



## The relationship between mobile online gameplay duration and sleep quality in the latest adolescents

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### ABSTRACT

**Background:** One of adolescents' popular physical activities and entertainments is playing online games. Playing online games with excessive duration can cause poor sleep quality. This study aimed to determine whether there is a relationship between the duration of playing mobile online games with sleep quality in late adolescents at senior high school 1 Dawan, Bali, Indonesia.

**Methods:** The research method used is analytic observational with a cross-sectional design and purposive sampling method. The total sample obtained is 91 samples according to the specified criteria.

Data were collected by measuring the duration of playing player unknown's battlegrounds (PUBG) mobile with a questionnaire on the duration of playing online games and measuring sleep quality with the *pittsburgh* sleep quality index (PSQI) questionnaire.

**Results:** Based on the results of testing the data using *spearman rho* analysis, the results obtained were  $p=0.002$ .

**Conclusion:** Based on the study's results, it can be concluded that there is a relationship between the duration of mobile online games and sleep quality in late adolescents.

**Keywords:** adolescents, online games, playing duration, sleep quality.

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### INTRODUCTION

The world of adolescents is full of colors and other exciting things. In adolescents, a period is often in the spotlight, namely puberty.<sup>1</sup> Based on the republic of Indonesia ministry of health (2009), adolescents can be grouped into two, namely, early adolescents (12-16 years) and late adolescents (17-25 years). The adolescent phase is transitional or can be called the transitional phase from children to adults. At this time, the process of growth and development of a person will take place rapidly, both mentally and physically.<sup>2</sup>

In the stages of development, adolescents will be faced with health-related problems, such as fulfilling the quality of sleep in adolescents.<sup>3</sup> In the last few decades, epidemiological research has shown that the number of adolescents experiencing sleep disturbances has increased by 21.2%.<sup>4</sup> Sleep is an essential physiological human need. A teenager's average sleep time to maintain his health is 8 to 10 hours per night.<sup>5</sup> Sleep is when a person's awareness of something goes down. However, brain activity still plays an extraordinary role in regulating its functions, such as digestive function, heart activity, blood vessels, and immune function, in providing energy to the body in cognitive processing, including storage, structuring, and reading information stored in the brain, as well as information acquisition.<sup>6</sup>

Technology and science have developed and changed people's interests and lifestyles. This can be

seen from the increasing number of internet users in Indonesia. Based on research from the Association of Indonesian Internet Service Providers (APJII) in 2012, 24.23% of people were using the Internet in Indonesia. Bali is one of Indonesia's provinces with the most internet users, 67.7% male and 33.3% female users.<sup>7</sup> Based on these achievements, Indonesia is ranked 8th in the world. Of the total number of internet users, 80% of them are teenagers aged 15-19 years.<sup>8</sup>

Online games are an impact that arises due to the existence of modern media while implementing a new lifestyle. Nowadays, many smartphones are facilitated by online games on their smartphones.<sup>9</sup> Player unknown's battlegrounds (PUBG) mobile is an online game with a type of battleground widely played by gamers. There are around 217 million online game players spread all over the world.<sup>10</sup>

Teenagers are one of the ages that are targeted in terms of marketing an online game. Being in that age range can later influence the character of a teenager still developing into adulthood. This is because adolescents are considered easier to be attracted to an online game than adults.<sup>7</sup> When a teenager plays online games without paying attention to the duration of the game and is accompanied by not doing activities for a long time, it will cause the muscles to be inactive and it can trigger a decrease in metabolic processes. In the long term, it can cause a decrease in muscle mass.<sup>9</sup>

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Another negative impact of online games is that they can affect health, such as sleep patterns. When someone has a wrong sleep pattern, it can cause stress. The longer the duration used to play, it can cause a person to experience addiction, causing a lack of fulfillment of his sleep needs. People with online game addiction can spend up to 7 hours a day just playing games. Poor sleep quality can affect the learning process in adolescents, especially students, where a teenager with good sleep quality will have good concentration in learning. Likewise, when an adolescent has poor sleep quality, characterized by excessive sleepiness, weakness, and difficulty concentrating on learning, it affects academic performance.<sup>11</sup>

This study was conducted to determine the relationship between the duration of playing mobile online games with sleep quality in adolescents based on problems, exposure to the results of preliminary studies, and the lack of research on the relationship between the duration of playing mobile online games with sleep quality in latest adolescents in Dawan, Klungkung, Bali, Indonesia.

## METHODS

This study is an analytical observational study using cross-sectional studies. The research was conducted in January 2023 at senior high school 1 Dawan, Bali, Indonesia. The sample selection used the purposive sampling method. The inclusion criteria in this study were senior high school students of 1 Dawan, Klungkung, Bali, Indonesia. Respondents whose age range is 17 to 18 years, respondents who played the PUBG mobile online game and were willing to complete informed consent as proof of willingness to be the research sample exclusion criteria for students taking sedatives or sleeping pills. The number of samples obtained was 91 students.

Playing duration can be measured with a gameplay duration questionnaire. This questionnaire classifies the duration of play into three, namely, use of less than 3 hours a day (low intensity), use of 3-7 hours a day (medium intensity), and use of more than 7 hours a day (long intensity).<sup>12</sup>

Sleep quality was measured using the Pittsburgh sleep quality index (PSQI) questionnaire, a method for assessing sleep quality that contains questions about a person's sleep quality.<sup>13</sup> The total score of the answers will indicate the quality of a person's sleep. Someone with a score <5 indicates good sleep quality, while someone with a score >5 indicates poor sleep quality.<sup>14</sup>

There are two types of data analysis in this study, namely univariate and bivariate analysis. Variables with univariate analysis included age, gender, sleep

quality, and duration of online PUBG mobile games, which aimed to describe the variables in the study. Furthermore, bivariate analysis was carried out to determine the relationship between the independent and dependent variables.

## RESULTS

From a total of 91 respondents, the descriptive characteristics of the respondents in this study were obtained. Namely, age, gender, duration of PUBG mobile online games, sleep quality, and physical activity can be seen in Table 1.

Table 1. Based on the table, it is known that most respondents were aged 17 years (75.8%). There were more male respondents, namely 68 respondents (74.7%). Other data from this study consisted of the duration of playing PUBG Mobile online games, quality of sleep, and physical activity. The data in the table shows that most respondents for the duration of play are in the medium category, with as many as 53 respondents (58.2%). The table also shows more respondents with a moderate level of physical activity (52.7%) than those with a light level (47.3%). The majority of respondents were in the category of poor sleep quality as many as 68 respondents (74.7%), while in the category of good sleep quality, there were 23 respondents (25.3%).

Table 2. The value of  $p = 0.002$  ( $p < 0.05$ ) is obtained. This shows a significant relationship between the duration of PUBG mobile online games and sleep quality. This shows that the longer the PUBG mobile online games duration, the worse the sleep quality.

## DISCUSSION

The results of testing the data using non-parametric Spearman rho analysis show a significant relationship between the duration of PUBG mobile online games and sleep quality. This shows that the longer the PUBG mobile online games duration, the worse the sleep quality.

Adolescents who play online games will carry out continuous motor processes to get sensations from their senses via the ventral striatum, occipital lobe, and prefrontal cortex. When a teenager performs an activity repeatedly and is used to receiving stimulation from a game, the dorsal striatum will experience a change in activity that causes the dopamine nerves to produce the hormone dopamine, which is captured as a feeling of pleasure. Suppose a teenager plays online games without paying attention to the duration of his play and is used to doing so. In that case, it will affect the dopaminergic pathways, namely a collection of projection neurons that combine and release

**Table 1.** Distribution of subject characteristic data

Variable	frequency	Percentage
Age		
17 years	69	75.8
18 years	22	24.2
Gender		
Man	68	74.7
Woman	23	25.3
Duration of Playing		
Low	30	33
Currently	53	58.2
Long	8	8.8
Sleep Quality		
Good	23	25.3
Bad	68	74.7
Physical Activity		
Light	43	47.3
Currently	48	52.7

**Table 2.** The Relationship Between Duration of Playing PUBG Mobile Online Games and Sleep Quality

Variable Correlation	P-value
Duration of Playing PUBG Mobile Online Games with Sleep Quality	0,002

dopamine, which will become more substantial and more persistent in bringing addiction, making the reactive system more substantial and more robust. The reflective system is getting weaker, which will cause cognitive abilities to decrease, and it isn't easy to manage self-control.<sup>15</sup>

Online games are intended to minimize fatigue or be played to refresh after daily activities. However, the reality is different. Online games can cause individuals to become addicted due to not paying attention to the duration of their play and instead have various impacts that can affect individual behavior.<sup>16</sup> Lack of control from parents can cause their children to forget the time to rest or when the time that should be used for sleeping is instead used to play. Therefore it will indirectly hurt someone.<sup>17</sup> Playing too long is one of the factors that can affect a person's lack of sleep quality. Playing too long is one of the factors that can affect a person's lack of sleep quality. A person's sleep quality is said to be good if they do not show various signs of sleep deprivation and do not experience problems in their sleep. This lack of sleep causes many effects, including reduced concentration, attacked by diseases such as colds, flu, and cough.<sup>19</sup>

Habibi's research (2021), which examined the relationship between the habit of playing online games and the quality of sleep in students, found a positive correlation between the habit of playing online games and sleep quality.<sup>18</sup> Khatijah's research (2021), which examines the relationship between the intensity of using online games and the quality

of sleep of adolescents, found that the causes of adolescents playing online games excessively are caused by boring routines and a home atmosphere that is far from comfortable.<sup>16</sup>

The same thing was also found in Yustina's research (2021) concerning the relationship between online game addiction and student sleep quality. It found that adolescents are more prone to experiencing poor sleep quality due to accessing the internet too often to play and forgetting time to rest at night, which will impact health. Such as lethargy, sore eyes, and not concentrating when class starts.<sup>17</sup>

In Keswara's research (2019) regarding the behavior of using gadgets and sleep quality in adolescents, it was found that there was a relationship between the behavior of using gadgets and the quality of adolescent sleep caused by the use of gadgets, especially at night, which would disrupt a person's sleep schedule, besides that by staring at the gadget screen for a long time.<sup>3</sup>

Online games are considered a stress reliever after a long day of activities. Still, teenagers often use online games as an excuse to sleep late, which causes progressive sleep disturbances and poor sleep quality due to continuous exposure to light on electronic devices.<sup>20</sup> Besides that, staring at the gadget screen for a long time will also cause a person to have difficulty sleeping because the blue light causes a person to stay awake.<sup>21</sup>

There are several limitations of this study. First, the sample size was small. A multicenter study with a larger sample size is needed to verify the results of this study further. Second, as this study was a cross-sectional survey, we could not observe patients' sleep quality dynamically, and it was difficult to explore the causal relationship between variables. We could not control for other variables that might interfere, such as scrolling through social media or other activities using cell phones. Future researchers are expected to pay more attention to the duration of playing online games with sleep quality in adolescents.

## CONCLUSION

Based on the research results and the Spearman Rho analysis test that has been carried out, it can be concluded that there is a relationship between the duration of PUBG mobile online games and sleep quality in late adolescents.

## ETHICAL CLEARANCE

This research has been approved by the Research Ethics Commission of the Faculty of Medicine, Udayana University. Ethical clearance with letter

number 3072/UN14.2.2.VII.14/LT/2022 and protocol number 2022/01.1.1400.

## CONFLICT OF INTEREST

This study has no conflicts of interest.

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## AUTHOR CONTRIBUTIONS

GAP prepared the research design, collected data, processed data, and wrote the manuscript. AW, NKAJA, and IMNW have directed data collection and revised the manuscript.

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