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Duration of playing mobile legends on the incidence of De Quervain syndrome among e-sport players

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ABSTRACT

Background: The development of e-sports in Indonesia is influenced by favorable economic aspects such as commercial and marketing activities, but it also poses physiological problems such as game addiction, physical injuries, and social disorders. This study analyzed the relationship between the duration of playing mobile legends and de Quervain's syndrome (DQS) incidence in e-sport players.

Methods: This study used a descriptive-analytic cross-sectional approach. The inclusion criteria were mobile legend esports players who had been in the game for at least one year, while the exclusion criteria were injuries in the wrist. The sampling technique used was total sampling, with the research location in Denpasar City, Bali. Data was collected in April 2023 using a personal data questionnaire, and a sample with DQS was determined using the Finkelstein test. The study's 150 subjects were analyzed using IBM SPSS 26 software.

Results: The results of data analysis and hypothesis test showed that there was a significant association between the duration of playing mobile legends and the incidence of DQS among e-sport players in the city of Denpasar (p= 0.001)

Conclusion: Playing mobile legends for more than 2.25 hours a day potentially increases the risk of DQS, while shorter playing durations correlate with lower risks.

Keywords: de Quervain syndrome, e-sport, wrist and hand pain, mobile legends.
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INTRODUCTION

In the era of globalization, various aspects of daily life have been significantly impacted by the rise of information technology, including the emergence of electronic sports (e-sports).[1] Popularity has been gained by e-sports, characterized by organized digital competitions, with games like mobile legends bang bang (MLBB) being prominent, as evidenced by their high rankings in app stores and numerous downloads worldwide.[2,3] Indonesia has also embraced E-sports, as evidenced by its inclusion as an exhibition sport in significant events like the Asian Games 2018 and SEA Games 2019, signaling recognition as a competitive sport.[4] The potential of e-sports in contributing to national development has been recognized by the Indonesian government, leading to a focus on nurturing talent and fostering the industry's growth.[5]

The rapid growth of e-sports globally and in Indonesia is attributed mainly to its economic potential, with integration into the sports economy resulting in significant financial gains through commercial activities, marketing, and business strategies.[6] However, along with economic benefits, physiological challenges have been presented by e-sports, including musculoskeletal issues such as De Quervain syndrome (DQS), commonly observed among e-sports players due to prolonged and repetitive hand movements during gameplay.[7] A significant prevalence of musculoskeletal injuries among e-sports players has been shown by studies, including wrist and hand pain, which can significantly impact their careers.[7,8]

While online gaming can have positive effects like stress relief and improved concentration, various physical health issues, particularly musculoskeletal problems, can lead to excessive and prolonged use of electronic devices.[9] Studies have indicated a correlation between prolonged mobile gaming and conditions like DQS, with specific durations of gameplay being identified as potential risk factors.[10,11] Additionally, musculoskeletal strain is contributed to by ergonomic considerations and repetitive thumb movements during gaming, increasing the likelihood of conditions like DQS among players.[12,13] The high prevalence of musculoskeletal problems among e-sports players, particularly DQS, suggests that further research is needed to explore the relationship between the duration of Mobile Legends gameplay and the incidence of DQS among e-sports enthusiasts.[14,15]

METHODS

This quantitative observational analytical study with a cross-sectional design aimed

to investigate the relationship between the duration of playing Mobile Legends and the occurrence of DQS among e-sports enthusiasts in Denpasar. The study was conducted in April 2023 with the use of the questionnaire. This study's respondents were 150, comprising active e-sports enthusiasts in Denpasar in 2023. The inclusion criteria for participants involved active e-sports enthusiasts in Denpasar who had played Mobile Legends for approximately one year and were willing to participate in the research. According to the screening assessment, the exclusion criteria included individuals who played games other than mobile legends or had experienced wrist injuries or fractures.[3,16]

The study investigated the relationship between the duration of playing Mobile Legends and the occurrence of DQS among e-sports enthusiasts in Denpasar. The independent variable was the duration of playing Mobile Legends, categorized into light players (< 2 hours/day), regular gamers (> 2 hours - 7 hours/day), and heavy gamers (> 7 hours/day). This variable was deemed crucial as it suggested prolonged exposure to repetitive thumb movements, potentially contributing to DQS.[9,14] The dependent variable, DQS, was diagnosed through the Finkelstein test and served as the outcome measure to assess the association between the duration of playing Mobile Legends and the occurrence of DQS among e-sports enthusiasts.[17,18]

Data analysis included both univariate and bivariate analyses. Univariate analysis comprised descriptive statistics such as frequency distribution, standard deviation, and mean for age, gender, duration of playing Mobile Legends, and DQS. Bivariate analysis examined the relationship between the independent variable (duration of playing Mobile Legends) and the dependent variable, DQS, using *Chi-square* and *Fisher Exact* tests. This study passed the review process of the Ethics Commission of the College of Medicine, Universitas Udayana, with SK number 319/UN14.2.2.VII.14/LT/2023, and each research respondent consented voluntarily to participate in this study. Respondents also signed an informed consent form stating their understanding of this study's purpose, procedures, and risks.

RESULTS

The characteristics of the sample population, characteristics of the sample population, including age, gender, duration of Mobile Legends play, and incidence of DQS, were described in the univariate analysis in Table 1. Among the 150 subjects, the majority were males (98%), and the rest were females (2%). The duration of playing with the highest distribution was observed among regular gamers (89.3%), followed by heavy gamers (7.3%) and light players (3.3%). The occurrence of DQS was measured through the Finkelstein test; the results showed that 65% of respondents tested positive for DQS, while 35% tested negative in Table 2.

The *chi-square* and Fisher exact tests were used to investigate the relationship between the duration of playing Mobile Legends and the occurrence of DQS among e-sports enthusiasts. The main finding showed a significant association, with p=0.001 (Table 3).

DISCUSSION

This study investigated the prevalence of DQS among active e-sports players in Denpasar in 2023. The study included 150 subjects who met the predetermined inclusion criteria. The sample of this study was predominantly male, comprising 98% of the participants, while females constituted the remaining 2%. The age distribution of the sample showed an average age of 15.3. World Health Organization considered this age to be in the adolescent category. This gender and age distribution aligns with previous studies that indicated a higher prevalence of gaming addiction among teenage males compared to females.[19,20]

The analysis of playing duration revealed that most participants were regular gamers, spending between 2 and 7 hours per day playing Mobile Legends. This finding is consistent with previous studies indicating that regular gamers represent a significant portion of e-sports enthusiasts.[11] Moreover, the study found a notable percentage of participants who tested positive for DQS, indicating a potential correlation between gaming duration and this syndrome.

The Fisher Exact test confirmed a statistically significant relationship between the duration of playing Mobile Legends and the prevalence of DQS among e-sports players in Denpasar. The research highlighted the correlation between prolonged gaming sessions and the likelihood of developing DQS.[8,11] Studies have shown that excessive gaming, characterized by prolonged and repetitive thumb movements, can lead to musculoskeletal issues such as DQS.[21] The findings suggest that individuals who spend more time gaming are at a higher risk of experiencing DQS symptoms due to the repetitive stress placed on the thumb tendons and ligaments.[22,,23]

In Sholikah's study (2020) on the relationship between the duration of playing the online game Mobile Legends and DQS, 53 physiotherapy students at Muhammadiyah University of Surakarta were involved. The research findings revealed that 36 respondents were diagnosed with DQS out of this

Table 1. Respondent characteristics of the e-sport players

Variable	n or mean	Percentage (%) or standard deviation
Age (years)	15.3	1.27
Gender		
Male	147	98
Female	3	2
Playing duration		
Light players	5	3.3
Reguler players	134	89.3
Heavy gamers	11	7.3
DQS		
Yes	98	65.0
No	52	35.0
Total	150	100

n, frequency; DQS, de Quervain syndrome

Table 2. The correlation between the duration of playing mobile legends with the incidence of DQS

			Finkelstein test		
			No	Yes	Total
Playing duration	Light player	n	5	0	5
		Expected count	1.8	3.2	5.0
		Percent (%) of total	3.3	0.0	3.3
	Regular player	n	48	89	137
		Expected count	48.4	88.6	137.0
		Percent (%) of total	32.0	59.3	91.3
	Heavy player	n	0	8	8
		Expected count	2.8	5.2	8.0
		Percent (%) of total	0.0	5.3	5.3
Total		n	53	97	150
		Expected count	53.0	97.0	150.0
		Percent (%) of total	35.3	64.7	100.0

n, frequency; DQS, de Quervain syndrome

Table 3. *Fisher's exact* test of the duration of playing mobile legends on the incidence of de Quervain syndrome

	Exact sig. (2-sided)
Fisher exact test	0.001

sample, while the remaining 17 did not exhibit symptoms of DQS. The highest distribution occurred among the regular gamer category. From these results, it can be concluded that there is a correlation between the duration of playing Mobile Legends and DQS, indicating that longer durations of online gaming may increase the risk of DQS.[11] The positive Finkelstein test results increased with the length of gaming due to the repetitive and rapid movements required in gaming, leading to friction and inflammation accompanied by pain.[21]

Based on the discussion above, this study has several limitations. The researcher did not develop other factors, such as screen size of screen size and thumb-related activities performed daily other than playing games. Besides playing games, this study only included 150 subjects from Denpasar, which may not represent the entire population of e-sports enthusiasts in Indonesia or globally. A larger sample size could provide more robust findings.

CONCLUSION

Playing Mobile Legends for a longer duration potentially increases the risk of DQS, while shorter playing durations correlate with lower risks. Further research is needed to explore other risk factors for DQS, such as screen size and thumb activities apart from gaming. Physiotherapy provides kinesiotaping for pain relief and education about home exercises to prevent more severe conditions.

ETHICAL CLEARANCE

This study received approval from the Ethical Committee, Medical Faculty, Udayana University, under registration number 319/UN14.2.2.VII.14/LT/2023. The respondents' informed consent, which approved the use of sampling, was also provided.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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AUTHOR CONTRIBUTIONS

PPP developed the study's methodology, gathered the data, and wrote the article. I also conducted a literature search, edited the draft, and reviewed the final version of the paper. PPP used SPSS to process the data.

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