International Journal of Health Science (IJHS)

E-ISSN: 2827-9603
P-ISSN: 2827-9603

Research Article

Smartphone Addiction and Sleep Quality in Adolescents at SMA N 1 Singorojo

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Abstract: *Smartphone* addiction *is* the interest in using *smartphones* excessively and ignoring the negative effects that may arise. Smartphone use that *exceeds* reasonable limits has a high risk that can affect sleep disorders and a person's sleep quality. This study aims to analyze the relationship between *smartphone addiction* and sleep quality in high school adolescents. This type of quantitative research is a correlational design with a *cross-sectional approach* . The research sample calculated by the Slovin formula resulted in 236 respondents with *the Disproportionale Stratified Random Sampling method* . The instruments used were the *Smartphone Addiction Scale* (SAS) and *Pittsburgh Sleep Quality Index* (PSQI) questionnaires. The results showed that most respondents experienced moderate and severe levels of addiction (40.7%) and poor sleep quality (71.2%). *The Spearman Rank test showed a p value = 0.000 (p <0.05) and r = 0.469, which means there is a positive relationship with a moderate category between smartphone* addiction and sleep quality in adolescents. So it can be concluded that the higher the level of smartphone addiction, the worse the sleep quality.

Keywords: Adolescents; High School; Sleep Quality; *Smartphone* Addiction; Teenagers.

1. Background

The peak of digital transformation is marked by the modernization of the times and the rapid advancement of science. This phenomenon is evident in the widespread use of electronic devices evenly across all age groups in society, from children and adolescents to adults (Gundagi & R, 2023) . In early 2023, *smartphone users* reached 68% or 5.44 billion of the world's population. In the last 12 months, there were 168 million new users. The number of *smartphone users* has increased by slightly more than 3% in the last year. Currently, there are 5.16 billion globally using *smartphones* , meaning 64.4% of the total population is connected to their phones, namely *smartphones* . (We are social, 2023)

Smartphone addiction is the excessive attraction to using *a* smartphone *,* ignoring the potential negative effects. Excessive *smartphone use carries a high risk of disrupting sleep and affecting sleep quality. Given the characteristics of adolescents, who are not yet fully controlled, they are the group most vulnerable to smartphone addiction.* (Supartini et al., 2021) . The consequences of excessive *smartphone use* are manifold. In particular, using electronic devices before bed is associated with an increased risk of reduced sleep duration, disrupted sleep patterns, and increased sleep onset latency (Olivares-Guido et al., 2024) .

Sleep is a physiological mechanism that occurs in alternating longer sleep stages. Sleep quality is the condition that makes a person feel comfortable and in good physical condition when waking up. Good sleep quality can improve health and well-being, while poor sleep quality can harm health (Fazril et al., 2024) . *Smartphone use* can cause various health problems such as eye fatigue, sleep deprivation, anxiety that can cause dizziness. It is thought that getting enough sleep will support the growth and development of children and adolescents and maintain focus during class. Therefore, everyone needs to get the amount of sleep they need, with the duration adjusted based on age (Dinata et al., 2024) .

Based on a preliminary study conducted on 10 students consisting of 5 females and 5 males aged 16 to 17 years. The results obtained with a category of severe *smartphone addiction* with poor sleep quality reached 40% of male students and 10% of female students. Thus, this initial data indicates the potential for sleep quality problems related to *smartphone addiction* in the school environment. Therefore, researchers are interested in conducting an in-depth study entitled "The Relationship Between *Smartphone Addiction* and Sleep Quality in Adolescents". This is due to the high use of *smartphones* among adolescents and the significant impact on

Received: January 23, 2025
Revised: February 27, 2025
Accepted: March 30, 2026
Online Available: April 02, 2026
Curr. Ver.: April 02, 2026

sleep quality as well as to understand this phenomenon in a specific school context and fill the existing research gap.

2. Theoretical Study

Smartphone Addiction

According to the Big Indonesian Dictionary (KBBI), *a smartphone* is a device that can perform various tasks similar to a computer. Meanwhile, the definition of addiction is an act of dependence on something that is done continuously on an activity that can cause physical and mental health problems. *Smartphone* addiction is a type of compulsive behavior that causes excessive and uncontrolled use of devices that causes disruption of daily tasks, mental health, and interpersonal relationships. *Smartphone addiction* is classified as a behavioral addiction. This indicates that repetitive behaviors and habits of responding to certain signals, such as notifications, sounds, and sensations that cause addiction, not the substance itself (Testi Creativi, 2025) .

Sleep Quality

Sleep plays an important role in systemic and brain physiology, including metabolism, regulating food, and balancing the hormonal and cardiovascular systems. (Catri Wulansih et al., 2024) . Sleep quality is a state experienced by individuals, so that when someone builds something from sleep, they will experience comfort and refreshment. Sleep quality encompasses quantitative and qualitative elements, such as duration, latency required for sleep, recurrent life perspectives, and abstract elements such as deep sleep and sleep levels (Dewi, 2021) .

Teenager

Adolescence is a demographic period that occurs during the transition between childhood and adulthood, typically between the ages of 12 and 18. Physically, emotionally, and socially, it is characterized by rapid development. Adolescents often desire independence and self-identity, and their social and family relationships change. (Wahyuni et al., 2024) . The age range of adolescence is usually classified into three categories:

a. Early adolescence (12-15 years)
   When a person begins to move away from the position of a child and tries to become an independent individual.
b. Middle adolescence (16-18 years).
   Teenagers learn to manage their impulsivity, begin to mature behaviorally, and make initial assessments of the careers they desire during this time.
c. Late adolescence (age 19 -21 years).
   A period marked by significant aspirations to develop and adapt to both peers and adults. (Bawono, 2023)

3. Research Methods

This study uses a quantitative research type with a correlational research design and applies a *cross-sectional approach* . The population of this study was all adolescents at SMA Negeri 1 Singorojo, totaling 577 students. The sample in this study was determined by the Slovin formula which obtained 236 samples and used a *Disproportionale Stratified Random Sampling sampling technique* . The instruments used were *the Smartphone Addiction Scale (SAS)* questionnaire to measure the level of *smartphone addiction* and *the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality. Data were analyzed using the Spearman Rank* test to identify relationships or evaluate the meaning of associative hypotheses between two variables.

4. Results And Discussion

Results

Table 1 Frequency Distribution of Respondent Characteristics (n=236)

Respondent Characteristics	Frequency (n)	Percentage(%)
Age		
15 years	38	16.1%
16 years	82	34.7%
17 years	79	33.5%
18 years	37	15.7%
Gender		
Man	116	49.2%
Woman	120	50.8%
Class		
Class X	78	33.1%
Grade XI	80	33.9%
Grade XII	78	33.1%
***Smartphone* Use in a Day**		
2 hours	7	3.0%
3 hours	26	11.0%
4 hours	54	22.9%
5 hours	59	25.0%
>6 hours	90	38.1%
Total	236	100%

Table 1 shows the characteristics of respondents with the highest age percentage being 16 years old (82 respondents (34.7%). The highest gender percentage was female (120 respondents (50.8%). Furthermore, the highest percentage of *smartphone usage duration* was >6 hours (90 respondents (38.1%).

Table 2*Smartphone* Addiction Levels (n=236 **)**

***Smartphone* Addiction Level**	**Frequency (n)**	**Percentage (%)**
Light	42	17.8%
Currently	96	40.7%
Heavy	96	40.7%
Very heavy	2	0.8%
Total	236	100.0%

Based on Table 2, it is known that the results of the frequency distribution of *smartphone addiction levels* , the average respondent is at a moderate and severe addiction level with a total of 96 respondents (40.7%). Furthermore, respondents with a mild addiction level numbered 42 people (17.8%), and a very severe addiction level was the category with a total of at least 2 respondents (0.8%). These results indicate a high intensity of *smartphone use* among respondents.

Table 3Adolescent Sleep Quality (n=236)

Sleep Quality	**Frequency (n)**	**Percentage (%)**
Good	68	28.8%
Bad	168	71.2%
Total	236	100.0%

Based on Table 3, the frequency distribution of adolescent sleep quality shows that the majority of respondents (168 respondents) fell into the poor sleep quality category, representing 71.2%. Meanwhile, 68 respondents (28.1%) fell into the good sleep quality category. These results indicate that the average adolescent is indicated to have sleep disorders or insufficient sleep, as evidenced by the high percentage of respondents reporting poor sleep quality.

Table 4 The Relationship Between Smartphone Addiction Levels and Sleep Quality of Adolescents at SMA N 1 Singorojo (n=236)

		Sleep Quality							
		Good		Bad		Total		P-*Value*	r
		F	%	F	%	F	%		
Smartphone Addiction Level	Light	35	14.8%	7	3.0%	42	17.8%	0.000	0.469
	Currently	21	8.9%	75	31.8%	96	40.7%		
	Heavy	12	5.1%	84	35.6%	96	40.7%		
	Very heavy	0	0.0%	2	0.8%	2	0.8%		
Total		68	28.8%	168	71.2%	236	100.0%		

Based on table 4, it shows that the category of mild *smartphone* addiction has an average of 35 respondents (14.8%) who have good sleep quality, while those who have poor sleep quality are 7 respondents (3.0%). At the moderate addiction level, more respondents have poor sleep quality, 75 participants (31.8%), although those who have good sleep quality are 21 respondents (8.1%). This is also seen in the severe addiction level category, where most respondents have poor sleep quality, 84 participants (35.6%), while those who have good sleep quality are 12 participants (5.1%). Furthermore, respondents with a very severe addiction level all respondents have poor sleep quality, 2 participants (0.8%).

Data analysis using *Spearman Rank* correlation test regarding *smartphone addiction* with sleep quality of adolescents in SMA Negeri 1 Singorojo, obtained a p-value of 0.000 <0.05, so there is a relationship between *smartphone addiction* and sleep quality of adolescents in SMA Negeri 1 Singorojo. The correlation coefficient (Rho) value of 0.469, indicates a significant relationship in the moderate category with a positive direction (unidirectional), so the higher the level of *smartphone addiction* , the worse the sleep quality experienced by adolescents.

Discussion

***Smartphone* Addiction and Sleep Quality of Adolescents at SMA N 1 Singorojo**

Based on the results of the statistical test of the study using *the Spearman Rank correlation test* , a p-value of 0.000 <0.05 was obtained, so Ha was accepted and H0 was rejected, meaning there was a relationship between *smartphone addiction* and the sleep quality of adolescents at SMA Negeri 1 Singorojo. The correlation coefficient (Rho) value of 0.469 indicated a significant relationship in the moderate category with a positive direction (unidirectional), so the higher the level of *smartphone addiction* , the worse the sleep quality experienced by adolescents.

Students who use their *smartphones* late at night or right before bed may have difficulty sleeping because they delay bedtime due to being too busy using their *smartphones* . They often lose track of time and continue playing with their phones late into the night due to being too focused on their *smartphone use* (Noviani & Harahap, 2021) . Teenagers who use *their smartphones* beyond reasonable limits require an additional 60 minutes of sleep. Frequent *smartphone screen use also disrupts the sleep cycle, making it more difficult for people to fall asleep.* (Yanti et al., 2023)

5. Conclusion And Suggestions

Based on the results of research conducted at SMA N 1 Singorojo on 236 respondents, the majority of respondents were at moderate and severe addiction levels with 96 respondents (40.7%) each. Furthermore, respondents with mild addiction levels were 42 people (17.8%), and very severe addiction levels were the category with the fewest total, namely 2 respondents (0.8%). Respondents with poor sleep quality categories were 168 respondents (71.2%), while those with good sleep quality categories were 68 respondents (28.1%). Bivariate analysis obtained a *p-value of* 0.000 <0.05 and a correlation coefficient (Rho) value of 0.469 indicating a significant relationship between *smartphone addiction* and adolescent sleep quality in a positive direction and in the moderate category. This means that the higher the level of *smartphone addiction* , the worse the adolescent sleep quality. Researchers recommend that schools provide health education programs for adolescents regarding good *smartphone usage management* and the importance of sleep quality, which is also supported by the active role of parents.

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