Martina et al. AJPMH 2025; 2 (1). DOI: 10.62337/

Excessive Gaming Time and Internet Gaming Disorder Among Adolescents: Evidence from a School-Based Cross-Sectional Study in Indonesia

Marlina[1], Mariatul Kiftia[1]

[1]Faculty of Nursing, Universitas Syiah Kuala, Banda Aceh, Indonesia
Corresponding author: Martina: martina@usk.ac.id

Abstract

Background: Internet Gaming Disorder (IGD) has emerged as a growing public mental health concern among adolescents, particularly with the widespread availability of mobile gaming. Excessive gaming time has been consistently identified as a key behavioral risk factor for IGD; however, empirical evidence from school-based populations in low- and middle-income countries, including Indonesia, remains limited. This study aimed to examine the association between excessive gaming time and Internet Gaming Disorder among adolescents in Indonesia. **Methods:** A school-based cross-sectional study was conducted among 124 junior high school students in Aceh Besar, Indonesia, using purposive sampling. Data were collected using a demographic questionnaire and the 9-item Internet Gaming Disorder Scale. Gaming duration was self-reported. Descriptive statistics were used for univariate analysis, and Spearman's rank correlation test was applied to assess the association between gaming duration and IGD severity. **Results:** More than half of the participants (53.2%) were classified as being at risk for Internet Gaming Disorder, while 1.6% met the criteria for IGD. A statistically significant positive association was found between gaming duration and IGD severity (Spearman's $\rho = 0.383$, $p < 0.001$), indicating that longer gaming time was associated with higher levels of disordered gaming behavior. **Conclusion:** Excessive gaming time is significantly associated with Internet Gaming Disorder among adolescents. These findings highlight the importance of early identification and school-based preventive strategies to reduce excessive gaming behaviors and mitigate the risk of IGD in adolescent populations.

Keywords: Internet Gaming Disorder; gaming duration; adolescents; behavioral addiction

Introduction

The rapid expansion of internet access and digital technologies has fundamentally transformed adolescents' daily activities, with online gaming becoming one of the most prevalent forms of entertainment worldwide (Wang et al., 2014; Kumar and Bharti, 2023; Ghali et al., 2023). The widespread availability of smartphones and mobile internet has further intensified adolescents' engagement in online gaming, particularly in low- and middle-income countries where mobile devices represent the primary gateway to digital media. As a result, online gaming has become an integral part of adolescents' daily lives, warranting closer examination of its potential risks.

Internet Gaming Disorder (IGD) is characterized by impaired control over gaming behavior, increasing prioritization of gaming over other activities, and continued engagement despite negative consequences across personal, social, and academic domains (Darvesh et al., 2020; Paulus et al., 2018). While the DSM-5 recognizes IGD as a condition requiring further study, the ICD-11 formally classifies Gaming Disorder as a diagnosable mental health condition, underscoring growing global concern regarding its clinical and public health relevance (Kumar and Bharti, 2023). This recognition is particularly salient during adolescence, a developmental period marked by heightened vulnerability to behavioral addictions.

Epidemiological studies have reported substantial variation in the prevalence of IGD across regions and age groups. Estimates among adolescents range from 1.2–1.6% in Europe to as high as 18.4% in parts of Asia, with consistently larger proportions of adolescents classified as being at risk rather than meeting full diagnostic criteria (Feng et al., 2017; Wu et al., 2018; Sarda et al., 2016; Ahmed et al., 2022). Similar patterns have been observed across school-based and community-based studies, highlighting the importance of early identification of problematic gaming behaviors before clinical thresholds are reached.

Among the various factors associated with IGD, gaming duration has consistently emerged as one of the most robust behavioral correlates. Excessive gaming time has been linked to emotional dysregulation, sleep disturbances, impaired academic functioning, and reduced physical activity among adolescents (Ahmed et al., 2022; Pontes et al., 2022; Jin et al., 2025). Adolescents with IGD often report gaming for extended periods, sometimes exceeding recommended limits for healthy screen use, which may intensify psychological distress and maladaptive coping patterns (Yen et al., 2019; Skripkauskaite et al., 2022). These findings suggest that gaming duration plays a central role in the development and maintenance of disordered gaming behaviors.

Despite growing international evidence, most studies examining gaming duration and IGD have been conducted in high-income countries, with relatively limited data from Southeast Asia. In Indonesia, where mobile gaming is widespread and access barriers are low, school-based evidence remains scarce. This gap limits the development of culturally and contextually appropriate prevention strategies targeting adolescents in educational settings.

Therefore, this study aimed to examine the association between excessive gaming time and Internet Gaming Disorder among adolescents using a school-based cross-sectional design in Indonesia. By addressing an underrepresented context, this study seeks to contribute to the broader understanding of adolescent gaming behaviors and inform early prevention efforts.

Methods

Study Design and Setting

This study employed a school-based cross-sectional design conducted among junior high school students in Aceh Besar District, Indonesia. A cross-sectional approach was selected to examine the association between gaming duration and Internet Gaming Disorder (IGD) at a single point in time, which is appropriate for identifying behavioral correlates in adolescent populations (Feng *et al.*, 2017). The study was conducted in a formal school setting to reflect adolescents' natural gaming behaviors within an educational context.

Participants and Sampling

The study population consisted of adolescents enrolled in junior high school. Participants were recruited using purposive sampling based on predefined inclusion criteria. Eligible participants were students aged 14–17 years, actively enrolled in school, and owning or having regular access to a smartphone, laptop, or computer that enabled online gaming. Students who were unwilling to participate or who returned incomplete questionnaires were excluded from the analysis. A total of 124 adolescents met the inclusion criteria and were included in the final sample.

Sociodemographic Characteristics

Sociodemographic information was collected using a structured questionnaire that included age, sex, grade level, and type of digital device used for gaming. These variables were included to describe participant characteristics and provide contextual information relevant to gaming behavior among adolescents.

Gaming Duration

Gaming duration was assessed through a self-reported item measuring the average amount of time spent playing online games. Participants were asked to report their typical gaming duration, reflecting habitual rather than occasional gaming behavior. Gaming duration was treated as an ordinal variable in the correlational analysis, consistent with previous studies examining associations between time spent gaming and IGD symptoms (Pontes *et al.*, 2022).

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Internet Gaming Disorder

Internet Gaming Disorder was assessed using the 9-item Internet Gaming Disorder Scale developed by Lemmens *et al.* (2015). This scale is based on the diagnostic criteria for IGD outlined in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-5*), covering symptoms such as preoccupation, tolerance, withdrawal, loss of control, and functional impairment. Each item is scored dichotomously, with higher total scores indicating greater severity of disordered gaming behavior. The scale has demonstrated acceptable reliability and validity in adolescent populations and has been widely used in epidemiological and school-based studies (Lemmens and Hendriks, 2016). In this study, participants were categorized into normal, at-risk, and disordered gaming groups based on their total scores to facilitate interpretation.

Data Collection Procedure

Data collection was conducted in the school setting after obtaining permission from school authorities. Participants received a brief explanation of the study objectives and procedures and provided informed consent prior to participation. Questionnaires were administered in a supervised classroom environment to ensure standardized administration and to minimize discussion among participants. All responses were collected anonymously to reduce social desirability bias and encourage honest reporting.

Statistical Analysis

Data were analyzed using statistical software. Descriptive statistics were used to summarize sociodemographic characteristics, gaming duration, and IGD categories. The association between gaming duration and IGD severity was examined using Spearman's rank correlation coefficient, as the variables were ordinal and did not meet the assumptions of normal distribution. A two-tailed p-value of less than 0.05 was considered statistically significant, in line with conventional standards in behavioral health research (Field, 2018).

Ethical Considerations

Ethical approval was obtained from the Ethics Committee of the Faculty of Nursing, Syiah Kuala University (approval number: 113101210623). Participation was voluntary, and confidentiality and anonymity were strictly maintained throughout the study. Participants were informed of their right to withdraw at any stage without academic or personal consequences.

Results

Participant Characteristics

A total of 124 adolescents participated in the study. Most participants were aged 15 years (52.4%), followed by those aged 16 years (25.0%) and 17 years (19.4%), while a smaller proportion were aged 14 years (3.2%). Female participants accounted for 52.4% of the sample, with males comprising 47.6%. All participants reported using mobile phones as their primary device for online gaming.

Regarding Internet Gaming Disorder classification, more than half of the participants (53.2%) were categorized as being at risk for IGD. Nearly half (45.2%) were classified within the normal range, while 1.6% met the criteria for Internet Gaming Disorder. Detail of Sociodemographic Characteristics and Internet Gaming Disorder is presented in Table 1.

Association Between Gaming Duration and Internet Gaming Disorder

Spearman's rank correlation analysis indicated a statistically significant positive association between gaming duration and Internet Gaming Disorder severity (Spearman's $\rho = 0.383$, $p < 0.001$). This finding suggests that adolescents who reported longer gaming durations tended to exhibit higher levels of disordered gaming behavior.

Discussion

This study investigated the association between excessive gaming time and Internet Gaming Disorder among adolescents in a school-based sample in Indonesia. The findings demonstrated a statistically significant positive association between gaming duration and IGD severity, indicating that adolescents who spent more time gaming were more likely to exhibit symptoms of disordered gaming behavior. This finding reinforces the growing consensus that gaming duration is a key behavioral correlate of IGD in adolescent populations.

Table 1. Sociodemographic Characteristics and Internet Gaming Disorder Classification of Participants (N = 124)

Variable	Category	n	%
Age (years)	14	4	3.2
	15	65	52.4
	16	31	25.0
	17	24	19.4
Gender	Male	59	47.6
	Female	65	52.4
Primary gaming device	Mobile phone	124	100.0
Internet Gaming Disorder status	Normal	56	45.2
	At risk	66	53.2
	Disordered	2	1.6

The results are consistent with previous studies conducted across diverse cultural contexts, which have reported similar positive associations between time spent gaming and IGD symptom severity (Pontes et al., 2022; Skripkauskaite et al., 2022; Yu et al., 2021; Wong et al., 2024). Although gaming duration alone does not fully explain the development of IGD, evidence suggests that prolonged gaming time increases exposure to reinforcing game mechanics, social immersion, and reward-based feedback loops that may intensify problematic gaming patterns (Kumar and Bharti, 2023). The moderate strength of the association observed in this study aligns with prior research indicating that gaming time functions as an important, but not exclusive, risk indicator.

From a psychological perspective, prolonged gaming time may contribute to IGD through several mechanisms. Adolescents with extended gaming exposure often demonstrate poorer emotional regulation, increased stress reactivity, and greater reliance on avoidance-based coping strategies (Yen et al., 2019; Li et al., 2024). Neurobehavioral research has further shown altered frontal–parietal connectivity and reduced cognitive control among individuals with IGD, which may exacerbate difficulties in regulating gaming behavior once excessive patterns are established (Zeng et al., 2021; Abdallat et al., 2024). These mechanisms may partially explain why increased gaming duration is associated with greater IGD severity.
The distribution of IGD classifications observed in this study—characterized by a high proportion of adolescents at risk and a relatively small proportion meeting full diagnostic criteria—mirrors findings reported in other adolescent populations (Sarda et al., 2016; Feng et al., 2017; Abdallat et al., 2024). This pattern underscores the importance of focusing preventive efforts on at-risk adolescents, as this group represents a critical window for intervention before gaming behaviors become entrenched and clinically impairing.

The school-based nature of this study has important practical implications. Schools provide a strategic setting for early detection of excessive gaming behaviors and for the delivery of preventive interventions aimed at promoting balanced digital engagement. Evidence suggests that school-based psychoeducation, combined with family involvement and parental monitoring, can play a protective role in reducing

problematic gaming behaviors among adolescents (King and Potenza, 2020; Bibelia et al., 2021). Such approaches may be particularly relevant in contexts where mobile gaming is highly accessible.

Several limitations should be acknowledged. The cross-sectional design limits causal inference, and self-reported gaming duration may be subject to recall bias. Additionally, purposive sampling from a single geographic area may restrict generalizability. Nonetheless, this study contributes valuable empirical evidence from an underrepresented low- and middle-income context and supports the growing recognition of excessive gaming time as a meaningful correlate of IGD among adolescents.

Conclusion

This school-based cross-sectional study provides empirical evidence that excessive gaming time is significantly associated with Internet Gaming Disorder among adolescents in Indonesia. Adolescents who reported longer durations of online gaming exhibited higher levels of disordered gaming behavior, underscoring gaming duration as a meaningful behavioral correlate of IGD in this population. The high proportion of adolescents classified as being at risk further highlights the importance of early identification of excessive gaming behaviors before they progress into clinically significant disorder.

These findings have important implications for adolescent mental health promotion and prevention strategies. Schools represent a critical setting for implementing early screening, psychoeducation, and preventive interventions aimed at promoting healthy digital habits and balanced gaming behaviors. Collaborative efforts involving educators, families, and health professionals are essential to mitigate the risk of Internet Gaming Disorder and support adolescents' psychosocial well-being in increasingly digital environments. Future research employing longitudinal designs and incorporating broader psychosocial factors is warranted to better understand causal pathways and inform targeted intervention development.

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