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Relationship between Gadget Addiction and Sleep Disorder among Adolescents in the Community

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ABSTRACT

The rapid advancement of digital technology has increased gadget use, particularly among adolescents. While gadgets offer benefits, excessive use can lead to negative consequences, including sleep disturbances. Quality sleep is crucial during adolescence, as it influences physical growth, learning concentration, and mental and emotional health. This study aimed to examine the relationship between gadget addiction and sleep disturbances in adolescents. A quantitative correlational approach was employed, using a questionnaire divided into two sections: gadget addiction and sleep disturbance, each with five Likert-scale items (1–5). The study population comprised adolescents aged 13–15 years at Junior High School N 31 Padang, with a sample of 100 respondents selected through purposive sampling based on predetermined criteria. Data were analyzed using the Pearson correlation test. The results indicated a significant positive correlation between gadget addiction and sleep disturbance ($r = 0.61$, $p < 0.01$), suggesting that higher levels of gadget addiction are associated with greater likelihood of experiencing sleep problems. The findings highlight the need for educational interventions from both schools and families to guide adolescents in managing gadget use and reducing the risk of sleep disturbances. In conclusion, gadget addiction is significantly related to sleep disturbances in adolescents, emphasizing the importance of promoting healthy and balanced technology use to support adolescent development.

Keywords: *Gadget Addiction, Sleep Disorder, Teenagers, Mental Health*

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INTRODUCTION

The development of information and communication technology has significantly changed people's lifestyles, including in terms of how to interact, learn, work, and Access Entertainment. Gadgets such as smartphones, tablets, and laptops are now a staple in everyday life. This phenomenon not only occurs among adults, but is also increasingly dominant among adolescents. Teenagers as a generation of digital natives grow up in an environment full of technology, making gadgets the main means of communication, entertainment, and learning.

However, behind the great benefits offered, excessive use of gadgets raises various negative impacts, especially on mental and physical health aspects. One issue that has received increasing attention in recent years is sleep disorders caused by gadget addiction. Gadget use late into the night, exposure to blue light from screens, and excessive cognitive activity near bedtime have been shown to interfere with the quality and duration of sleep, especially in adolescents who biologically still need enough sleep for growth and development.

Based on a survey conducted by the National Sleep Foundation (2020), about 72% of adolescents use electronic devices in bed, and more than 60% of them have sleep disorders. This is confirmed by a study from the American Academy of Sleep Medicine (AASM), which states that adolescents aged 13-18 years need 8-10 hours of sleep every night, but only 23% of them actually achieve it. These Data show a large gap between adolescents ' sleep needs and their sleep habits that are influenced by the use of technology.

In Indonesia, studies conducted by several researchers in areas such as Sumedang, Gorontalo, and Palu, also found similar facts. Most teenagers admit to using gadgets for more than 8 hours per day, not a few even use them before or while in bed. Reported sleep disorders include difficulty falling asleep (insomnia), often waking up at night, waking up not fresh, and excessive sleepiness during the day. On the other hand, compulsive use of gadgets has also been associated with the appearance of stress, anxiety and reduced academic performance.

Physiologically, blue light from gadget screens inhibits the production of the hormone melatonin, a hormone that plays an important role in regulating sleep cycles. As a result, sleep time regresses and sleep quality decreases. In addition, interactive activities such as playing games, social media, or watching videos before bed trigger brain activation that prolongs wakefulness (sleep latency). This condition is known as bedtime procrastination, which is the tendency to delay sleep even though there is no urgent reason.

Chronic sleep disorders in adolescents have been strongly associated with excessive gadget use, both in terms of duration and intensity. The physiological mechanism is closely linked to blue light exposure, which suppresses melatonin production, and the stimulating nature of digital interactions, which delays sleep onset. Although many studies have explored the connection between gadget use and sleep disturbances, most have been limited to specific variables such as screen time duration or the type of activity performed. Few local studies have examined gadget addiction as a psychological factor with a direct influence on sleep disorders among adolescents in the general population. This gap is important to address, particularly in the context of an

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increasingly pervasive and hard-to-control digital culture.Therefore, this study aims to determine the relationship between the level of gadget addiction with sleep disorders in adolescents in the community. Using a quantitative approach and relevant simple instruments, this study is expected to provide a clearer picture of the impact of gadget use on Adolescent Sleep Health. The results of this study are expected to be the basis for providing education to adolescents, parents, and schools about the importance of managing the use of gadgets in order to maintain the quality of sleep and overall mental health of adolescents.

METHODS

This study uses a quantitative approach with correlational descriptive design. The population in this study is adolescents aged between 13 to 15 years in Junior High School N 31 Padang with a sample of 100 respondents, who were selected using purposive sampling technique, which is a sampling technique based on certain criteria that have been set by the researcher. Data collection was conducted through questionnaires and analyzed with Pearson Product Moment correlation to determine whether or not there is a significant relationship between gadget addiction and sleep disorders. The significance level used is $p < 0.05$.

RESULTS

1. Characteristics Of Respondents

The study involved 100 teenagers aged 13-18 years who actively use gadgets. Based on the collected data:

Table 1. Characteristics of Respondents

Characteristics	Frequency	Category (n=100)	Percentage (%)
Age	13–15 years	52	52%
	16–18 years	48	48%
Duration of Gadget use	< 4 hours	15	15%
	4–6 hours	60	60%
	> 6 hours	25	25%
Gadget activity	Social media	45	45%
	Watch videos	30	30%
	Play games	25	25%

The majority of respondents are 13-15 years old (52%). About 85% of teens use gadgets more than 4 hours a day, with 60% using gadgets between 4 to 6 hours. The most common activities are social media (45%), watching videos (30%), and playing games (25%). This indicates a fairly intensive level of gadget use among adolescents.

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2. Univariate Analysis

Univariate analysis was conducted to see the distribution of scores of two main variables:

Table 2. Frequency distribution of Gadget addiction and Sleep Disorders

Variable	Average Score (Scale 1–5)	Interpretasi
Gadget addiction	3,6	Moderate to high
Sleep Disorders	3,4	Moderate

The average gadget addiction score is 3.6 which shows most respondents have gadget addiction levels in the medium to high category. Meanwhile, an average sleep disorder score of 3.4 indicates sleep disorders in adolescents are also in the moderate category, which can interfere with the quality and duration of their sleep.

3. Bivariate Analysis

To test the relationship between the level of gadget addiction with sleep disorders, Pearson correlation test with the following results:

Table 3. Analysis of The Relationship Between the Level of Gadget Addiction with Sleep Disorders

Variable	R value Pearson	p-value	Conclusion
Gadget addiction and Sleep Disorders	0,61	< 0,01	there was a positive and significant relationship between the two

There is a fairly strong (r=0.61) and significant ($p < 0.01$) positive relationship between gadget addiction and sleep disorders. That is, the higher the level of gadget addiction experienced by adolescents, the more likely they are to experience sleep disorders. This suggests that gadget addiction can be a risk factor for sleep disorders in adolescents

DISCUSSION

1. Univariate Analysis

The majority of respondents are 13-15 years old (52%). About 85% of teens use gadgets more than 4 hours a day, with 60% using gadgets between 4 to 6 hours. The most common activities are social media (45%), watching videos (30%), and playing games (25%). This indicates a fairly intensive level of gadget use among adolescents.

The results showed that the average score of gadget addiction was 3.6 which showed that most respondents had gadget addiction levels in the medium to high category. Meanwhile, an average sleep disorder score of 3.4 indicates sleep disorders in adolescents are also in the moderate category, which can interfere with the quality and duration of their sleep.

According to Bronfenbrenner's Ecological Systems Theory (1979), individual behavior is influenced by various layers of the environment ranging from family, school, to society at large.

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Environmental factors such as lack of parental supervision, easy access to gadgets, and lack of alternative activities can strengthen the tendency to excessive gadget use.

Analysis of the data showed that the age range of 13-15 years, who are still in the early stages of adolescence, tend to be more vulnerable to unhealthy patterns of gadget use due to lack of maximum self-control ability and social encouragement from peers (peer pressure). The study by Steinberg (2005) confirms that adolescents at this age are still developing executive functions of the brain, so the risk of digital dependence is higher. In addition, the dominant pattern of activity (social media, video, games) elicits a special psychological effect. Social media, for example, is not only time-consuming but also has the potential to lead to social comparisons and psychological distress that can worsen mental health (Vogel et al., 2014). Online gaming can trigger dopamine thereby reinforcing addictive behavior and reducing the time it should be for sleep and physical activity.

Gadget addiction that is classified as moderate to high indicates that gadget use behavior is already in the category of maladaptive. According to Billieux et al. (2015), digital technology addiction is not only related to duration, but also involves psychological dimensions such as inability to control use, strong urge to use, and negative consequences that remain ignored.

The neurobiological aspects described by Montag and colleagues are in line with the findings of Kuss & Griffiths (2012) which states that internet and gadget addiction is included in the new addictive behavior disorders (behavioral addictions) that have a serious impact on mental health and social functioning.

In addition, gadget addiction can also serve as a maladaptive coping mechanism against stress and emotional problems. Adolescents who experience academic or social pressure can use gadgets as a temporary escape, but this actually worsens the psychological condition in the long term, as shown by Brand et al. (2014).

This condition reflects the phenomenon of changing the lifestyle of adolescents who are highly dependent on digital technology. As an implication, the intervention must be multisectoral, involving families, schools, and communities to create an environment that supports the wise use of gadgets. Education should also target not only a reduction in usage time but an increase in the quality of content accessed in order to continue to support the growth and development of adolescents. This phenomenon shows that the treatment of gadget addiction is not enough just from the aspect of time management, but must involve a comprehensive psychological approach, including cognitive behavioral therapy to change thought patterns and attitudes towards gadget use. It is also important to prepare positive activity alternatives and strengthen social support in the adolescent environment.

The Sleep Disorders found show a real impact of gadget use on physiological health. Exposure to blue light that inhibits melatonin is just one mechanism. Other factors such as mental overstimulation, social anxiety due to online activity, and circadian rhythm disturbances due to altered sleep patterns also contribute. Minges & Redeker (2016) confirmed that sleep disorders related to gadget use can cause a domino effect on hormonal balance and metabolism, which leads to the risk of obesity, decreased endurance, and mood disorders.

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In addition, poor sleep quality decreases adolescents ' cognitive capacities, such as attention, memory, and executive function, which impacts learning and decision-making performance (Curcio et al., 2006). This is very important considering that adolescence is a period of formation of learning abilities and social adaptation. This sleep disorder also has the potential to aggravate gadget addiction. A bad cycle in which lack of sleep increases the desire to seek stimulation through gadgets, and the use of gadgets worsens the quality of sleep, creating a vicious circle that is difficult to break. Therefore, effective interventions need to focus on education about healthy sleep habits (sleep hygiene) and reducing the use of gadgets, especially at night.

2. Bivariate Analysis

The results showed that there was a strong positive correlation ($r = 0.61$, $p < 0.01$) between gadget addiction and sleep disorders, indicating a link that cannot be underestimated. A growing addiction to gadgets is causing significant sleep disruption, and this has long-term implications for the mental and physical health of adolescents. Exelmans & Van den Bulck (2017) found that sleep disorders in intensive gadget users are often exacerbated by anxiety related to digital activities, such as fear of missing out (FOMO). This anxiety makes it difficult for adolescents to digitally disconnect, even when their bodies need rest. According to the Self-Regulation Failure Model (Baumeister et al., 1994), individuals with gadget addiction have difficulty controlling their urges and impulses, leading them to continue gadget use despite knowing its impact on bedtime. This lack of self-regulation causes adolescents to unconsciously sacrifice sleep time for the instant gratification obtained from gadget use.

Exposure to gadget screens not only affects the hormone melatonin, but can also trigger a stress response with increased cortisol levels that can interfere with sleep quality (Leone et al., 2015). High cortisol at night makes it difficult for the body to relax and reduces the depth of sleep, so sleep becomes not restorative. In addition, sleep disorders due to gadget addiction have the potential to increase the risk of Sleep Debt Syndrome, which is the accumulation of sleep deprivation that has an impact on mood disorders, decreased immune resistance, and decreased cognitive and academic abilities (Banks & Dinges, 2007). This condition becomes very crucial considering that adolescence is a phase in which cognitive and emotional functions are very vulnerable.

Longitudinal study by Hirshkowitz et al. (2015) showed that adolescents with chronic sleep disorders have a higher tendency to develop psychological disorders such as depression and anxiety disorders, which in the long term can also reinforce digital addictive behaviors.

On the other hand, sleep disorders that occur can worsen adolescents ' mental resilience to stress, thus reinforcing their need to “escape” to the digital world as a maladaptive coping mechanism, as explained in the Compensatory Internet Use Theory (Kardefelt-Winther, 2014).
These findings confirm that the relationship between gadget addiction and sleep disorders is multifactorial and mutually reinforcing. Therefore, prevention and intervention efforts should be comprehensive, not only focusing on the time-of-Use aspect, but also considering the psychological, hormonal, and social factors that influence adolescent behavior. The balance between the benefits of

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technology and health risks should be a key focus in the development of youth digital health policies, given that gadgets are unlikely to be completely avoided in everyday life. With a deeper understanding of the mechanism of this relationship, it is hoped that more effective strategies can be generated to improve sleep quality and adolescent mental health, while mitigating the adverse effects of gadget addiction

CONCLUSIONS

Based on the results of univariate analysis, the majority of respondents in this study were adolescents aged between 13 to 15 years who used gadgets for 4 to 6 hours every day. The use of these gadgets is mostly focused on social media activities, watching videos, and playing games. These findings show that gadgets are already an important part of teenagers ' daily lives, both for social interaction and entertainment. However, this fairly long duration of use also has a negative impact. The level of gadget addiction found was in the medium to high category, which indicates that the pattern of gadget use in adolescents has begun to interfere with their daily activities. In addition, sleep disorders experienced by adolescents are also classified as moderate, with the main symptoms such as difficulty initiating sleep, frequent awakenings at night, and drowsiness that interfere with activities during the day.

Furthermore, from the bivariate analysis found a positive and significant relationship between gadget addiction and sleep disorders in adolescents. This means that the higher the level of gadget addiction, the more severe the sleep disturbance experienced. This relationship can be explained through several mechanisms, such as exposure to blue light from gadget screens that inhibit the production of the hormone melatonin, mental stimulation that makes it difficult for the body to relax, as well as the psychological urge to continue to connect with the digital world that interferes with sleep time. The impact of this sleep disorder is not just a sleep quality problem, but also has the potential to worsen mental health and decrease adolescent cognitive function, which has an impact on academic performance and overall well-being.

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