, accessing information, and engaging in study and social activities. The use of electronic devices such as smartphones, tablets, and computers continues to increase, resulting in increased screen time each year. The use of digital devices for entertainment and learning has become a daily necessity for students during and after the pandemic. This has led to students frequently using devices late into the night (Ristiani et al.).

Concerns about the impact on health, particularly sleep quality, have arisen as a result of the increasing amount of time students spend in front of screens. Sleep is a physiological need that is essential for physical and mental health, as well as academic achievement. Poor sleep quality can lead to impaired concentration, decreased learning productivity, and psychological problems (Tristianingsih & Handayani, 2021). Previous research has shown a link between high digital device use and poor sleep quality, mediated by disrupted circadian rhythms, decreased melatonin levels, and an increased risk of sleep disorders such as insomnia (Pandoh et al., 2025; Yuwana, 2021).

As a productive age group, college students are vulnerable to sleep quality disorders due to academic pressure, sedentary lifestyles, and excessive exposure to electronic screens. Recent research has focused on the use of electronic devices before bedtime, leading to reduced sleep time, altered sleep patterns, and a tendency to sleep longer than usual (Arfiandika et al., 2025; Kusumawardani & Yolanda, 2023).

Analysis of Research Findings

According to this study, the majority of students of the Public Health Study Program of the Deli Husada Deli Tua Health Institute have poor sleep quality (coding 1: 74.7%) and high screen time (coding 1: 73.4%). The results of data processing show that, based on the Chi-

Square test, there is a significant relationship between the two variables, with a value of X2 = 64.232 and p-value = 0.0001, far below the significance limit of 0.05, and an odds ratio (OR) of 541.5. Therefore, students with high screen time are 541.5 times more likely to experience poor sleep quality compared to students with low screen time.

Nearly all students who spend a lot of time in front of computers experience poor sleep, according to research conducted in various universities and adolescent groups. Similar results were also found (Tristianingsih & Handayani, 2021; Ristiani et al.; Shorayasari et al., 2025). A similar phenomenon was found in students at the Yogyakarta Optometry Academy by Ainy, Kurniawan, and Batlayeri (2025). They noted decreased sleep quality caused by prolonged use of digital devices, especially in students with multiple academic responsibilities. Additional factors, such as education level, stress, physical activity patterns, gender, and habits of using electronic devices before bed, also influence sleep quality (Shorayasari et al., 2025).

The Impact of High Screen Time on College Students' Sleep Patterns

Many physiological and psychological changes in people, especially college students, have been linked to high screen time. Exposure to blue light emitted by electronic device screens is one important mechanism explaining the link between screen time and sleep disturbances. Blue light is known to suppress the production of the hormone melatonin, which is responsible for initiating the sleep cycle, preventing people from falling asleep, shortening sleep duration, and reducing sleep quality (Pandoh et al., 2025).

A study by Zahrani, Syuaib, and Sa'diyah (2024) also found that screen time is associated with lower cardiorespiratory fitness levels. This, in turn, leads to people sleeping less and repairing their bodies less during sleep.

Arfiandika, Amalia, and Sulistyowati (2025) said that screen time not only impacts sleep quality but can also worsen psychological conditions such as anxiety, depression, and stress, which in turn causes sleep patterns to worsen.

Students are increasingly finding it difficult to limit their electronic device use beyond personal needs for various reasons, including online learning activities, digital entertainment, access to social media, and social demands. Kusumawardani and Yolanda (2023) found that using devices for more than four hours per day significantly increases the risk of sleep

disorders, especially among Indonesian students at the Faculty of Public Health. Insomnia is more often caused by gadget use before bed (Yuwana, 2021).

The Role of Individual Characteristics and the Environment

According to the results of this study, the majority of participants were female and attended secondary education (grade 3). This demographic characteristic aligns with the report by Ristiani et al., which states that female students tend to use digital devices more for academic and social purposes. Their activity levels, academic workload, and high achievement demands all contribute to female students engaging in online activities before bed. As a result, they are more susceptible to sleep disturbances (Ristiani et al.).

In contrast, Shorayasari et al. (2025) emphasized that the impact of screen time on sleep quality is exacerbated by stress levels, caffeine consumption, and late dinner habits. Furthermore, Lestari, Rusyani, and Yuliani (2024) emphasized that adolescents and young adults who have a habit of attending school or studying online use their phones more often at night, which increases the likelihood of experiencing poor sleep quality.

Screen Time Score Unit: Treatment and Health Implications

This study used the Screen Time Questionnaire (STQ), which divided participants' screen time scores into low (10–24) and high (25–40) categories. This score combines the frequency and time spent using various digital devices, such as cell phones, tablets, and laptops. Those with higher scores indicated longer and more frequent screen time, which has been statistically associated with a higher risk of poor sleep in students.

Pandoh et al. (2025) stated that it is important to understand that screen time parameters are not only hours of use but also the total intensity of screen exposure. In other words, promotional interventions should focus on changing students' behavior, such as reducing the amount of time they spend using digital devices and improving their sleep quality. To prevent negative outcomes, you may want to change your bedtime routine by eliminating electronic devices and teaching children about the importance of a screen-free "bedtime ritual."

High Odds Ratio: Clinical and Practical Significance

The very high odds ratio (OR) of 541.5 indicates that excessive screen time is a dominant risk factor for decreased sleep quality among college students. This figure far exceeds the national average for public health research. A study at Muhammadiyah University Prof. Dr. Hamka, Tristianingsih, and Handayani (2021) also achieved similar results, although the reported OR was relatively lower. Furthermore, research findings by Shorayasari et al. (2025) and Lestari, Rusyani, and Yuliani (2024) strengthen the evidence that there is a positive association between the amount of time spent in front of screens and the likelihood of experiencing sleep disorders.

This high OR rate underscores the importance of implementing digital health education on campus and encouraging the active involvement of health professionals in assessing and monitoring digital device usage habits among students from an early age. This is expected to increase students' awareness of the risks of excessive gadget use and its impact on sleep quality and academic performance.

The Relationship Between Screen Time and Other Health Indicators

The Relationship between Screen Time and Other Health Indicators Sleep quality is influenced by many factors, including stress, diet, and physical activity. Shorayasari et al. (2025) emphasized that many factors contribute to sleep disturbances in college students; screen time intensity is one of the main factors, along with environmental and psychosocial factors. A study by Kusumawardani and Yolanda (2023) showed that poor sleep quality impacts cognitive health and reduces endurance.

Ainy, Kurniawan, and Batlayeri (2025) reported that intensive gadget use caused physical complaints such as fatigue, headaches, and decreased concentration among students at the Yogyakarta Optometry Academy. This suggests that poor sleep quality can contribute to broader health problems.

Furthermore, Zahrani, Syuaib, and Sa'diyah (2024) provide empirical evidence that the combination of high screen time and poor-quality sleep will reduce cardiorespiratory fitness, increase the risk of chronic fatigue, and lead to poor physical performance in college students. This relationship requires special attention in health promotion efforts in higher education settings.

Relationship of Research Results with Previous Studies

Correlation between Research Results and Previous Studies: Several national and international studies have shown that longer screen time, especially before bedtime, is associated with decreased sleep quality in college students and adolescents (Lestari, Rusyani, & Yuliani, 2024; Ristiani et al., Pandoh et al., 2025; Ainy et al., 2025). It has been shown that the two main factors contributing to poor sleep quality are the intensity of device use and the duration of device use.

These findings are strongly supported by Tristianingsih and Handayani (2021), who found that students who use electronic devices for more than four hours a day, especially after 9:00 p.m., are more susceptible to sleep disorders such as insomnia and poor sleep quality. Furthermore, research by Arfiandika, Amalia, and Sulistyowati (2025) found that excessive device use negatively impacts mental health and increases stress, which in turn leads to poorer sleep quality.

MatterThis is also supported by Yuwana's (2021) research on medical students at UIN Malang. It showed that engaging in screen time before bed significantly increased the likelihood of insomnia and disrupted students' natural sleep rhythms. This pattern of findings across studies suggests that stronger policies are needed in schools to protect students' mental and physical health through more judicious screen time management.

Practical Implications of Research

The results of this study indicate that college students need health support and behavioral interventions. Limiting screen time and monitoring sleep quality helps psychosocial health, productivity, and academic well-being (Kusumawardani & Yolanda, 2023; Ainy et al., 2025). Therefore, digital hygiene education should be a primary focus to encourage students to adopt healthy sleep habits, such as turning off devices 30 to 60 minutes before bed.

Schools can also implement interventions such as providing digital health education, psychological counseling, and conducting regular surveys to monitor students' sleep health.

Research by Shorayasari et al. (2025), Lestari et al. (2024), and Pandoh et al. (2025) also suggests similar approaches.

CONCLUSION

Research on students of the Public Health Study Program at the Deli Husada Deli Tua Health Institute in 2025 showed that high screen time was closely related to decreased sleep quality, thus indicating a significant relationship between the two variables.

SUGGESTION

1. Students are advised to reduce screen time, especially at night before bed.
2. The campus can provide preventative education about the negative effects of excessive gadget use on sleep quality and mental health.

3. Further studies could investigate additional factors such as stress levels, physical activity, and diet that also affect sleep quality.

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