



# The Relationship Between Duration of Online Game Playing and Sleep Quality Among Students at SMP Negeri 8 Manado

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**Abstract.** *The increasing duration of online gaming among adolescents has raised public concern, particularly due to its potential impact on sleep quality. Sleep is a fundamental physiological need that is essential for physical growth, mental health, and overall well-being, aligning with Sustainable Development Goal (SDG) 3, which emphasizes ensuring healthy lives and promoting well-being for all ages. Adequate sleep also plays a crucial role in cognitive functioning, learning capacity, and academic performance, which are central to SDG 4, aimed at ensuring inclusive and equitable quality education. Excessive engagement in online gaming may lead to addictive behaviors and reduced sleep duration, ultimately resulting in poor sleep quality among adolescents. This study aimed to examine the relationship between the duration of online gaming and sleep quality among students at SMP Negeri 8 Manado. The study employed a quantitative approach using an analytical survey with a cross-sectional design. A total of 90 students were selected using the Lemeshow formula and stratified random sampling. Data were collected through questionnaires assessing online gaming duration and the Pittsburgh Sleep Quality Index (PSQI). Statistical analysis was conducted using Spearman's rank correlation test. The findings revealed a significant negative correlation between the duration of online gaming and sleep quality ( $r = -0.577$ ,  $p = 0.001$ ), indicating that longer durations of online gaming are associated with poorer sleep quality among junior high school students. These results highlight the importance of regulating online gaming duration as part of health promotion and educational support strategies to enhance adolescent well-being and learning outcomes in line with the SDGs.*

**Keywords:** Adolescent Health; Junior High School Students; Gaming Duration; Online Gaming; Sleep Quality

## 1. Introduction

Advances in technology and the internet have changed the way adolescents spend their leisure time. One of the most prominent developments today is online gaming. Online games have not only become a popular form of entertainment but have also become an important element of the daily routines of many adolescents. Adolescents often spend hours playing online games, especially at night. This phenomenon has attracted the attention of many parties because it not only changes adolescents' entertainment patterns but also has significant consequences for various aspects of adolescents' lives, including their health (Tesalonika, 2024).

Online games are a type of electronic and visual-based game that utilizes the internet as a medium. Currently, online games are highly favored by various groups, especially among students. This condition significantly affects the younger generation, as online games can lead to addiction (Habibi et al., 2021).

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The duration of online gaming has now become an increasingly concerning issue in society. School-aged children, who are in a phase of growth and development, appear to be greatly affected by the amount of time spent playing these games. One of the most obvious consequences is a decline in sleep quality among adolescents who are excessively involved in online gaming. A study by Poli (2021) found that out of 56 respondents, 55 (98.2%) university students experienced poor sleep quality due to the habit of playing online games. Adolescents' sleep patterns are often disrupted by the large amount of time spent playing games late into the night, which can lead to sleep problems that may result in more serious health issues among adolescents (Tesalonika, 2024).

Sleep is one of the important aspects of basic human physiological needs, during which the body and brain undergo recovery processes to achieve optimal health (Putriningtyas et al., 2020). Based on the findings of a study by Zendrato et al. (2025), higher stress levels were found to be significantly associated with poor sleep quality among students. Therefore, it is recommended that schools and health professionals provide stress management programs, increase awareness of healthy sleep patterns, and encourage balanced academic workloads to improve overall student well-being. Sleep is a fundamental physiological need that is essential for physical growth, mental health, and overall well-being, aligning with Sustainable Development Goal (SDG) 3, which emphasizes ensuring healthy lives and promoting well-being for all ages. Adequate sleep also plays a crucial role in cognitive functioning, learning capacity, and academic performance, which are central to SDG 4, aimed at ensuring inclusive and equitable quality education.

Based on the results of a survey conducted by the Indonesian Internet Service Providers Association (APJII) in 2025, the number of internet users in Indonesia reached 229,428,417 people out of a total population of 284,438,900, with an internet penetration rate of 80.66%. In North Sulawesi, the proportion of the population using the internet was 73.48%. Internet usage among individuals aged 13–28 years was 87.80%, and among junior high school students it reached 81.26%.

Based on the study by Poli et al. (2021), there was a relationship between gaming habits and sleep quality among university students in the health promotion interest group at the Faculty of Public Health. Inadequate sleep quality among adolescents was caused by excessive online gaming, which hindered their ability to rest, resulting in sleep durations of only 3–6 hours compared to normal sleep duration.

Based on preliminary observations at SMP Negeri 8 Manado, students with prolonged online gaming duration were found to experience impaired sleep quality, leading to insufficient sleep and negative effects on physical and mental functioning, including daytime sleepiness and reduced concentration at school. SMP Negeri 8 Manado was selected as the research site due to the relevance of the junior high school population to the study topic and the absence of previous similar research at this location, which justified the need to examine the relationship between online gaming duration and sleep quality among its students.

## 2. Methods

This study employed a quantitative analytical survey with a cross-sectional design. The study was conducted at SMP Negeri 8 Manado between June and November 2025. The population consisted of all enrolled students (N = 1,187). Sample size was determined using the Lemeshow formula, resulting in a minimum sample of 90 students. Participants were

selected using probability sampling with a stratified random sampling technique to ensure proportional representation across grade levels and sex.

The independent variable was the duration of online gaming, measured using a structured self-administered questionnaire that captured average daily gaming time. The dependent variable was sleep quality, assessed using the Pittsburgh Sleep Quality Index (PSQI), a standardized and validated instrument consisting of seven components with a global score ranging from 0 to 21, where higher scores indicate poorer sleep quality.

Data collection was conducted in a classroom setting under the supervision of the research team after obtaining informed consent. Univariate analysis was used to describe the distribution of online gaming duration and sleep quality. Bivariate analysis was performed using Spearman's rank correlation test to examine the relationship between online gaming duration and sleep quality, as the data were not normally distributed. Statistical significance was set at  $p < 0.05$ . Data analysis was conducted using statistical software.

All questionnaires, study protocols, and anonymized datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. The PSQI questionnaire is publicly available and was used in accordance with standard guidelines. No custom computer code was used in this study.

### 3. Results and Discussion

Table 1 presents the distribution of respondents by age and sex characteristics among students at SMP Negeri 8 Manado.

**Table 1.** Distribution of Respondents by Age and Sex Characteristics

Respondent Characteristics	n	(%)
Age (years)		
12	21	23.3
13	24	26.7
14	30	33.3
15	15	16.7
Sex		
Male	47	52.2
Female	43	47.8
Total	90	100

The age distribution shows that the largest proportion of respondents were 14 years old, accounting for 30 students (33.3%). This was followed by students aged 13 years (26.7%), 12 years (23.3%), and 15 years (16.7%), indicating that the majority of participants were in early adolescence. In terms of sex, the sample was relatively balanced, with 47 male students (52.2%) and 43 female students (47.8%). Overall, a total of 90 students participated in this study. These demographic characteristics provide an important context for interpreting the findings related to online gaming duration and sleep quality.

Table 2 describes the distribution of respondents based on online gaming characteristics.

**Table 2.** Distribution of Respondents Based on Online Gaming Characteristics

Respondent Characteristics	n	(%)
Most Frequently Played Game		
Free Fire	31	34.3
Roblox	39	43.3
PUBG Mobile	3	3.3
Valorant	2	2.2
Mobile Legends	13	14.4
Call of Duty	2	2.2
Gaming Device Used		
Mobile phone	84	93.3
Laptop	6	6.7
Total	90	100

The findings show that *Roblox* was the most frequently played game among students, with 39 respondents (43.3%), followed by *Free Fire* played by 31 students (34.3%). Other games such as *Mobile Legends* (14.4%), *PUBG Mobile* (3.3%), *Valorant* (2.2%), and *Call of Duty* (2.2%) were played by a smaller proportion of respondents.

Regarding the gaming device used, the vast majority of students played online games using mobile phones, accounting for 84 respondents (93.3%), while only 6 students (6.7%) used laptops. Overall, a total of 90 respondents were included in this analysis. These results indicate that mobile-based online gaming dominates gaming behavior among junior high school students, which may contribute to longer gaming duration and its potential impact on sleep quality.

### 3.1. Univariate analysis

Table 3 presents the frequency distribution of online gaming duration among students of SMP Negeri 8 Manado by sex.

**Table 3.** Frequency Distribution of Online Gaming Duration Among Students of SMP Negeri 8 Manado

Duration of Online Gaming	Male	Female	n	(%)
< 2 hours	7	3	10	11.0
2-4 hours	4	6	10	11.1
4-6 hours	18	17	35	38.8
6-8 hours	5	12	17	18.9
8-10 hours	8	2	10	11.1
10-12 hours	3	2	5	5.5
≥ 12 hours	2	1	3	3.3
Total	47	43	90	100

The results indicate that the largest proportion of students spent 4–6 hours per day playing online games, accounting for 35 respondents (38.8%). This pattern was observed in both male and female students, with 18 males and 17 females in this category. Students who reported playing online games for 6–8 hours per day comprised 17 respondents (18.9%), followed by those playing for less than 2 hours and 2–4 hours, each representing approximately 11% of the sample. A smaller proportion of students reported longer gaming durations, including 8–10 hours (11.1%), 10–12 hours (5.5%), and 12 hours or more (3.3%). Overall, these findings suggest that a substantial proportion of students engage in prolonged online gaming, exceeding four hours per day, which may have implications for their sleep quality and overall well-being. This distribution provides important context for the subsequent bivariate analysis examining the relationship between online gaming duration and sleep quality.

Table 4 presents the frequency distribution of sleep quality among students of SMP Negeri 8 Manado.

**Table 4.** Frequency Distribution of Sleep Quality Among Students of SMP Negeri 8 Manado

Sleep Quality	n	(%)
Good	16	17.8
Poor	74	82.2
Total	90	100

The results show that the majority of students had poor sleep quality, accounting for 74 respondents (82.2%), while only 16 students (17.8%) reported good sleep quality. These findings indicate that sleep disturbances were highly prevalent among students at SMP Negeri 8 Manado. The high proportion of poor sleep quality underscores the importance of examining factors that may contribute to sleep problems, including the duration of online gaming, which is further analyzed in the subsequent bivariate analysis.

### 3.2 Bivariate analysis

Table 5 presents the results of Spearman’s rank correlation analysis between online gaming duration and sleep quality among students of SMP Negeri 8 Manado.

**Table 5.** Spearman’s Rank Correlation Between Online Gaming Duration and Sleep Quality

Variables	Online Gaming Duration	Sleep Quality
Online Gaming Duration	1.000	-0.577
Sleep Quality	-0.577	1.000
Sig. (2-tailed)	0.001	0.001

The analysis revealed a statistically significant negative correlation between online gaming duration and sleep quality ( $r = -0.577$ ,  $p = 0.001$ ). This finding indicates that longer durations of online gaming are associated with poorer sleep quality among students. The strength of the correlation was classified as moderate, suggesting that although online gaming duration is not the only factor affecting sleep quality, it plays a substantial role in contributing

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to sleep disturbances among adolescents. These results support the need for strategies to regulate online gaming behavior in order to promote healthier sleep patterns.

### 3.3. Discussion

The findings of this study indicate that most respondents spent more time playing online games at night than during the daytime or morning. Nighttime was the most dominant period for online gaming, primarily due to more stable internet connectivity and busy daytime schedules. Online gaming was mainly used as a form of entertainment, often without consideration of the potential consequences of excessive gaming duration (Jelita et al., 2023).

Prolonged online gaming duration can reduce time allocated for studying, resting, and social interaction, and may contribute to health problems such as sleep disturbances. Excessive gaming frequently delays bedtime, leading to disrupted sleep patterns, decreased sleep quality, and circadian rhythm disturbances due to inhibited melatonin production. Consequently, students may experience excessive daytime sleepiness, tardiness, or school absenteeism (Haibanissa et al., 2022).

Although online gaming can provide positive benefits, such as enhancing cognitive skills and teamwork, poor time management may lead to negative outcomes, including sleep disorders and chronic fatigue. Therefore, disciplined time management is essential to maintain balance and prevent gaming disorder (Tesalonika, 2024).

Previous studies have reported similar findings, showing that poor sleep quality is prevalent among individuals who engage in excessive online gaming, particularly due to late-night gaming habits that interfere with daily responsibilities (Poli et al., 2021). Excessive and uncontrolled gaming behavior is a key indicator of addiction, as online games are designed with engaging features that encourage prolonged play and fear of losing in-game rankings (Agustin & Karneli, 2022).

Furthermore, excessive online gaming has been shown to negatively affect family communication, learning processes, and sleep patterns. Reduced parent-child interaction and increased social withdrawal have been reported among children with online gaming addiction, highlighting the importance of parental involvement in regulating gaming duration and promoting healthy digital behavior (Raihan et al., 2024; Ananta et al., 2025).

An increase in nighttime sleep disturbances reduces the likelihood of adolescents achieving good sleep quality, as they are unable to maintain continuous sleep due to factors such as nighttime awakenings, breathing difficulties, coughing, snoring, and other conditions that contribute to poor sleep quality and may adversely affect cognitive function and increase the risk of chronic diseases (Muntomimah & Mubarok, 2025). A common problem among adolescents is the habit of going to sleep after 10:00 p.m., with sleep durations limited to 3–5 hours. This pattern is often caused by activities such as mobile phone use and completing school assignments, leading adolescents to neglect appropriate sleep schedules (Hemas et al., 2022).

### Conclusions

This study demonstrates that students at SMP Negeri 8 Manado engage in prolonged online gaming, with an average daily duration of 365 minutes, and that poor sleep quality is highly prevalent among the participants. A statistically significant negative relationship was identified between the duration of online gaming and sleep quality, indicating that longer gaming durations are associated with poorer sleep outcomes. These findings highlight the

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importance of regulating online gaming behavior and promoting healthy sleep habits among adolescents. School-based health education programs, parental supervision, and time management strategies are recommended to reduce excessive gaming and improve sleep quality in this population.

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### Conflicts of Interest

The authors declare no conflict of interest.

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