

Playing games online increases risk of hypertension, tachycardia, and tachypnea

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Received: 01 February 2025 ● Revised: 11 March 2025 ● Accepted: 01 April 2025

ABSTRACT

Introduction: Game Online is a virtual world game site connected via the internet. Playing a game online intensely and with a high level of difficulty will trigger an increase in the production of adrenaline hormones, thus affecting blood pressure, pulse rate, and breathing. This study aims to determine the relationship between playing online games and blood pressure, pulse rate, and breathing rhythm.

Research Methodology: The study used a quantitative research method, a non-experimental type with a cross-sectional design. The sampling technique was purposive sampling with a sample size of 84 people. The research variables were measured using a digital sphygmomanometer, pulse oximeter, and manual respiratory examination. Data was analyzed using SPSS 25 with the Pearson product-moment test and linear regression.

Result: the majority of the sample was playing games online 7 times a week (56%), with a duration of 3 hours a day (41.7%). The results of the Pearson test showed that the intensity of playing online games was positively correlated with blood pressure ($p < 0.05$; $r = 0.529$), pulse rate ($p < 0.05$; $r = 0.482$), and respiration ($p < 0.05$; $r = 0.269$). The results of the linear regression test proved that the intensity of playing online games affected blood pressure ($p < 0.05$; $R\text{-square} = 0.347$), pulse rate ($p < 0.05$; $R\text{-square} = 0.232$), and respiration ($p < 0.05$; $R\text{-square} = 0.072$).

Conclusion: It can be concluded that there is a positive relationship between the intensity of playing online games with blood pressure, pulse, and respiratory frequency. The higher the intensity of playing online games, the higher the value of the three physiological indicators. In addition, the intensity of playing online games has also been shown to affect blood pressure, pulse, and breathing. These findings suggest that intensive online gaming activities can have an impact on the body's physiological condition.

Keywords: Blood Pressure, Game online, Pulse, Respiratory



INTRODUCTION

Online games are very loved by most people in the digital era. Online games are very easily accessible through gadgets and have increasingly interesting features so people's interest in playing them is even greater (Balducci et al., 2024). Research conducted by the Ministry of Communication and Information Technology (Kominfo) and the United Nations Children's Emergency Fund (UNICEF) found that as many as 63% use the internet to play online games. According to a survey by the Indonesian Internet Service Providers Association (APJII) in 2021-2022, 14.23% of around 210.03 million Indonesians accessed the internet to play online games. This percentage puts Indonesia in the top twenty countries using the internet to play the most games in the world (Hidayat et al., 2023). The reason why individuals are more interested in playing online games than offline games is because of the interesting nature of the game in the online version, more fun, more levels, and accessories, and allowing more opponents (Tan & Nurul - Asna, 2023).

The nature of games is challenging, addictive, and fun. Playing online games can have a positive impact such as: improving social interaction, cognitive stimulation, fine motor coordination, and minimizing stress (Piasek, 2024). However, playing uncontrolled online games can lead to addiction it affects the lifestyle, mentality, and behavior of the players. A person who is addicted to online games will easily feel anxious to the point of depression if they are not playing them (Hew et al., 2024). This can have an impact on emotional stability, sleep patterns, diet, eye health, muscle stiffness, and joint disorders such as carpal tunnel syndrome (CTS)(Mondal & G. S., 2024).

Playing online games intensely can trigger acute stress. The body's response to such stress will activate the sympathetic nerves to secrete a number of hormones that can affect the cardiorespiratory system (Pakarinen, 2023). Changes in the cardiorespiratory system in the body will have an impact on general physical health. The cardiorespiratory system plays a vital role in human health (Aziz et al., 2024). However, studies related to the interaction of online games with the cardiorespiratory system are still limited. Therefore, it is necessary to conduct further studies on the relationship between the intensity of playing online games with blood pressure, pulse rate, and breathing.

RESEARCH METHODOLOGY

The study used quantitative methods with non-experimental types and cross-sectional designs. The population in this study is students of the Applied Bachelor of Occupational Therapy Study Program of the Ministry of Health of the Ministry of Health of Surakarta who play online games. The sampling technique in this study uses purposive sampling techniques with inclusion criteria, namely: actively playing online games, playing online games with a fighting genre, and being willing to be a research sample. The number of samples that met the inclusion criteria was 84 people. The research variables were measured using a digital sphygmomanometer, pulse oximeter, and manual respiratory examination. Data analysis using SPSS 25 with Pearson product moments test and linear regression. This research was declared feasible with an ethical test number: 1.140/VIII/HREC/2023.

RESULT

Table 1. Pearson Correlation Test between Online Gaming Intensity and Physiological Parameters (n = 84)

Physiological Parameter	Correlation Coefficient (r)	Significance (p)	Strength of Correlation
Blood Pressure	0.529	< 0.05	Moderate positive
Pulse Rate	0.482	< 0.05	Moderate positive
Respiration Rate	0.269	< 0.05	Low positive

The results of the Pearson correlation test indicate a statistically significant positive relationship between the intensity of playing online games and the three physiological parameters. The correlation with blood pressure is moderate ($r = 0.529$), suggesting that as gaming intensity increases, blood pressure tends to rise. Similarly, the correlation with pulse rate is moderate ($r = 0.482$), indicating a notable increase in heart rate with more frequent or longer gaming sessions. The correlation with respiration rate is low ($r = 0.269$), which means that although the association exists, it is weaker compared to the other two parameters.

Table 2. Linear Regression Test between Online Gaming Intensity and Physiological Parameters (n = 84)

Physiological Parameter	R-square (%)	Significance (p)	Interpretation of Influence
Blood Pressure	34.7	< 0.05	Significant strong influence
Pulse Rate	23.2	< 0.05	Significant moderate influence
Respiration Rate	7.2	< 0.05	Significant low influence

The linear regression analysis confirms that the intensity of online gaming significantly affects all three physiological parameters. The influence on blood pressure is the strongest, with an R-square of 34.7%, meaning that about one-third of the variance in blood pressure can be explained by gaming intensity. The effect on pulse rate is also significant, with an R-square of 23.2%, showing a moderate impact. Meanwhile, the effect on respiration rate is relatively low, with an R-square of 7.2%, indicating that only a small portion of changes in breathing rate can be attributed to online gaming intensity. Nevertheless, all relationships were statistically significant ($p < 0.05$), suggesting that increased gaming is a meaningful contributor to physiological changes.

Based on the results of the correlation and regression analyses, it can be concluded that the intensity of playing online games is significantly associated with physiological changes. Specifically, higher frequency and longer duration of gaming are positively correlated with increases in blood pressure, pulse rate, and respiration rate. These findings suggest that frequent and prolonged online gaming may contribute to an elevated risk of hypertension, tachycardia, and tachypnea, even in a relatively young population such as students. Therefore, monitoring and regulating gaming habits is important to prevent potential negative impacts on cardiovascular and respiratory health.

DISCUSSION

Playing online games is usually done for entertainment and to fill free time. The attractive, fun, and challenging characteristics of online games cause online game players to become addicted so they tend to want to play them continuously. Playing online games is popular with various levels of society, especially among teenagers to adults (Wu et al., 2023). Addiction to playing online games is more common in teenagers and early adults because during this time it is easy to be influenced by their friends (Coyne et al., 2023). They spend an average of more than two hours/day playing online games, or more than 14 hours/week (Columb et al., 2023).

Seseorang dikatakan bermain game dalam kategori ringan jika bermain game As many as 1-2 times per week, the category of playing games 3-4 times per week and being categorized as heavy if you play games 5-7 times per week. Then based on the intensity or time used when playing games, it is categorized into 3, namely: low if playing <1 hour per day, medium if playing 1-2 hours per day, and heavy if playing >2 hours per day

(Sansone et al., 2023). The results of the study (Table 1) show that the majority of the research sample is in the weight category, both based on the frequency of playing online games per week (5-7 times per week = 100%) and based on the intensity of playing online games per day (> 2 hours = 63.1%). This requires very serious attention considering the impact of playing very complex online games on both physical and psychic levels, which can affect the learning process of students. Playing online games for a long period of time can cause students' motivation to learn to decrease (Sun et al., 2023).

The excessive intensity of playing online games is generally due to the attractive and fun visual design, as well as due to the challenges that become addictive (Nawaser et al., 2024). Addiction to online gaming is characterized by a high frequency and intensity of play (T'ng et al., 2023). Addiction is accompanied by new challenges in online games that cause discomfort when not playing online games that can stimulate stress. This condition can cause the secretion of the hormones cortisol and adrenaline to increase significantly. An increase in the hormone adrenaline will affect the work of the heart resulting in an increase in blood pressure, pulse, and breathing (Ranjan & Gulati, 2023). A tendency to increase blood pressure, pulse, and breathing along with the increase in the frequency and intensity of playing online games. This study is in line with previous research that found that playing online games correlates significantly with prehypertension (51.4%) (Chin et al., 2024).

The intensity of playing online games, which tends to be high, will cause the body to be exposed to stress continuously. The sustained stress is a long-term effect of the decrease in beta waves due to playing online games that have an impact on the activation of sympathetic autonomic nerves. As a result, the secretion of stress hormones will continue to be at high levels, leading to increased pulse rate (tachycardia), blood pressure (hypertension), and respiratory frequency (tachypnea) due to chronic oxygen requirements (Quesnel et al., 2023). The results of the study prove that the intensity of playing online games is significantly positively correlated with pulse, blood pressure, and breathing rate (table 8). The intensity of playing online games significantly affected an increase in blood pressure by 34.7%, an increase in pulse rate by 23.2%, and an increase in breathing by 7.2%. This can increase the risk of hypertension and various other heart and blood vessel diseases (Masenga & Kirabo, 2023). Many factors are linked between online gaming addiction and blood pressure, pulse rate, and breathing. High blood pressure, pulse rate, and breathing are also associated with individual characteristics and are associated with lifestyles such as low physical activity, smoking behavior, and staying up all night due to playing online games (Juhász et al., 2023).

The results of several studies indicate that stress is one of the risk factors that contribute to cardiovascular system disorders, especially hypertension, in addition to smoking, lack of exercise, and less nutritious food (Parmar et al., 2023). Hypertension in young people affects 1 in 8 adults between the ages of 20 and 40 (Wyszyńska et al., 2023). Hypertension at a young age needs to be of special concern because the incidence of hypertension at a young age will increase the risk of cardiovascular disorders in middle age. Furthermore, hypertension can cause complications including heart disease, stroke, kidney failure, and death (Burnier & Damianaki, 2023).

CONCLUSION

This study concludes that the intensity of playing online games has a significant positive correlation with physiological parameters, including blood pressure, pulse rate, and respiration

rate. Students who frequently play online games particularly those who play seven times a week and for more than three hours a day are more likely to experience elevated blood pressure (hypertension), increased heart rate (tachycardia), and accelerated breathing (tachypnea). The Pearson correlation analysis demonstrated that higher gaming intensity is moderately associated with increases in blood pressure and pulse rate, and slightly associated with increased respiration. Furthermore, the linear regression analysis confirmed that gaming intensity significantly influences these physiological responses, with the most substantial effect observed on blood pressure. These findings suggest that excessive and uncontrolled gaming behavior may pose health risks, particularly related to the cardiovascular and respiratory systems. As such, it is essential for students, educators, and health professionals to be aware of the potential impact of prolonged gaming and to encourage balanced, healthy gaming habits as part of a broader strategy to promote student well-being and prevent the early onset of chronic health conditions.

Conflict of Interest

The authors declare that they have no competing interests.

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