THE RELATIONSHIP BETWEEN THE DURATION OF PLAYING ONLINE GAMES ON A PC AND NECK PAIN IN TEENAGERS AT THE WHITE WOLF GAMING ARENA INTERNET CAFE, PEKANBARU

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Abstract

Neck pain is one of the most common musculoskeletal disorders among adolescents, primarily due to excessive online gaming duration. This study aims to analyze the relationship between the duration of online gaming on a PC and the occurrence of neck pain in adolescents. The research employs a quantitative correlational design with a cross-sectional approach, conducted at the White Wolf Gaming Arena Internet Café in Pekanbaru from September 2024 to February 2025. A total of 94 respondents were selected using an accidental sampling technique. Data collection was carried out through questionnaires consisting of demographic data and the Neck Pain Disability Index (NPDI) to measure the severity of neck pain. Data analysis was performed using the Spearman's rho statistical test. The study results indicate that the majority of respondents (54.3%) had a short gaming duration (1–5 hours), while mild neck pain was the most commonly reported symptom (78.8%). Statistical analysis revealed a significant relationship between online gaming duration and neck pain in adolescents ($p < 0.001$). These findings suggest that the longer the duration of online gaming, the higher the risk of experiencing neck pain. Other contributing factors include non-ergonomic sitting postures, lack of stretching, and high-intensity gameplay. Therefore, adolescents are advised to limit their gaming duration and perform neck stretches before and after playing. This study's findings are expected to serve as a recommendation for internet café operators to provide education on proper ergonomics for gamers. Additionally, educational institutions can utilize these results as a reference for preventing neck pain in adolescents, promoting optimal and sustainable musculoskeletal health.

Keywords: neck pain; gaming duration; online games; adolescents

INTRODUCTION

Neck pain is a globally reported musculoskeletal disorder with a relatively high incidence. In Indonesia, the prevalence of neck pain reaches 46.5%, often with recurrent episodes. A contributing factor to neck pain is prolonged sitting, particularly in a static posture, which causes neck muscle tension (Faldano, 2020).

In recent years, the prevalence of neck discomfort has increased to 26%, especially among adolescents. This rise is attributed to prolonged poor posture during certain activities, including playing online games (Faldano, 2020). Excessive online gaming can lead to a static neck position for extended periods, increasing the risk of neck pain due to excessive muscle contraction. This tension can result in limited neck movement, chronic pain, and contribute to other health issues like headaches, sleep disturbances, and neurological problems (Cahyono *et al.*, 2023).

Studies indicate that online game addiction is more prevalent among males (64.45%) than females (47.85%), with most players spending significant time in front of a screen (Laeto, 2020). Over the long term, this habit can affect neck tissue flexibility, reduce joint range of motion, and decrease comfort during daily activities (Hikmah & Puspitasari, 2021).

Online games are increasingly popular and accessible on various platforms like computers, consoles, and smartphones. Games such as Mobile Legends, PUBG, Dota 2, and Valorant have become a part of the adolescent lifestyle regardless of social background (Muhazir *et al.*, 2023). The Georgia Institute of Technology classifies gaming intensity into three categories: mild (<10 hours/month), moderate (11-40 hours/month), and high (>40 hours/month) (Wati *et al.*, 2023). Players with high-duration gaming are more susceptible to negative health impacts, including neck pain due to non-ergonomic postures.

A preliminary study of five adolescents who played online games for more than two hours showed that four experienced neck pain, while one experienced both neck and lower back pain. Based on this phenomenon, this research aims to analyze the relationship between the duration of playing online games on a PC and the incidence of neck pain in adolescents. This study is expected to contribute to a deeper understanding of the ergonomic impact of online gaming habits and the pre ventive measures that can be implemented to reduce the risk of neck pain among adolescents.

RESEARCH METHODS

This was a quantitative correlational study using a cross-sectional approach. This design allowed the researchers to observe the relationship between the duration of playing online games and neck pain at a single point in time. The study was conducted at the White Wolf Gaming Arena Internet Cafe in Pekanbaru, chosen because it had the highest number of visitors compared to other internet cafes surveyed. The research took place from September 2024 to February 2025.

The study population consisted of adolescents who played games at the internet cafe, totaling 56 permanent members. The sample size, calculated using the Slovin formula, was 94 respondents. Accidental sampling was the technique used, where samples were selected based on individuals who happened to be present at the research location and met the respondent criteria.

The research instrument consisted of a questionnaire divided into two main parts. The first part contained demographic data (name, age, sex) and online gaming duration, categorized as brief (1-5 hours) and long (5-12 hours). The second part used the Neck Pain Disability Index (NPDI) to measure the level of neck pain. The NPDI score was calculated based on the total value of 10 items, with interpretations categorized as mild (0-20%), moderate (20-40%), and severe (40-60%). The operational definition of the variables included neck pain as the independent variable and online gaming duration as the dependent variable. The collected data were analyzed using appropriate statistical methods to examine the relationship between the two variables

RESEARCH RESULTS

The research was conducted at Puskesmas Simpang Tiga Pekanbaru from February 1 to February 14, 2025, with 94 adolescent respondents at the White Wolf Gaming Arena Internet Cafe Pekanbaru. The data were processed using univariate and bivariate analyses, presented as frequency distribution tables.

Univariate Analysis
General Data

Table 1. Frequency Distribution of Adolescent Characteristics at White Wolf Gaming Arena Internet Cafe Pekanbaru (N=94)

No	Characteristic	Frequency (n)	Percentage (%)
1	**Age**		
	Early Adolescence	2	2.1
	Middle Adolescence	18	19.1
	Late Adolescence	**74**	**78.8**
	Total	**94**	**100%**
2	**Sex**		
	Female	6	6.4
	Male	**88**	**93.6**
	Total	**94**	**100%**

Source: Primary Data, 2025

Table 1 shows that the majority of respondents (78.8%) were in the late adolescence age range (74 people), and nearly all (93.6%) were male (88 people).

Table 2. Distribution of Average Online Gaming Duration in Adolescents (N=94)

	N	Mean	SD	Min	Max
Online Gaming Duration	94	**5.43**	2.617	1	15

Source: Primary Data, 2025

Table 2 indicates that the average online gaming duration was 5.43 hours, with a standard deviation of 2.617, a minimum of 1 hour, and a maximum of 15 hours. The average duration of 5 hours suggests a categorization of 1-5 hours as brief and >5-12 hours as long.

Specific Data
a. Gaming Duration

Table 3. Distribution of Respondents based on Online Gaming Duration (N=94)

No	Gaming Duration	Frequency (n)	Percentage (%)
	Brief (1-5 hours)	**51**	**54.3**
	Long (>5-15 hours)	43	45.7
	Total	**94**	**100**

Source: Primary Data, 2025

Table 3 shows that more than half of the respondents (54.3%) played games for a brief duration (51 people).

b. Neck Pain Disability Index (Pain Level)

Table 4. Frequency Distribution of Respondents based on Neck Pain Disability Index (N=94)

No	Neck Pain Disability Index	Frequency (n)	Percentage (%)
	Mild	**74**	**78.8**
	Moderate	18	19.1
	Severe	2	2.1
	Total	**94**	**100%**

Source: Primary Data, 2025

Table 4 demonstrates that nearly all respondents (78.8%) experienced mild neck pain (74 people).

Bivariate Analysis

Bivariate analysis was performed using the Spearman's Rho rank statistical test to analyze the relationship between the independent variable (pain level) and the dependent variable (gaming duration), with a significance level of P value <0.05.

Table 5. Relationship between Online PC Gaming Duration and Neck Pain in Adolescents at White Wolf Gaming Arena Internet Cafe Pekanbaru, February 2025 (N=94)

		Neck pain disability index
Gaming Duration	**r**	**0,565**
	P	**<0,001**
	n	**94**

Source: Primary Data, 2025

The Spearman's Rho test result in Table 4.5 shows a correlation coefficient (r) of 0.565 between gaming duration and the Neck Pain Disability Index. This positive value indicates that the longer a person plays games, the higher the level of neck pain experienced. Based on common interpretation, 0.40 - 0.59 is a moderate/moderate correlation. The significance value (Sig. 2-tailed) is $p < 0.001$, which is less than 0.05. This indicates that the relationship between gaming duration and neck pain is statistically very significant.

DISCUSSION

Univariate Analysis

General Data

a. Age

The majority of respondents were in late adolescence (78.8%). This phase is defined as a transition from childhood to adulthood, involving both physical and psychological transformations. This finding aligns with research by Manuputty et al. (2019) and Al Mubarok & Soedirham (2021). Furthermore, Santoso & Wiguna (2022) emphasize that late adolescents possess immature impulse control, making them more susceptible to sedentary behavior in front of screens. The researchers suggest that late adolescents are more engaged in online gaming due to curiosity and the satisfaction derived from gaining new friends and experiences.

b. Sex

Nearly all respondents (93.6%) were male. This is consistent with existing literature (Manuputty et al., 2019; Putra & Ratnawati, 2020) suggesting that males spend more time gaming and are more prone to addiction than females. Pratama et al. (2023) also noted that a preference for competitive game genres among males triggers longer play durations. The researchers hypothesize that males are more drawn to the challenging nature of online games, seeking the rewards of completing missions and challenges.

Specific Data

a. Gaming Duration

Over half of the respondents (54.3%) had a brief gaming duration (1–5 hours). However, the overall average duration was 5.43 hours. Literature, such as Erik & Syenshie (2020) and Juniarto et al. (2021), supports the idea that online games—especially for those with addictive tendencies—often lead to continuous play exceeding two hours to complete missions. This is further reinforced by Dewi & Putra (2024), who state that "daily reward" features and ranking systems compel players to remain in front of the screen for extended periods. The researchers assume that the challenges and rewards in online games strongly influence play duration.

b. Neck Pain

The overwhelming majority of respondents (78.8%) experienced mild neck pain. Neck pain has numerous etiologies, including sex, age, posture, stress, work position, and prolonged static movement (Nazhira et al., 2023). Playing online games is an activity that forces players to maintain a static position for a long duration. This result is consistent with the findings of Khairi et al. (2024) and is supported by Hidayat et al. (2023), who identified that using a smartphone with a head tilt angle of more than 45° significantly increases the load on the cervical muscles.

Bivariate Analysis

The Spearman's Rho test yielded a p-value < 0.001, leading to the rejection of H_0. This confirms a statistically significant relationship between the duration of online gaming and neck pain in adolescents. The correlation coefficient of 0.565 indicates a moderate positive correlation, meaning longer gaming durations are associated with higher levels of neck pain.
This aligns with the findings of Wati et al. (2023) and is supported by a study by Lestari (2024), which explains that continuous isometric contractions in the neck muscles cause decreased blood flow and lactic acid accumulation. Additionally, Ramadhan & Sari (2022) found that players who do not perform stretching exercises every 60 minutes have a three times higher risk of experiencing neck pain. The researchers' assumption is that high duration is a major contributor to neck pain; the longer the duration, the more severe the pain, particularly among adolescents addicted to online games.

CONCLUSION

Based on the research findings regarding the "Relationship between Online PC Gaming Duration and Neck Pain in Adolescents at White Wolf Gaming Arena Internet Cafe Pekanbaru," the following can be concluded: The majority of online gaming duration was brief (1-5 hours), involving 51 people (54.3%). The most common level of neck pain experienced by adolescents was mild neck pain, involving 74 people (78.8%). The Spearman's Rho statistical test resulted in a p-value < 0.001, which is less than 0.05. Therefore, the null

hypothesis (is rejected, indicating a significant relationship between the duration of online gaming and neck pain in adolescents.

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