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Relationship of Online Game Addiction with Sleep Disorders in School-Age Children

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Abstract: Excessive online gaming causes sleep deprivation and disrupts health, as addicted individuals often sacrifice rest to continue playing. This study aimed to determine the relationship between online game addiction and sleep disorders in school-aged children. This quantitative correlational study utilized a cross-sectional design with a sample of 148 respondents selected via stratified random sampling. Univariate analysis showed that nearly half of the respondents experienced severe online game addiction (49.32%), while a majority suffered from sleep disorders (60.14%). Bivariate analysis revealed a statistically significant positive correlation between online game addiction and sleep disorders (r_s = 0.27, p = 0.001). These findings indicate that higher levels of online game addiction are significantly associated with sleep disorders among school-aged children. Therefore, students should manage their screen time, particularly before bedtime, to prevent sleep disturbances.

Keywords: Online Game Addiction; School-age children; sleep disorders

Introduction

In the era of globalization, the influence of the internet has penetrated various aspects of human life, including children (Wiguna et al., 2020). Changes in internet technology can be felt directly or indirectly, one of which is seen in the rapid development of digital gaming platforms globally (Harrison et al., 2021). In 2018, the World Health Organization (WHO) formally included gaming addiction in the classification of mental health disorders (World Health Organization (WHO, 2019). In the 11th Revision of the International Classification of Diseases (ICD-11), gaming disorder is defined as a persistent or recurrent pattern of gaming behavior (online or offline) characterized by impaired control over gaming, increasing priority given to gaming over other life interests, and continuation despite negative consequences (Harrison et al., 2021) WHO, 2019).

In Indonesia, internet usage has grown rapidly over the past decade. Data from the Indonesian Internet Service Providers Association (APJII) indicates that internet penetration reached 64.8% (171.1 million people) of the total population (Yunita et al., 2021). Java Island recorded the highest internet usage rate at 55%, with Central Java Province contributing 34.3% to the regional share (Yunita et al., 2021). Statistics further estimate that online gamers in Indonesia reach 34 million, with 19.9 million paying for online games and spending an average of 9.12 USD (130,000 IDR) (Herlianty et al., 2024). Consequently, online game addiction has emerged as one of the most prevalent behavioral addictions in Indonesia, with online games representing the primary media played (51.1%), followed by PlayStation (45.6%) and other gaming devices (3.3%) (Herlianty et al., 2024). Online games are digital platforms requiring internet connectivity that allow real-time interaction among multiple players

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across distant locations (Yuliawati et al., 2022) and foster compulsive engagement.

The prevalence of online game addiction among school-aged children in Indonesia reached 10.51%, which is comparable to international figures such as 2.4% in South Korea, 13.7% in China, and 1.5–8.2% in the United States (Ahmad et al., 2022). Children who experience severe game addiction often develop behavioral problems, including reduced learning motivation, difficulty maintaining academic focus, and neglect of their immediate social environment (Abdi & Karneli, 2020; Ahmad et al., 2022). Furthermore, excessive online gaming leads to repetitive, self-destructive behavior that impairs daily functioning and detrimentally impacts children's developmental trajectories (Abdi & Karneli, 2020).

According to the World Health Organization (WHO, 2019), individuals playing online games for more than 7 hours daily face a 39% increased risk of sleep disruption, often reducing their total sleep duration from the recommended 7–8 hours to merely 5 hours. This pattern significantly elevates the risk of insomnia (37%) and disrupts essential physical and cognitive growth in school-aged children (Rezkika et al., 2023). Nationally, the prevalence of sleep disorders in children ranges between 25% and 40%; specifically, among school-aged children aged 9–12 years, sleep disturbances affect up to 42.20% of the population (Firdaus & Mantu, 2020). Sleep disorders involve alterations in sleep duration, quality, and timing, influenced by health status, stress, age, lifestyle, and excessive smartphone addiction (Guntur et al., 2025).

Sleep disturbances during childhood can negatively influence multiple aspects of growth and development, including physical, cognitive, emotional, and behavioral functioning. Insufficient or poor-quality sleep has been associated with impaired neurodevelopment, reduced attention and memory, weakened executive function, emotional dysregulation, behavioral problems, and poorer academic performance. Conversely, maintaining healthy sleep hygiene through adequate sleep duration and regular bedtime routines contributes to better cognitive functioning, emotional well-being, learning ability, behavioral regulation, and overall quality of life. Recent evidence also suggests that excessive exposure to electronic media, particularly television viewing and the use of smartphones, tablets, or other digital devices before bedtime, is associated with delayed sleep onset, shorter sleep duration, and poorer sleep quality among children and adolescents (Félix & Candeias, 2025; Merín et al., 2024; Silva et al., 2026). Therefore, reducing screen exposure before bedtime and promoting healthy sleep habits are important strategies to improve children's sleep health and developmental outcomes.

Despite growing awareness of gadget-related sleep disturbances, significant gaps remain regarding how online game addiction specifically correlates with sleep disorders among late elementary school children (aged 9–12 years) within local educational settings in Indonesia. A preliminary study conducted at Keroncong Jatiuwung Public Elementary School, Tangerang City, revealed that out of 10 interviewed students in grades 4–6, 6 children regularly played online games on personal cellphones until 01:00 AM, while only 4 played under parental supervision until 09:00 PM. Unsupervised gaming habits predispose children to severe addiction, directly undermining sleep quality and impairing their physical, emotional, and cognitive development.

Therefore, this study aims to examine the relationship between online game addiction and sleep disorders specifically in school-aged children (grades 4–6). The novelty of this research lies in its target population focus on upper-grade elementary students (9–12 years) combined with dual-informant measurements (evaluating both student gaming behaviors and parental reports of sleep disturbances using validated instruments like the Sleep Disturbances Scale for Children). Investigating this specific cohort is crucial to provide empirical evidence for educators, healthcare practitioners, and parents to formulate targeted interventions and early parental control strategies to mitigate sleep health risks in school-aged children.

Method

This study used a quantitative correlational method with a cross-sectional design. This study was conducted at the Keroncong Jatiuwung Public Elementary School, Tangerang City in June 2024. The population of this study were students and parents in grades 4-6 who attended the Keroncong Jatiuwung Public Elementary School, Tangerang City. The sampling technique used was Stratified Random Sampling using the Slovin formula, obtaining 148 samples.

The inclusion criteria were students and parents in grades 4-6 who attended the Keroncong Jatiuwung Public Elementary School, Tangerang City, students who played online games, and parents of students who knew whether their child had sleep disorders or not. Exclusion criteria were parents or students who were sick so they could not participate in data collection activities. The instruments used were a questionnaire from online game addiction consisting of 13 questions and the Sleep Disturbances Scale for Children (SDSC) consisting of 26 questions.

Both questionnaires were tested for validity and reliability before being used. The results of the validity test of the online game addiction questionnaire with 13

range questions rtable (0.339) and Cronbach's Alpha reliability of 0.770 so that it can be stated that the questionnaire is valid and reliable. The Sleep Disturbances Scale for Children (SDSC) questionnaire with 26 questions with rtable (0.74) and Cronbach's Alpha reliability of 0.785 so that it can be stated that the questionnaire is valid and reliable. The ethical principles in this data collection study include informed consent, anonymity, and confidentiality. This study has gone through an ethical review by the Ethics Committee of the Faculty of Nursing, Yatsi Madani University and received a letter of freedom from ethical problems with letter No.: No. 103/LPPM-UYM/V/2024. This study uses univariate and bivariate data analysis with the Spearman rho correlation test.

Result and Discussion

This research was conducted on 148 students and parents in grades 4-6 at the Keroncong Jatiuwung Public Elementary School, Tangerang City.

Table 1. Online Game Addiction

Online Game Addiction	Frequency (n)	Percentage (%)
Heavy	73	49.3
Medium	42	28.4
Light	33	22.3
Amount	148	100

Based on Table 1, the frequency distribution of respondents shows that 73 respondents (49.3%) have a severe level of addiction, 42 respondents (28.4%) have moderate addiction, and a small number of respondents have mild addiction, namely 33 respondents (22.3%).

The results of this study are in line with research conducted by Wiguna et al. (2020) with the level of online game addiction in the moderate category of 27 people (52.9%), in the low category as many as 19 people (37.3%), while in the high category as many as 5 people (9.8%). This is also supported by research Ahmad et al. (2022) that 37 respondents (48.7%) have low levels of online game addiction, and 39 respondents (51.3%) have high levels of online game addiction. This is also supported by research (Simatupang et al., 2023).

Showing that 46 respondents (70.8%) are addicted to online games and 19 respondents (29.2%) are not addicted. Online game addiction is when a player continues to play and cannot stop because school-age children have a lot of free time, this criterion is often called tolerance. Players usually play games to relieve stress or anger and make themselves feel better when they forget about other activities (Yuna Triana et al., 2023).

A person who is addicted to games cannot control, reduce, stop their game or ignore other activities. As a result, it can reduce their social relationships and interactions with friends, family, and others, as well as reduce their motivation to study and academic achievement (Wiguna et al., 2020).

Table 2. Sleep Disorders

Information	Frequency	Percentage (%)
There is sleep disturbance	89	60.1
No Sleep disturbance	59	39.9
Amount	148	100

Based on Table 2, the frequency distribution of respondents showed that 89 respondents (60.1%) had sleep disorders and 59 respondents did not have sleep disorders with a percentage of (39.9%).

The results of this study are in line with research conducted by Yasmien et al. (2020) which experienced sleep disorders as many as 66 respondents (65.3%) and those who did not experience sleep disorders as many as 35 respondents (34.7%). This is also supported by research Witantri et al. (2022) sleep pattern disorders in elementary school children in grades 4 to 6 in Denpasar, a small number of respondents experienced sleep pattern disorders as many as 44 respondents with a percentage (41.5%). This is also supported by research Muwindhasari et al. (2022) that there were 56.3% of respondents who experienced sleep disorders by using gadgets for more than 2 hours 30 minutes so that respondents had difficulty sleeping, and respondents who experienced sleep disorders using gadgets for less than 2 hours 30 minutes there were 27.4%. Sleep disorders are one of the most common sleep problems caused by irregular sleep patterns or times. Sleep disorders have effects such as disrupting concentration while studying, often feeling sleepy in class, and can cause other diseases. Sleep disorders can also have a negative impact on student achievement such as decreased concentration, depression, and memory. Students must be able to prevent sleep disorders by limiting sleep hours to 8-12 hours without naps for ages 6-13 years (Anggraeni et al., 2025).

Table 3. The Relationship Between Online Game Addiction and Sleep Disorders

Variable	Correlation Coefficient	P-value
Online Game Addiction	0.274	0.001
Sleep Disorders	0.274	0.001

Based on table 3, the results of the Spearman Rank test show the results of the relationship between online game addiction and sleep disorders in students of Public Elementary Schools in the Keroncong Jatiuwung area,

Tangerang City. This study shows the results of the correlation indicated by the number 0.274. The magnitude of the correlation that occurs between the two variables is 0.274. While sig. (2-tailed) is 0.001 still <0.05 so that Ho is rejected and Ha is accepted which there is a relationship between online game addiction and sleep disorders. The Correlation Coefficient value of 0.274 which shows the closeness of the relationship between online game addiction and sleep disorders is quite strong and positive with a value of 0.274. This means that the relationship between the two variables is directional.

The results of this study are in line with research conducted by Wiguna et al. (2020). Based on the results of the Spearman Rank test analysis calculation, a p value of 0.003 was obtained. There is a relationship with the highest level of online game addiction in the moderate category of 27 (52.9%) respondents. Other research conducted by Ahmad et al. (2022). Based on the results of the statistical test obtained through the chi-square test with a p value of 0.012 which means the p value <0.05. The results show that online game addiction and students' desire to study at SMA Yupentek 1 Tangerang are correlated. The results of the Pearson correlation test are -0.289. Other research conducted (Simatupang et al., 2023). Based on the results, there is a significant relationship between the two variables where the results of the Fisher exact test obtained a p-value (0.000) <α (0.05). The results of this study are in line with research conducted by (Yasmien et al., 2020). Based on the results of the chi-square test, a p-value of 0.044 was obtained, indicating a relationship between sleep disorders and academic achievement in students of SDN Jatinangor, SDN Neglasari, and SD Inklusi Al Ghazali. Another study was conducted by (Witantri et al., 2022). Based on the results of the Spearman Rank test, a p-value of 0.000 (p <0.05) was obtained, indicating a relationship between the length of gadget use and sleep pattern disorders in elementary school children in grades 4 to 6 in Denpasar. Another study was conducted by (Muwindhasari et al., 2022). Based on the results of the chi-square test, it showed that there was a relationship between the length of gadget use and sleep disorders in school-age children with a p-value = 0.014.

According to Yunita et al. (2021) Compared to adults, school-age children are more likely to be addicted to playing online games and can cause uncontrolled changes in sleep quality, resulting in poor sleep quality, children become unable to concentrate while studying, sleepy, tired, and decreased achievement.

Age is a factor that influences the tendency of school-age children to play online games. Children of school age usually spend more time playing online games. Because it is exciting and entertaining, they become addicted and want to play it continuously. Therefore, parents must monitor how their children use their time and their internet wisely, especially boys who spend a lot of time playing online games because of their extraordinary pleasure (Yuna Triana et al., 2023). It can be concluded that the need for sleep in children is very important. Quality sleep in children, in addition to having an effect on health, can also affect children's concentration in learning. This will improve children's achievement in learning at school. The limitations of the study are that the study has a time limit because it was conducted when grade 6 was on holiday and the final school exam (UAS) for grades 4 and 5.

Conclusion

The results of the study conducted in June at the Keroncong Jatiuwung Elementary School, Tangerang City in 2024 from 148 students showed that some respondents had the most online game addiction at a severe level, namely 73 students with a percentage (49.3%) and some respondents who experienced sleep disorders with a total of 89 students with a percentage (60.1%). Based on the Spearman Rank test, the two variables have a correlation value of 0.274, which indicates that the two variables have a fairly strong relationship. While sig. (2-tailed) is 0.001, there is a relationship between online game addiction and sleep disorders at the Keroncong Jatiuwung Elementary School, Tangerang City.

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Author Contributions

All authors contributed significantly to this research at every stage, including conceptualization, data collection, analysis, and the writing of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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