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Original Article

THE RELATIONSHIP BETWEEN GADGET USE BEHAVIOR AND SLEEP QUALITY

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ABSTRACT

Background. Rapid technological advancements have made gadgets an essential part of students' daily lives. However, excessive gadget use can have negative impacts, particularly on sleep quality. This study aims to investigate the relationship between gadget use behavior and sleep quality among students from the Faculty of Medicine at Universitas Kristen Indonesia (UKI), specifically those in the 2023 class.
Research Method. The study employed a cross-sectional design with a quantitative approach, involving 138 university students as a sample collected through a total sampling technique. Data were collected using the SAS-SV (Smartphone Addiction Scale Short Version) questionnaire to measure gadget use behavior and the PSQI (Pittsburgh Sleep Quality Index) to assess sleep quality. Data analysis was performed using the chi-square test with the help of SPSS.
Findings. The study's results showed that 84.1% of respondents exhibited negative gadget usage behavior, and 86.2% experienced poor sleep quality. A chi-square test showed a significant relationship between gadget usage behavior and sleep quality ($p = 0.000$). This study suggests that excessive gadget usage negatively impacts students' sleep quality.
Conclusion. Managing gadget use wisely is crucial for improving the quality of sleep and overall health of students.

Keywords: Gadget, Sleep Quality, Medical Students, Smartphone Addiction Scale Short Version, Pittsburgh Sleep Quality Index.

BACKGROUND

The development of information and communication technology, especially in the form of gadgets, has changed many aspects of human life, especially in terms of smartphone use. Based on the latest information from Insider Monkey, in 2023, around 7.33 billion people own a mobile phone or smartphone, which means 91.40% of the world's population is connected via a cellular network. Based on data from [1], more than 209 million people in Indonesia are estimated to use smartphones in 2023. This shows how important gadgets are in everyday life. In addition to functioning as a communication tool, gadgets have also become multifunctional devices that have supported various activities, such as direct or

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online learning, working, searching for information, and entertainment. This illustrates that gadgets have now become an inseparable part of people's lives, especially among the younger generation.

Gadgets are sophisticated technological devices that have become an integral part of human life, with features and applications that enable users to connect with the outside world, perform daily tasks, and access entertainment and education. Their ability to store data, run complex applications, and support various multitasking functions makes them highly effective tools for enhancing personal and professional performance. With the continuous advancement of technology, gadgets function not only as communication tools but also as centers of digital activity that unite various elements of modern life [2].

Gadget use also impacts social patterns, as discussed in a 2023 study in the Global Health Science Journal. This technology makes it easier for people to access information and interact online. However, the more frequently gadgets are used, the greater the risk of negative impacts on psychological and social well-being, particularly in terms of increasingly limited social interactions. Therefore, it is important to manage gadget use wisely to maximize their benefits without causing negative impacts that disrupt other aspects of life, such as physical health and social relationships [3].

In the world of healthcare, research published in the Midwifery Journal in 2023 showed that gadget use significantly impacts communication between medical personnel and patients. While this technology can improve the quality of communication in healthcare, it also has the potential for negative impacts if gadget use is not managed properly. A similar finding was found in a study conducted by [2], which stated that excessive gadget use can negatively impact physical and mental health, such as sleep disturbances and stress. This in turn affects a person's sleep quality.

Sleep is a biological need that is crucial for maintaining physical and mental health. Quality sleep supports the body's recovery process, improves brain function, and maintains emotional balance. However, today many people experience sleep disorders due to various factors, such as stress, unhealthy lifestyles, and exposure to artificial light from gadgets. These sleep disorders can have serious impacts, such as decreased productivity, mood swings, and an increased risk of chronic diseases [4].

Sleep quality is a crucial element for health and well-being, influenced by various biological and environmental factors. One hormone that plays a key role in regulating the sleep cycle is melatonin, which is produced by the pineal gland. Melatonin synthesis is regulated by signals from the suprachiasmatic nucleus (SCN), produced in the

hypothalamus, the brain's circadian rhythm regulator. The SCN sends signals to the paraventricular nucleus of the hypothalamus, which then communicates with the upper thoracic segment of the intermediolateral spinal column. Through this pathway, information is sent to the superior cervical ganglion, part of the sympathetic nervous system [5].

According to research conducted by Del Brutto, Mera, Rumbea, Sedler, and Castillo in 2023, with the advancement of technology, our exposure to artificial light often increases, especially at night. Using electronic devices such as smartphones, tablets, and computers at night often exposes us to intense blue light, which is known to disrupt sleep patterns. Furthermore, LED lights commonly used in many homes and offices also have a high blue light spectrum. Excessive exposure to blue light, especially before bedtime, has been linked to sleep problems, difficulty falling asleep, and decreased sleep quality in adolescents and adults. This can disrupt the body's circadian rhythm, making it difficult to fall asleep, and ultimately lead to long-term health problems. Sleep quality is significantly associated with mortality rates in adolescents and adults, where having good sleep quality can help reduce the risk of death [6]. Several previous studies have examined the relationship between gadget use and sleep quality, but most have only measured a single aspect, such as sleep duration or bedtime delay. This approach limits our understanding of how gadget use behavior impacts sleep multidimensionally [7]. However, sleep is a complex process involving various components, including sleep efficiency, frequency of awakenings, subjective sleep quality, and daytime dysfunction [8]. This study is novel because it comprehensively measures sleep quality using the Pittsburgh Sleep Quality Index (PSQI), which evaluates seven key dimensions of sleep quality, providing a more complete picture than studies that only assess sleep quantity [9]. Furthermore, the urgency of this research is heightened by the increasing prevalence of excessive gadget use among college students each year. Cross-national studies show that the prevalence of smartphone addiction among college students has now reached 39–60% and is associated with insomnia, high stress, depression, and impaired academic functioning [9,10]. In Indonesia, recent reports indicate that college students are the group with the highest smartphone usage intensity compared to other age groups, and using gadgets before bed is a very common habit [11]. This situation suggests that students are at high risk of experiencing sleep disorders if preventative measures are not taken. In the context of medical education, the urgency of this research is even more crucial. Medical students require optimal sleep quality to maintain cognitive functions such as memory, attention, and analytical skills, which are essential for clinical learning. Poor sleep quality has been shown to be associated with increased levels of fatigue, memory decline,

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impaired decision-making, and decreased academic performance [12]. If sleep patterns continue to deteriorate, the risk of burnout, chronic stress, and mental health disorders will increase significantly, ultimately impairing students' future professional competence [12]
In a survey conducted by researchers on 10 college students, all admitted to using gadgets regularly. Of these 10 students, 7 reported experiencing sleep disturbances, while 3 did not report significant sleep problems. The students experiencing sleep disturbances spent an average of more than 6 hours per day using their gadgets, with most using them at night, particularly in the last hour before bed. The most frequent activities on their gadgets included accessing social media (such as Instagram, TikTok, and Twitter), watching videos on YouTube, and playing games.

The seven students experiencing sleep disturbances, 5 reported difficulty falling asleep, frequently waking up in the middle of the night, and feeling tired and unrefreshed upon waking. The other two students revealed that they were unable to sleep soundly and felt disturbed by the blue light from their gadget screens, which caused delays in their sleep schedule and disrupted their natural sleep patterns. These students experiencing sleep disturbances also tended to feel drowsy and had difficulty concentrating during daytime lectures.

Meanwhile, three students who did not experience sleep disturbances reported that they only used gadgets for no more than 1 to 2 hours per day and did not use them in the last hour before bed. They felt their sleep was of a better quality and did not experience difficulty falling asleep or sleep disturbances at night. There is a lack of research examining the effect of screen time on sleep quality among college students. This study aims to determine the relationship between sleep quality and screen time among college students, as well as to compare screen time and sleep quality in medical students [13, 14]

Therefore, based on the above problems, the researchers are interested in conducting a study entitled "The Relationship between Gadget Use Behavior and Sleep Quality among Medical Students of the Indonesian Christian University Class of 2023." The aim is to analyze the influence of gadget use behavior on sleep quality among medical students at the Indonesian Christian University. The contribution of this research was to provide deeper insight into healthy gadget use patterns and their impact on sleep quality, as well as offer recommendations for enhancing student sleep well-being in academic settings.

RESEARCH METHOD

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This study will use a quantitative approach with a cross-sectional analytical design to collect data from a group of subjects at a specific point in time. The study was conducted in April 2025 with a sample of 138 students from the Faculty of Medicine at the Indonesian Christian University, class of 2023. They were selected using a total sampling technique and met the inclusion and exclusion criteria. This study involved two types of variables: a dependent variable and an independent variable. The dependent variable in this study was the sleep quality experienced by students from the Faculty of Medicine, Christian University of Indonesia, class of 2023, while the independent variable was the students' gadget usage behavior patterns.

This study used two standardized and validated questionnaire instruments to measure gadget use behavior and sleep quality. Both instruments have undergone extensive validity and reliability testing, ensuring that the data obtained are trustworthy and suitable for academic research.

1) Smartphone Addiction Scale–Short Version (SAS-SV): Gadget use behavior was assessed using the SAS-SV, an instrument developed by Kwon et al. (2013) specifically to detect problematic smartphone use among adolescents and adults. The SAS-SV consists of 10 multiple-choice items measured on a Likert scale (typically 1–6). The instrument has shown strong psychometric performance with a Cronbach's alpha of 0.91, indicating excellent internal reliability [15].

Scoring and categorization:

- Each item is scored 1–6, resulting in a total score range of 10–60.
- Higher scores indicate more severe smartphone addiction behavior.
- According to Kwon et al. (2013) [15]:
  - Male cutoff score: ≥ 31 → *problematic/negative gadget use*
  - Female cutoff score: ≥ 33 → *problematic/negative gadget use*
- Scores below the cutoff are categorized as non-addicted/positive behavior.

This scoring approach allows the data to be categorized into negative gadget use and non-problematic gadget use using established clinical thresholds.

2. Pittsburgh Sleep Quality Index (PSQI)

Sleep quality was evaluated using the PSQI, a widely used, validated instrument consisting of 18 items grouped into 7 components:

1. subjective sleep quality,
2. sleep latency,
3. sleep duration,

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4. sleep efficiency,
5. sleep disturbances,
6. use of sleep medication,
7. daytime dysfunction.

The PSQI has been proven reliable in both clinical and general populations, with a global Cronbach's alpha ranging from 0.70–0.83, showing acceptable to good reliability [,17].

Scoring and categorization:

- Each of the seven components is scored 0–3.
- The global PSQI score ranges from 0–21.
- According to Buysse et al. (1989) [16]:
  - Global score ≤ 5 → *good sleep quality*
  - Global score > 5 → *poor sleep quality*

Scores are therefore categorized dichotomously into good vs. poor sleep quality using this internationally accepted cutoff.

3. Total Number of Items and Data Structure

Together, both instruments include 28 total items (10 SAS-SV + 18 PSQI). The combination provides a comprehensive measurement of digital behavior and sleep outcomes. Categorization based on established scoring cutoffs enables the data to be analyzed using chi-square to test the association between problematic gadget use and sleep quality in a statistically valid manner.

Since this study involved human participants, the research was conducted in accordance with ethical principles. The study received approval from the Ethics Committee of the Faculty of Medicine, Universitas Kristen Indonesia, with the number: Ethical Clearance No: 087/UKI.LPPM/PPM.00.00/ET.2023. The data were analyzed using SPSS software using univariate and bivariate analyses. Univariate analysis is used to examine one variable separately, to gain a deeper understanding of its characteristics, including its distribution and frequency. The results of this analysis provide a clear picture of the characteristics and distribution of gadget use behavior and sleep quality among students in the Faculty of Medicine, Christian University of Indonesia, Class of 2023.

Next, a bivariate analysis was conducted, involving two variables, to identify any relationship between the two. This bivariate analysis aimed to examine the relationship between gadget use behavior and sleep quality among students in the Faculty of Medicine,

Christian University of Indonesia, Class of 2023, using the chi-square statistical test in SPSS. This analysis will provide further insight into the relationship between the two variables.

FINDINGS

The total number of students from the Faculty of Medicine, Christian University of Indonesia who completed the questionnaire was 138 people.

Table 1. Frequency Distribution of Respondent Characteristics

Respondent Characteristics		Frequency (n)	Percentage (%)
Gender	Male	33	23.9
	Female	105	76.1
Age	18-19 years	101	73.2
	20-21 years	37	26.8
Religion	Hinduism	7	5.1
	Islam	29	21.0
	Catholic	15	10.9
	Christian	87	63.0
Duration of Gadget Use (in years)	> 3 years	136	98.6
	1- 3 years	2	1.4
Most Commonly Used Applications	Academic/Scientific/Educational	3	2.2
	News/Current Events	1	0.7
	Entertainment	1	0.7
	Competitions	2	1.4
	Social Media	131	94.9
How Long Do You Use Gadgets in a Day?	> 6 hours	78	56.5
	1- 2 hours	7	5.1
	3- 4 hours	13	9.4
	5- 6 hours	40	29.0

Based on the research results, the characteristics of the respondents were obtained. The majority of respondents were female (76.1%), while only 23.9% were male. This indicates that this study involved more female students. Age: Most respondents were 18–19 years old (73.2%), the rest were 20–21 years old (26.8%). This indicates that the respondents were first-year students. Religion: The majority of respondents were Christian (63.0%), followed by Islam (21.0%), Catholicism (10.9%), and Hinduism (5.1%). This reflects the religious diversity in the campus environment. Class: All respondents were from the class of 2023 (100%), so these results reflect the characteristics and behavior of new students. Duration of Gadget Use: As many as 98.6% of respondents have used gadgets for more than 3 years, indicating that gadget use has become part of their daily lives. Most Commonly Used Applications: Social media is the most widely used application (94.9%), followed by other applications such as education, news, entertainment, and games, which account for a

small percentage. Daily Gadget Usage Duration: The majority of users (56.5%) spend more than 6 hours a day on gadgets, followed by 5–6 hours (29.0%), and a small proportion (14.5%) use them for less than 4 hours.

Table 2. Frequency Distribution of Gadget Usage Behavior

Gadget Usage Behavior	Frequency (n)	Percentage (%)
Negative	116	84.1
Positive	22	15.9
Total	138	100.0

Based on the research results, the majority of respondents (84.1%) exhibited negative gadget use behavior, while 15.9% used gadgets positively. This indicates a tendency toward unhealthy gadget use among students.

Table 3. Frequency Distribution of Sleep Quality

Sleep quality	Frequency (n)	Percentage (%)
Good	19	13.8
Bad	119	86.2
Total	138	100.0

Based on the research results, the majority of respondents (86.2%) reported poor sleep quality, with only 19 respondents (13.8%) reporting good sleep quality. This indicates significant sleep problems among college students.

Table 4. Cross-tabulation of the Relationship between Gadget Use Behavior and Sleep Quality in Medical Students of the 2023 Class of the Indonesian Christian University

Gadget Usage Behavior	Sleep quality				Total		P-value
	Good		Bad				
	n	%	n	%	n	%	
Positive	15	10.9%	7	5.1%	22	15.9%	0.000
Negative	4	2/9%	112	81.2%	116	84.1%	
Total	19	13.8%	119	86.2%	138	100.0%	

The cross-tabulation results show that of the 22 respondents with positive behavior, 15 of them (10.9%) had good sleep quality. Conversely, of the 116 respondents with negative gadget usage behavior, 112 (81.2%) had poor sleep quality. Based on the results of the chi-square test, the p-value = 0.000 was obtained, which means there is a statistically significant relationship between gadget usage behavior and sleep quality ($p < 0.05$). Negative gadget usage behavior tends to be associated with poor sleep quality.

DISCUSSIONS

Based on research conducted on students from the Faculty of Medicine, Christian University of Indonesia (2023) in 2025, the majority of students demonstrated negative

gadget use behavior (116 respondents (84.1%), while 22 respondents (15.9%) used gadgets positively. Furthermore, 19 respondents (13.8%) reported good sleep quality, while 119 respondents (86.2%) reported poor sleep quality.

The largest population, with 112 respondents (81.2%), comprised students with negative gadget use behavior and poor sleep quality. The smallest population, with 4 respondents (2.9%), comprised students with negative gadget use behavior and good sleep quality. Bivariate analysis yielded a P-value (significance value) of 0.000 (<0.05), indicating a relationship between gadget use behavior and sleep quality [17].

This research is also supported by the results of research conducted by Parulian & Soputri showing a significant correlation between gadget use and sleep quality among students living in dormitories at Universitas Advent Indonesia. Based on analysis using the Chi-square test, a p-value of 0.014 was obtained, which is smaller than the significance limit of 0.05 ($p < 0.05$). This finding indicates that there is a significant relationship between the intensity of gadget use and decreased sleep quality. In other words, the more frequently or longer students use gadgets, especially before bedtime, the more likely they are to experience sleep disorders or low sleep quality. This strengthens the evidence that uncontrolled digital behavior contributes to sleep problems among students [18].

A previous study by Romayati Keswara et al. found a significant relationship between gadget use behavior and sleep quality in adolescents. Through statistical analysis using the Chi-square test, a p-value of 0.000 was obtained, which is statistically much smaller than the 0.05 significance level ($p < 0.05$), so the alternative hypothesis (Ha) was accepted. This indicates that gadget use behavior is indeed correlated with adolescent sleep quality. Furthermore, the calculation results showed an odds ratio (OR) of 4.696, which indicates that adolescents with poor gadget use habits have a risk of almost 4.7 times greater for experiencing sleep disturbances or decreased quality compared to adolescents with healthy gadget use habits. This finding underscores the importance of awareness of technology management, especially gadget use, in efforts to maintain sleep quality among adolescents [19].

Based on the findings of a study conducted by Dustira et al. in the field of nursing, a significant relationship was observed between the level of smartphone dependence and a person's sleep quality. The results of the study revealed that the majority of individuals with a low level of smartphone dependence, namely 64.9%, tended to have good sleep quality, while only 35.1% of this group experienced poor sleep quality. Conversely, in the group of respondents with a high level of smartphone dependence, the majority, or around 83.6%,

experienced disturbed sleep quality, and only a small number, namely 16.4%, maintained good sleep quality. These findings strengthen the suspicion that high intensity of smartphone use contributes to decreased sleep quality, which can impact overall physical and mental health [20].

This is also supported by research conducted by Sangu & Wahyuni, which also strengthens the link between the intensity of device use and adolescent sleep patterns. In the study, it was found that of 84 respondents who used devices with high frequency, as many as 97.6% or 82 people experienced disturbed sleep patterns, while only 2 respondents (2.4%) still maintained good sleep patterns. On the other hand, in the group of respondents with moderate device use intensity, as many as 36.4% showed poor sleep patterns, while the majority, namely 63.6%, still had a sleep pattern that was classified as good. Furthermore, the results of statistical analysis using the Fisher's Exact Test produced a significance value of $p = 0.000$, indicating a significant relationship between the intensity of device use and the quality of sleep patterns in students at Regina Pacis High School, Jakarta. This finding suggests that the higher the frequency of device use, the greater the likelihood of individuals experiencing sleep disturbances, which in turn can negatively impact students' concentration, health, and academic performance [21].

In addition, Isnaningsih & Widya Sari also supported the results of a study analyzing the relationship between the frequency of gadget use and sleep quality in Muslim adolescents in the Aljihad Mosque area, Tatanga District, Tawanjuka Village, Palu City, Central Sulawesi, using the Chi-Square statistical test, showing statistically significant findings. The significance value (P-value) obtained was 0.029, which is below the 0.05 significance level ($p < 0.05$). This indicates that there is a meaningful relationship between how often adolescents use gadgets and the quality of sleep they experience. Thus, the null hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted, which means that the frequency of gadget use has a significant influence on sleep quality. These findings strengthen the view that the intensity of digital device use, especially at night, has the potential to reduce the quality of sleep in adolescents, which in turn can impact aspects of their health, productivity, and emotional balance [22].

According to research by Chang et al. in 2015, reading e-books with light-emitting screens near bedtime negatively impacts physiological processes related to sleep. Compared to reading printed books using reflected light, reading from these illuminated screens resulted in a decrease in subjectively perceived sleepiness. Furthermore, there was a decrease in delta and theta brainwave activity—two types of waves that typically appear when the

body begins to enter the sleepy and light sleep phases. Furthermore, exposure to light from these devices also inhibits the natural increase in melatonin produced by the pineal gland at night, an important hormone that plays a role in regulating sleep rhythms. These overall effects suggest that using illuminated digital devices near bedtime can disrupt the body's readiness for sleep and disrupt the natural biological mechanisms that support healthy sleep quality [23].

Research from Twenge et al. (2018) found that the habit of bringing and using smartphones in the bedroom, especially before bed, has the potential to impact sleep patterns negatively. The blue light emitted by device screens can suppress the secretion of melatonin a hormone that regulates sleepiness thus disrupting the body's biological clock. As a result, a person tends to have difficulty sleeping, sleep duration becomes shorter, and the quality of rest decreases, which in the long term can affect physical and mental health [24]

CONCLUSION

Based on the results of a study on the relationship between gadget use behavior and sleep quality among students from the Faculty of Medicine, Universitas Kristen Indonesia (UNI), Class of 2023, the following are as follows: 1) The majority of students from the Faculty of Medicine, Universitas Kristen Indonesia (UNI), Class of 2023, exhibited negative gadget use behavior (84.1%) and poor sleep quality (86.2%); 2) There was a significant relationship between gadget use behavior and sleep quality (p-value = 0.000), with negative gadget use behavior tending to be associated with poor sleep quality. These findings align with previous research showing that excessive gadget use, especially before bedtime, can disrupt circadian rhythms and reduce sleep quality. Therefore, this study strengthens the evidence that excessive and uncontrolled gadget use, especially at night, has the potential to disrupt sleep quality in medical students.

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