



## Research Article

### The Relationship Between Smartphone Addiction and Daytime Sleepiness in Adolescents at Senior High School in Cianjur, Indonesia

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#### ABSTRACT

Smartphone addiction is a behavioral dependency due to excessive use that can cause negative impacts, one of which is daytime sleepiness. This condition occurs when someone feels sleepy in a situation that should not cause drowsiness. Lack of sleep contributes to this problem, especially in students who sleep less than 7 hours each night, so they are at higher risk of experiencing drowsiness and difficulty focusing while studying. The purpose to determine the relationship between smartphone addiction and daytime sleepiness in students of SMAN 1 Sukaresmi. This method was quantitative study with a cross-sectional design involved 94 respondents. The instruments used were the Internet Addiction Test (IAT) questionnaire to measure smartphone addiction and the Epworth Sleepiness Scale (ESS) to measure daytime sleepiness. The results showed bivariate analysis using the Chi-Square test showed a significance value of 0.013 ( $p < 0.05$ )  $H_0$  was rejected and  $H_1$  was accepted indicating that there is a relationship between smartphone addiction and daytime sleepiness in adolescents at SMAN 1 Sukaresmi, Cianjur Regency. There is a significant relationship between smartphone addiction and daytime sleepiness in adolescents at Senior High School in Cianjur Regency.

## INTRODUCTION

Smartphone addiction has become one of the most prominent mental and social health issues among adolescents and young adults in Indonesia over the past decade. This phenomenon not only affects learning ability and concentration but also deteriorates the quality of social interactions within schools and families (Hakim & Raj, 2017). Addicted adolescents tend to prefer spending time on their devices rather than engaging in direct interactions with those around them.

Smartphones are sophisticated devices that function similarly to Personal Digital Assistants (PDAs) and are widely used by children to enhance creativity and intelligence (Ula, 2021). However, uncontrolled use can have adverse effects on physical, psychological, and social well-being. These effects include sleep disturbances, poor posture, increased stress, anxiety, and a tendency to avoid direct social interactions (Elhai et al., 2017; AlBarashdi et al., 2016)

According to recent surveys, adolescents in Indonesia predominantly use smartphones for entertainment purposes, such as accessing social media, playing online games, and watching videos. More than 80% of adolescents actively use platforms like Instagram, TikTok, and WhatsApp to communicate and share content (Marini et al 2024). Additionally, around 37.5% of adolescents spend 1–2 hours per day playing games such as Mobile Legends and Free Fire, with some spending more than 4 hours daily (Nuramadan et al., 2023).

Although the use of smartphones for learning increased during the COVID-19 pandemic, entertainment remains the primary function of these devices among adolescents. Most prefer watching videos on YouTube or TikTok over accessing digital learning materials (Fauziah Fatah et al., 2022). Consequently, study time is disrupted, affecting both physical and mental readiness to participate in school activities.

The school hours for students in Indonesia, which typically run from 7:00 AM to 3:00 PM, demand optimal physical and mental

conditions. However, smartphone addiction causes many adolescents to experience sleep deprivation due to staying up late. This finding is consistent with the study by Hamidah et al (2022) , which showed that adolescents exhibiting symptoms of internet addiction experienced disruptions in their daily routines, including rest time and social interactions, although it did not directly correlate with anxiety. The unstable and impulsive nature of adolescents makes it difficult for them to control the duration of smartphone use, making them more vulnerable to stress and anxiety (Agesti et al., 2019).

Studies have found that the prevalence of smartphone addiction among Indonesian adolescents reaches 29.8%, with minimal differences between male (30.3%) and female (29.3%) adolescents (Chen et al., 2017). Smartphone addiction is categorized as a form of behavioral dependence, characterized by excessive use, discomfort when not using the device, and inability to control usage (Billieux et al., 2015). These symptoms resemble those of substance addiction, as they impact emotional, social, and physical aspects of users.

The negative impacts of smartphone addiction include a decline in academic performance, psychological disturbances, and reduced face-to-face social interaction. Students who frequently use smartphones before bedtime have been reported to experience insomnia and difficulty concentrating in class. This condition may worsen stress and lower the quality of life among adolescents (Agesti et al., 2019; Hakim & Raj, 2017; Damayanti & Muhdiana, 2019)

The factors contributing to smartphone addiction may stem from internal aspects such as sensation seeking and low self-esteem. Social pressure and the need to maintain a presence on social media also exacerbate excessive usage habits. Studies have shown that social and practical gratification serve as strong motivations

behind this addiction (Soedarto, 2018; A A Apriyana & Sosialita, 2020)

According to the Indonesian Internet Service Providers Association (APJII), there were 221 million internet users in Indonesia in 2024, out of a total population of approximately 278 million (M.Arif, 2024). The internet penetration rate reached 79.5%, marking a 1.4% increase from the previous year, indicating the growing accessibility of technology. Moreover, a report from Common Sense Media stated that 53% of children aged 11 worldwide already own a smartphone, rising to 84% among those aged 13 to 18.

Smartphone addiction poses serious risks to adolescent health, particularly in terms of sleep quality. Research shows that adolescents who use smartphones excessively especially before bedtime tend to experience sleep disturbances such as insomnia, poor sleep quality, and morning fatigue (Demirci et al 2015). Aktivitas seperti bermain game atau berinteraksi di media sosial sebelum tidur Activities like gaming or engaging in social media before sleep increase brain stimulation and emotional alertness, hindering the relaxation process. Smartphone addiction also negatively affects sleep quality through poor bedtime habits, such as frequently checking notifications at night or sleeping with the device nearby. These behaviors contribute to a constant “on-call” state, which reduces sleep efficiency and may lead to long-term sleep disruption (Exelmans & Van Den Bulck, 2016). Consequently, such patterns can trigger excessive daytime sleepiness (EDS).

Sleep is a crucial aspect of adolescent development, supporting both physical recovery and cognitive functioning. The National Sleep Foundation recommends 8–10 hours of sleep per night for adolescents aged 14–17; however, in reality, most adolescents only get 6–7 hours of sleep (Hirshkowitz et al., 2015). Sleep deprivation is associated with an increased risk of depression, anxiety, and other emotional disorders due to disrupted

emotional processing in the brain (Roberts et al 2009).

Excessive Daytime Sleepiness is defined as the inability to maintain wakefulness and alertness during waking hours, with unintended episodes of falling asleep occurring nearly every day for at least three months (Pacheco & Rehman, 2022; Chervin, 2021). This condition can impair cognitive function, reduce academic performance, and increase the risk of accidents, especially when driving or operating machinery (Crips et al., 2021). EDS is also associated with short sleep duration, poor stress management, and sleep disorders that increase sleep needs (Meyer et al., 2019).

Daytime sleepiness is a direct consequence of poor sleep quality and the habit of late-night smartphone use. The Epworth Sleepiness Scale (ESS) describes this condition as excessive sleepiness during situations that typically should not induce sleepiness, such as sitting quietly or reading (Johns, 1991). Other studies indicate that 20–30% of high school students experience excessive daytime sleepiness, which negatively impacts concentration and academic performance (Minges & Redeker, 2016) ; Crowley et al., 2015).

This study was conducted at one of the public senior high schools under the Cianjur Regency Education Office, located in a semi-urban area experiencing rapid technological development. Preliminary observations revealed that many students reported experiencing daytime sleepiness due to staying up late using smartphones; some were also found to use smartphones for non-academic purposes during class hours. Therefore, this research aims to thoroughly examine the relationship between smartphone addiction and daytime sleepiness, and to provide scientific contributions to the field of psychiatric nursing and promotive interventions among adolescents.

## METHOD

This study employed a cross-sectional design and was conducted at one of the senior high schools in Cianjur Regency. The research was carried out from October to February 2025, involving a total of 94 respondents selected using simple random sampling. The instruments used in this study were the Internet Addiction Test (IAT) to measure the level of smartphone addiction and the modified ESS-CHAD (Epworth Sleepiness Scale for Children and Adolescents) to assess daytime sleepiness. Data analysis included univariate and bivariate tests, with the Chi-Square test used for statistical analysis.

## RESULTS

A total of 94 respondents participated in the study, with 53.7% being male and 46.3% female. The majority (95.7%) accessed the internet using smartphones, while the use of other devices such as tablets, computers, and laptops was minimal (1.1%–2.1%). The primary purposes for internet use were entertainment (28.7%) and communication (19.1%), with only 11.7% using it for educational purposes and 9.6% for information seeking. Additionally, 30.9% of respondents reported using the internet for all of the aforementioned purposes. Most respondents (52.1%) used the internet for 6–10 hours per day, followed by 23.4% who used it for 11–15 hours, 20.2% for less than 5 hours, and 4.3% for 16–20 hours; none reported usage exceeding 20 hours per day. The findings revealed that 8.5% of respondents fell into the normal category of smartphone use, 69% were at risk of addiction, and 22.5% were already classified as addicted. The impact of smartphone use was evident in the level of daytime sleepiness, with 57% of respondents experiencing severe sleepiness, 29% reporting moderate sleepiness, and only 14% experiencing mild symptoms. These results indicate a high prevalence of excessive internet use among adolescents, with most respondents being at risk of smartphone addiction and experiencing significant daytime sleepiness, which may

negatively affect academic performance and daily functioning.

**Table 1. Shows demographic data of adolescents in senior high schools in Cianjur Regency**

Characteristics of participants	f	%
<b>Gender</b>		
Male	50	53,7%
Female	44	46,3%
<b>Device</b>		
Smartphone	90	95,7%
Tablet	1	1,1%
Laptop	2	2,2%
Computer	1	1,1%
<b>Purpose of Use</b>		
Entertainment	18	28,7%
Communication	27	19,1%
Learning	11	11,7%
Information search	9	9,6%
All of the above	29	30,9%
<b>Daily Duration</b>		
<5 hours	19	20,2%
6 – 10 hours	49	52,1%
11 – 15 hours	22	23,4%
16 – 20 hours	4	4,3%
>20 hours	-	0%
<b>Addiction Level</b>		
Normal	8	8,5%
At Risk	65	69%
Addicted	21	22,5%
<b>Sleepiness Level</b>		
Mild	13	14%
Moderate	27	29%
Severe	54	57%

**Table 2. Relationship Between Smartphone Addiction and Daytime Sleepiness Among Adolescents**

Smartphone Addiction	Non Excessive Sleepiness	Excessive Sleepiness	Total	P value
	Mild	Moderate-Severe		
Not Addicted (Normal)	8	0	8	0,013
Addicted (At Risk+ Addicted)	5	81	86	
<b>Total</b>	<b>13</b>	<b>81</b>	<b>94</b>	

Bivariate analysis was conducted to examine the relationship between smartphone addiction and daytime sleepiness among adolescents. The Chi-Square test was used to assess the significance of the association, and the results are presented in Table 2.

As shown in Table 2, among adolescents categorized as not addicted (normal), all respondents (100%) experienced non-excessive daytime sleepiness (mild), and none experienced excessive sleepiness. In contrast, among those categorized as addicted (at risk and addicted), the majority (94.2%) experienced excessive daytime sleepiness (moderate–severe), while only 5.8% experienced non-excessive sleepiness.

## DISCUSSION

Based on the statistical analysis using the Chi-Square test with a significance level of  $\alpha = 0.05$ , the resulting  $p$ -value was 0.013 ( $p < 0.05$ ), indicating a significant relationship between smartphone addiction and daytime sleepiness among adolescents at Senior High School at, Cianjur Regency. This finding suggests that the higher the level of smartphone addiction in adolescents, the more likely they are to experience excessive daytime sleepiness.

From the 94 respondents surveyed, 8 (8.5%) were in the normal category, 65 (69%) were at risk of addiction, and 21 (22.5%) were categorized as addicted. Meanwhile, data on daytime sleepiness revealed that 54 respondents (57%) experienced severe sleepiness, 27 (29%) experienced moderate levels, and only 13 (14%) reported mild sleepiness. These results show that most respondents with higher levels of smartphone addiction also exhibited severe symptoms of daytime drowsiness.

These findings are consistent with previous studies by Uzunçakmak et al. (2022), which found that students with high smartphone addiction levels tend to have poor sleep quality and experience severe daytime sleepiness. Similarly, research by Exelmans & Van Den Bulck, (2016) found that uncontrolled smartphone use leads to

"bedtime procrastination," where individuals delay sleep due to excessive nighttime smartphone use, resulting in sleep deprivation and subsequent daytime fatigue. The present study found a significant relationship between smartphone addiction and daytime sleepiness among high school students. This finding is consistent with previous research, including a study by Pebriani & Marleni, (2020), which demonstrated that smartphone use had a significant effect on students' sleep quality ( $p = 0.001$ ). Poor sleep quality, in turn, has been associated with increased sleepiness during the day, potentially affecting students' concentration and academic performance.

This study found a significant relationship between smartphone addiction and daytime sleepiness, supporting the theory that screen exposure before sleep can impair rest and increase next-day fatigue. In contrast, Marta et al., (2021) reported no significant association between smartphone use before sleep and daytime sleepiness ( $p = 0.508$ ). The discrepancy may be due to differences in respondent characteristics and study variables, as this study emphasizes addictive behavior rather than usage duration alone.

This study also found that the majority of students used their smartphones for more than 6 hours per day, with approximately 23.4% using smartphones for 11–15 hours daily. This excessive use directly impacts natural sleep cycles due to blue light exposure from smartphone screens, which suppresses melatonin production (Chang et al., 2015). As a result, students experience difficulty falling asleep and a decline in sleep quality.

This phenomenon aligns with the National Sleep Foundation, (2020) which recommends that adolescents aged 14–17 years should ideally sleep 8–10 hours per night. However, most respondents in this study reported sleeping less than 7 hours per night. Such sleep deprivation can lead to reduced concentration, diminished academic performance, and an increased risk of accidents during daytime activities.

In conclusion, the study confirms a significant relationship between smartphone addiction and daytime sleepiness among adolescents. Uncontrolled smartphone use negatively affects adolescent sleep patterns, resulting in excessive drowsiness and decreased daytime productivity. Therefore, supervision and education on time management for smartphone use, as well as the importance of sleep quality, are essential for maintaining adolescents' physical health, mental well-being, and academic performance.

### CONCLUSIONS AND RECOMMENDATION

Based on the research conducted on the relationship between smartphone addiction and daytime sleepiness among adolescents at a senior high school in Cianjur Regency, it can be concluded that there is a significant relationship between smartphone addiction and daytime sleepiness. This study confirms that the higher the level of smartphone addiction among adolescents, the greater the tendency for them to experience daytime drowsiness. Thus, the alternative hypothesis ( $H_1$ ), which states "there is a relationship between smartphone addiction and daytime sleepiness among adolescents at a senior high school in Cianjur Regency," is accepted, and the null hypothesis ( $H_0$ ) is rejected. The findings emphasize that excessive smartphone use has the potential to disrupt adolescents' sleep patterns, which in turn affects their alertness and reduces focus during daytime learning activities.

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