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## Online Gaming Addiction as A Predictor of Sleep Quality through Male Teenagers

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### Abstract

About 18% of the world's population, especially teenagers, had sleep issues in 2023, according to WHO statistics. Addiction to internet gaming is one of the causative factors; it stimulates the Reticular Activating System (RAS), which excites the brain and delays the onset of sleep. In 2024, the current study also sought to find out the association between male teenage students of SMKN 1 Padang City's addiction towards online games and sleep quality. A cross-sectional analytical study was conducted from June until July, 2024. The entire 355 male second-grade students who were chosen by the total sampling technique were considered to be the population. Spearman correlation test was a bivariate and univariate technique used in data analysis. Mean score for sleep quality was 27.54, while that of gaming addiction was 37.44. Spearman test revealed a significant correlation ( $p = 0.000$ ;  $\rho = 0.758$ ). It is concluded that there is a strong correlation between online gaming addiction and sleep quality. It is recommended that school education programs on sleep hygiene and time management be provided.

**Keywords:** Online Gaming Addiction, Sleep Quality, Teenagers

### Introduction

According to the Child Protection Law, adolescence is a stage of life for individuals aged between 10-18 years. Adolescence is a transitional period between childhood and adulthood characterized by biological and psychological growth and development (Bariyyah Hidayati & ., 2016). Adolescents face various needs, one of which is the need for sleep (Zetrial, 2021). According to the Ministry of Health of the Republic of Indonesia, the healthy sleep requirement for adolescents is 8-9 hours per day (Kemenkes RI, 2024).

Based on data from the World Health Organization (WHO), approximately 18% of the world's total population experiences sleep problems with complaints so severe that they can

cause psychological stress for the sufferers (Susana et al., 2024). According to the Centers for Disease Control and Prevention (CDC) in 2017, the prevalence of sleep needs being unmet in American adolescents reached 68.8% (CDC, 2017). Based on data in Indonesia, as much as 63% of sleep quality among adolescents is not being met (Lengkong et al., 2022). Meanwhile, based on research conducted by the United States International Data Base, Census, Bureau, it is explained that out of 238.452 the millions of Indonesia's population, 28.035 million (11.7%) experience sleep disorders or difficulty sleeping. In West Sumatra, research conducted by Hergaf, I, (2016) at SMP Negeri 1 Padang shows a prevalence of sleep disorders among students of 44.3%. As many as 62.9% of adolescents experience sleep disorders, with sleep-wake transition disorders being the most frequently encountered type of disorder. Inadequate sleep and poor quality sleep can lead to disruptions in physiological and psychological balance.

One of the factors affecting the quality of sleep in adolescents is addiction to online games. Online Game Addiction is a condition in which a person is bound to a very strong habit and cannot break free from playing Online Games. Piyeke et al., (2014) mention that the duration of time or intensity of playing Online Games is considered abnormal or addictive if one plays for more than 3 hours. Azzahra et al., (2025) states that the symptoms of Online Game Addiction can be seen from children who spend more time playing Online Games during school hours, a decline in their school grades, falling asleep in class, preferring to play games rather than socialize with friends, distancing themselves from social groups (clubs or school activities), lying about the time spent playing games, frequently neglecting responsibilities, feeling anxious, and becoming easily irritable if they do not play. Research conducted by Matur et al. (2021) shows that there are 169 adolescents (70.4%) experiencing Online Game Addiction and 136 adolescents (56.7%) experiencing poor sleep quality. This occurs because adolescents playing Online Games spend 4-6 hours a day and are exposed to phone light, which leads to poor sleep quality.

One school located in Padang City has experienced a decline in student achievement. Based on interviews with several class teachers, some students occasionally sleep during learning hours and often lack focus in their studies due to fatigue. There are students who arrive late to school and skip classes. Interviews with students indicate that they prefer to play Online Games at night for up to 3 hours or more, and usually go to sleep after 11 PM.

## **Literature Review**

### **1. Sleep quality**

Sleep is an unconscious state in which individuals can be awakened by appropriate stimuli or sensory inputs. It can also be described as a relatively unconscious condition, not merely a state of complete tranquility without activity, but more as a sequence of recurring cycles characterized by minimal activity, with varying awareness, there are changes in physiological processes, and there is a decrease in response to external stimuli (Rohmah & Santik, 2020). Sleep is a basic human need that must be fulfilled to maintain biological homeostasis and the survival of each individual. This need is a basic requirement; if it is not met, it can affect other needs. The opportunity to sleep is as important as the need for eating,

activities, breathing, sexual needs, and other needs (Kurniati et al., 2022). Sleep quality is a person's satisfaction with sleep, so the person does not show feelings of fatigue, is easily aroused and restless, sluggish and apathetic, has dark circles around their eyes, swollen eyelids, red conjunctiva, sore eyes, divided attention, headaches, and frequently yawning or feeling drowsy. Inadequate sleep and poor quality sleep will cause disturbances in physiological and psychological balance.

## **2. Oline gaming addiction**

Online gaming addiction is a condition where a person is strongly bound to habits that they cannot break free from playing online games. Over time, there will be an increase in frequency, duration, or amount of engagement in this activity, disregarding the negative consequences on themselves. When a person becomes addicted to online games, the cerebral cortex releases norepinephrine and the midbrain releases the neurotransmitter dopamine. These two neurotransmitters are part of the reticular activation system (RAS) which functions in maintaining wakefulness. The electromagnetic waves and light produced inhibit the production of the hormone melatonin released by the hypothalamus gland, which functions to decrease alertness. Thus, if melatonin is not produced promptly, the person cannot immediately engage in sleep activities (Zetrial, 2021). According to Situmorang (2021), online gaming addiction can have effects including damaging the eyes, causing fatigue, making one lazy to study, teaching violence, and even having the potential to teach gambling.

## **Research Method**

This type of research is analytic with a cross-sectional method approach. It was conducted in 2024 at SMKN 1 Padang in West Sumatera with 355 male teenagers and total sampling. The research instrument used was a questionnaire distributed via google form. The data analysis conducted in this study is univariate and bivariate analysis with *Spearman correlation test*.

## **Result**

### **1. Univariate analysis**

Table 1. Sleep quality and online game addiction of male teenagers

<b>Variable</b>	<b>Mean</b>	<b>SD</b>	<b>Lowest Score</b>	<b>Highest Score</b>
Sleep quality	27,54	6,445	10	40
Online Game Addiction	37,44	8,549	14	55

Based on table 1, it is known that the average sleep quality is 27.54 (moderate) with a standard deviation of 6.445, the lowest sleep quality score is 10 and the highest is 40. the average online game addiction is 37.44 (high) with a standard deviation of 8.549, the lowest online game addiction score is 14 and the highest is 55.

## 2. Bivariate Analysis

Table 2. Relationship of online game addiction with Sleep Quality of Male teenagers

<b>Spearman Correlation</b>	<b>N</b>	<b>P Value</b>	<b>Rho</b>
Online game addiction and sleep quality	355	0,000	- 0.758

Based on Table 2 above, it can be seen that there was a significant relationship between Online game addiction and sleep quality at SMK N 1 Padang with P value of 0.048. The correlation number (rho) obtained is 0.758, meaning that the level of correlation strength is a very strong. That's mean if the level of online game addiction is high, the quality of sleep is low.

## Discussion

### 1. Sleep Quality

Research shows that the average sleep quality of male students at SMKN 1 Kota Padang is 27.54 (moderate) with a standard deviation of 6.445, with the lowest sleep quality score being 10 and the highest being 40. This research aligns with a previous study conducted by Trisnowiyanto et al. (2024), which showed that the average sleep quality scale for respondents is 9.732 (poor) with a standard deviation of 1.804. The minimum sleep quality score is 5 and the maximum is 13.

Subjective sleep quality refers to respondents' statements or opinions about their perceived sleep. High School students (SMA) are part of the population most lacking in sleep; they often postpone scheduled sleep. Teenagers tend to have busy times on the following days and do not go to bed until midnight. Such behaviors lead many teenagers to struggle to fall asleep until it is late and to wake up early in the morning, often experiencing dissatisfaction with their sleep (Luis et al., 2018). According to Pandey et al. (2019), many factors cause teenagers to experience sleep disturbances, including lifestyle changes, one of which is the excessive use of smartphones in daily routines. Research by Luis et al. (2018) mentions that a person's daily routine can affect their sleep patterns; having a routine at night can lead both teenagers and adults to become fatigued, disrupting their sleep process and resulting in unfulfilled sleep quality.

According to the researchers' assumption, the high average score of sleep quality among adolescents at SMKN 1 Kota Padang can be linked to their inability to manage time spent playing online games, which results in a lack of rest time. The research shows that smartphone usage, especially for gaming, significantly contributes to sleep disturbances. The blue light from smartphone screens inhibits the production of melatonin, which is crucial for regulating sleep cycles. Using gadgets before bed can lead to difficulties in falling asleep and feelings of tiredness upon waking. Respondents involved in the study reported symptoms such as frequent drowsiness (47%), headaches (44.2%), and feelings of weakness after sleeping (47.8%).

## **2. Online Game Addiction**

The research findings indicate that the average online game addiction score among male adolescents at SMKN 1 Kota Padang is 37.44 (high) with a standard deviation of 8.549, where the lowest online game addiction score is 14 and the highest is 55. These results are in line with research by Yanti et al. (2019), which shows that the average online game addiction score is 63.32 (moderate) with a standard deviation value of 11.16.

According to Ghina (2023), during school hours, students are more likely to feel stressed due to the many school assignments. Therefore, playing games is their choice to relieve stress and attain a sense of relief. According to Haibanissa et al. (2022), the goal of playing is to restore the energy expended due to work; playing is the opposite of working, making it an ideal way to replenish lost energy. Playing is regarded as a recreational activity or as behavior stemming from the need for relaxation. For individuals actively playing Online Games, when challenges in the game are successfully completed, they will receive rewards within the game. Upon achieving this, the dopamine hormone functions as a neurotransmitter or mediator for the biosynthesis of adrenaline. The role of dopamine in the brain is as a reward system that grants recognition to the brain for the behaviors that have been performed. The effects of dopamine lead individuals to experience addiction (Oktavian et al., 2018).

According to the researchers' assumptions based on the research results, the high average level of addiction to Online Games among male students at SMKN 1 Kota Padang is caused by a lack of self-control, making it difficult to stop playing games. Based on the type of game played, 152 respondents (42.5%) play Free Fire, and the objective of this game is to survive. there are various characters within it, making it very interesting to play. The analysis of the questionnaire shows that 159 (44.7%) of respondents always play online games. Teenagers who feel bored at home or school tend to seek entertainment through online games, which can be seen from the questionnaire analysis results showing that 175 (49.2%) of respondents often play online games at kiosks after school and even 132 (37.1%) of respondents sometimes skip school just to play online games at places that have Wi-Fi and gaming facilities. Based on the duration of playing online games, the highest frequency occurs at night, with 146 (41.1%) of respondents playing online games for more than 6 hours on regular days and 161 (45.3%) of respondents playing online games for more than 6 hours during school holidays. Teenagers who are addicted to online games tend to interact less with their peers, focus on their mobile screens, and prefer to isolate themselves. This can be seen from the questionnaire analysis, where 180 (50.7%) of respondents prefer to spend time playing online games rather than gathering with friends, and 160 (40%) of respondents prefer playing online games to resting/sleeping. This can have negative impacts on physical health (such as eye strain caused by radiation from devices), psychological health (such as declining academic performance), social health (such as reduced interaction with friends), and overall health (such as lack of sleep and physical activity) of the respondents.

## **3. The Relationship Between Online Game Addiction and Sleep Quality**

The research results show that the Spearman correlation test of online game addiction and sleep quality of male adolescents in SMKN 1 Kota Padang shows a significant value (p-

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value) of 0.000, which is smaller than the alpha value ( $\alpha = 0.05$ ), which means  $H_0$  is rejected. Therefore, it can be concluded that there is a relationship between online game addiction and sleep quality among male adolescents in SMKN 1 Kota Padang. The correlation coefficient ( $\rho$ ) obtained is -0.758, indicating that the strength of the correlation is very strong. The negative correlation coefficient means that if the level of online game addiction is high, the sleep quality is low. These research results are in line with previous research conducted by Sulistiyoningrum (2022) with  $p$ -value = 0.000 and Spearman correlation strength is 0.787 was obtained, it can be interpreted that there is a relationship between online game addiction and sleep quality among adolescents, and this relationship is strong. This finding is supported by Dewi (2022) research, which indicates that  $p$ -value (0.000) and  $\rho$  is 0.387 using Pearson Product Moment. It is indicating that the strength of the correlation between sleep quality and online game addiction exists.

According to Ghina (2023), playing online games can affect a person's sleep quality because exposure to light from electronic devices can influence an individual's circadian rhythm. For instance, exposure to blue spectrum light can impact the circadian rhythm, which is more sensitive to such light. Nighttime light has specific phase effect properties that delay the circadian rhythm, resulting in delayed sleep times. The cerebral cortex is activated when someone plays online games, producing norepinephrine and dopamine neurotransmitters released by the midbrain. These two neurotransmitters are part of the reticular activation system (RAS) that maintains a person's alertness. Exposure to light from electronic devices also results in increased melatonin production, making it difficult for someone to fall asleep.

According to the researchers' assumption, in Online Gaming, one must remain alert and vigilant while playing, which causes adrenaline hormone levels to rise, making it difficult to fall asleep because of the desire to keep playing continuously. Excessive exposure to light from computers and smartphones also keeps the brain awake, making it hard to sleep. The behavior of excessive smartphone use also causes adolescents to postpone sleep, leading them to experience sleep deprivation, which negatively affects sleep quality. Similarly, playing Online Games for too long will impact a person's sleep quality. This indicates the need for sleep control and duration management when playing games so as not to cause health disturbances.

## **Conclusion**

This research showed that average sleep quality of male students at SMKN 1 Kota Padang is 27.54 (moderate), and average addiction to Online Games is 37.44 (high). The Spearman correlation test shows a  $p$ -value of 0.000, indicating a relationship between Online Game addiction and sleep quality among male students at SMKN 1 Kota Padang. The correlation coefficient ( $\rho$ ) obtained is -0.758, indicating that the strength of the correlation is very strong. These findings are expected that the Education Institution can help students understand the negative impacts of Online Game addiction on sleep quality. Encourage students to engage in active activities outside of school, such as participating in youth activities, religious activities, and community service. These activities can help students reduce their time spent playing Online Games and improve their sleep quality. Coordinate with parents so they

can help monitor and pay attention to their children's activities. Parents can assist in managing Online Game playtime and maintaining adolescents' sleep quality.

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