ORIGINAL RESEARCH

ADDICTION TO ONLINE GAMES AFFECTS THE ATTENTION LEVELS OF MEDICAL STUDENTS OF PELITA HARAPAN UNIVERSITY

Johanes David Hendrijanto[1], Claudia Kinsky Irawan[1], Vivien Puspitasari[2]

[1]*Faculty of Medicine, Pelita Harapan University, Tangerang, Banten, Indonesia*

[2]*Department of Neurology, Siloam Hospital Lippo Village, Tangerang, Banten, Indonesia*

***Correspondence:** johanesdavid21@gmail.com*

Abstract

Background: Epidemiologically, the incidence of online games addiction in students in Indonesia in 2013 is estimated to be around 10.15%. Addiction to online games is one of the factors that might affect a person's level of attention. Previous studies had shown that there are positive and negative effects of attention function. There are also several studies that have reviewed the relationship between online games addiction and cognitive function but only a few studies focus on the level of attention. The study was conducted to determine the relationship of online games addiction with the level of attention to students.

Methods: This study uses a cross-sectional method. A sample of 158 peoples, who are students of the Faculty of Medicine at the University of Pelita Harapan in 2017 and were selected using a purposive technique. Data was collected from February to March 2020. The results were processed with Chi Square using SPSS version 25.0 software.

Results: Of the 158 samples needed, only 97 samples were collected due to COVID-19 and power by 56%. Of the 93 samples that met the inclusion criteria, 22.6% were addicted to games. In the game's addiction group, it was found that 23.8% experienced a decrease in forward attention and 57.1% experienced a decrease in backward attention. (forward: p value = 0,000, backward: p value = 0,001).

Conclusion: In conclusion, a significant relationship was found between online game addiction and decreased attention levels.

Keywords: Online games addiction, attention levels

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Introduction

The advancement of the internet in Indonesia is increasing expeditiously. Based on the APJII (Asosiasi Penyelenggara Jasa Internet Indonesia) survey in 2018, internet users in Indonesia were at 64,8%, which is 171.1 million people out of a total of 264.16 million people in Indonesia. From 100% internet users, there were 5.7% (ranked 6th as the main reason for using the internet) use the internet as the main reason for playing online games, and 7.8% of internet users (ranked 5th as the second reason for using the internet) use the internet as the second reason for playing online games.[1]

The addiction towards online games has now been officiated by the World Health Organizations (WHO) as the mental health disease in International Classification of Disease 11th Revision (ICD-11).[2] Online games addiction with the presence of clinical disorders can be categorized as the Internet Gaming Disorder in DSM V (Diagnostic and Statistical Manual of Mental disorders) by American Psychiatric Association in 2013.[3]

In 2013, according to Jab et al., it was estimated there were 10.15% Indonesian students addicted to online games.[4] Online games addiction had similar neural processes as drug addiction and other addictive behaviors, such as pathological gambling.[5] Online games addiction also led to several problems, such as problems with verbal memory, poor academic achievement, sleep disorders (insomnia and low sleep quality), difficulty in social adjustment, anxiety, and stress.[6,7] In 2014, Sara et al. found a relationship between playing video games and attention problems and several conceptually related abilities, and games that had violent elements were associated with greater attention problems.[8] In 2017, Peracchia et al. stated that playing video games was also often done at night which might affect sleep time, thereby, reducing sleep time. On the other hand, games addiction is also reported to have positive impacts on cognitive abilities, emotions, and social habits.[9] In 2018, Zahra et al. had shown that gamers had better concentration levels than non-gamers.[10]

The poor quality of sleep is also associated with reduced abilities of maintaining attention and focus on tasks.[11] Less than 6 hours of sleep during nighttime is considered as partial lack of sleep and might cause attention deficit continuously.[12] In 2017, Peracchia et al. had shown that hard gamers (playing almost 4-6 hours daily) had better sleep quality and efficiency than casual gamers (playing less than 1 hour), this might be due to larger physiological activity on the hard gamers, therefore causing the better and deeper sleep quality.[9]

From this description, the researcher is finally intrigued in examining whether there is an influence between online games addiction and the level of attention among respondents. Therefore, this study is conducted to determine whether there is an influence and physiological and psychological impact produced by online games addiction with a person's level of attention.

Methods

The study design in this research was a cross-sectional study design. This study was an unpaired categorical study. The Chi Square method was the method used for data analysis. This research was conducted at the Faculty of Medicine, Pelita Harapan University using the questionnaire method, digit span forward test, digit span backward test, Depression Anxiety Stress Scales 21 (DASS 21) test and will be described in the variables and research methods. This research was conducted during February - March 2020.

The target population was students of the Faculty of Medicine, Pelita Harapan University, class of 2017. The research sample is students of the Faculty of Medicine, Pelita Harapan University, batch

2017 with inclusion and exclusion criteria. The inclusion criteria were students that were part of the students of Pelita Harapan University (Batch 2017), agreeing to participate in the research, playing video games on any devices, such as smartphone, PlayStation, computer, laptop, and other game consoles, playing video games for 12 months, without 1 full month without playing video games. The exclusion criteria are the students that were training for video games competition, interested in becoming an e-sport athlete, needed time to play video games for certain purposes, DASS score for depression ≥ 9, DASS score for anxiety ≥ 8. The data obtained were processed and statistically tested using the SPSS 25.0 program with the Chi Square method.

Results

Based on the research that was conducted in February–March 2020 at the Faculty of Medicine, Pelita Harapan University, 97 research samples were obtained, which was less than the required number of respondents, which was 158. A total of 93 respondents met the inclusion criteria, while 4 respondents met the exclusion criteria because their DASS scores was 21, which met the criteria for depression or anxiety. The respondents were the preclinical medical students at the Faculty of Medicine, Pelita Harapan University, batch 2017, who voluntarily participated in this study, which involved completing a questionnaire and attention test, and met the inclusion and exclusion criteria.

Based on the respondents who met the criteria, 52 (55.9%) were female and 41 (44.1%) were male. The age range of respondents was between 18 and 30 years, with a mean of 20.24 ± 1.2.

From the collected data, 21 people (22.6%) were classified as addicted to games, and 72 people (77.4%) were not classified as addicted to games, according to the Internet Gaming Disorder (IGD) questionnaire. All respondents met the inclusion criteria, namely being a Medical Students of Pelita Harapan University, batch 2017, agreeing to participate in this study, and meeting the criteria for completing the IGD questionnaire, with always playing for 12 months, without any 31 full days without playing games, and from the data collected from respondents, none suffered from attention deficit hyperactivity disorder (ADHD) or autism as confounding variables (Table 1).

The level of attention of the respondents was measured using two types of attention tests; forward and backward, with a cut-off score of 4.

Table 1. Subjects Characteristics

Variable	n	Percentage (%)	Mean
Gender			
Male	41	44,1	
Female	52	55,9	
Mean Age ± SD, Year			20,24 ± 1,2
Online Games Addict (IGD)			
Yes	21	22,6	
No	72	77,4	
Forward Attention			
Decreased	5	5,4	4,48 ± 1,36
Normal	88	94,6	5,93 ± 1,09
Backward Attention			
Decreased	24	25,8	3.62 ± 0,92
Normal	69	74,2	4,33 ± 0,85

In the gaming addiction group, the results for the forward attention test, there were 5 respondents that had deficit of attention level and 16 had normal

attention level with mean or average score of 4,48 ± 1,36. Meanwhile, in the non-addiction group, there was no deficit of attention level based on the forward digit span, and the mean or average score of 5,93 ± 1,09. The mean forward digit span attention of all samples, both addicted and non-addicted to games, was 5.60 ± 1.303, and for backward digit span was 4.09 ± 0.905.

For the level of attention of the game addiction group with backward digit span, 12 respondents experienced decreased attention and 9 respondents had normal attention, with a mean or average score of 3.62 ± 0.92. For the group that did not experience game addiction, from the results of digit span backward, 12 respondents experienced decreased attention and 60 respondents had normal attention levels, with a mean or average of 4.33 ± 0.85 (Table 2).

The results of the statistical test using chi-square obtained a p-value using Fisher's exact test due to the Expected value of less than 5, amounting to 0.000, so it can be concluded that there is a statistically significant relationship between game addiction and attention level (forward).[40] The odd ratio value for this data cannot be calculated due to the value of 0 (Table 3).

The results of the statistical test using chi-square obtained a p-value of 0.001 (p <0.05) so it can be concluded that there is a statistically significant relationship between game addiction and attention level (backward).[40] The results of the odd ratio value in this study were 6.667 (OR> 1) and 95% CI of 2.302 - 19.31.40 (Table 4).

Table 2. Attention Test Results

Variable	Game Addiction	Non Game Addiction	n	%
Forward Attention				
Decreased (< 4)	5	0	5	5,4
Normal	16	72	88	94,6
Mean forward attention	4,48 ± 1,36	5,93 ± 1,09		
Overall Mean Forward Attention	5,60 ± 1,303			
Backward Attention				
Decreased (< 4)	12	12	24	25,8
Normal	9	60	69	74,2
Mean Backward Attention	3.62 ± 0,92	4,33 ± 0,85		
Overall Mean Backward Attention	4,09 ± 0,905			

Table 3. Statistical Analysis of Game Addiction with Attention Level (Forward)

Game Addiction	Attention (Forward)				Total	P Value
	Decreased		Normal			
Yes	5	23,8%	16	76,2%	21	0,000
No	0	0,0%	72	100%	72	
Total	5	5,4%	88	94,6%	93	

Table 4. Statistical Analysis of Game Addiction with Attention Level (Backward)

Game Addiction	Attention (Backward)				Total	OR (95% CI)	P Value
	Decreased		Normal				
Yes	12	57,1%	9	42,9%	21	6,667	
No	12	16,7%	60	83,3%	72	(2,302-19,311)	0,000
Total	24	25,8%	69	74,2%	93		

The respondents needed for this study were 158 respondents, and the number of accumulated respondents was 97 respondents, in which 4 respondents met the exclusion criteria, therefore, the data that could be processed was 93 respondents. As a result of the lack of accumulated respondents from the required number, the power calculation

was carried out. From the power calculation, the result was 56%.

Discussion

The results from the collected data in this study were still less than expected, there were 158 respondents, therefore, a power calculation was done, and the results obtained were 56%. The results of the analysis of this study found a relationship between addiction to online video games and the level of attention among Pelita Harapan University Medical Students batch 2017, with a p-value for forward attention using the fisher's exact test of 0.000 ($p < 0.05$) due to an expected value of less than 5, and for backward attention of 0.000 ($p < 0.05$). The odds ratio value for forward attention was not obtained due to the value of 0 in the table analyzing the level of attention (forward) with addiction to games in table 5.3, and for backward attention the value was 6.667 (OR> 1, 95% CI 2.302-19.311), therefore, the chances of someone who is addicted to online video games are 6.6 times greater to have a decreased level of attention than those who do not suffer from addiction to online video games.

In theory, playing games can be explained through a dual processing model where there is a reactive and reflective system, in people addicted to games, the reactive system (dopamine pathway) will remain because of the repeated pleasure of playing games so that the reactive system ("go" network) will strengthen and the reflective system ("stop" network) will weaken because of the strengthening of the reactive system, which causes decreased attention is the weakening of the reflective system, because the reflective system is a part area related to attention and impulse control.[3,25]

For the forward and backward attention tests, each has a different level of sensitivity and specificity, for sensitivity, digit span backward has a higher level of sensitivity, namely 77% and for forward it is 22%, so from this level of sensitivity, digit span forward allows it to miss more samples or respondents who may have attention disorders or decreased attention, while for digit span backward, it has a higher percentage level than forward so that there is less chance of this digit span backward to miss samples who have attention disorders, so the possibility of people addicted to games who have low attention is higher in sensitivity to digit span backward.[41] For specificity, digit span forward has a higher specificity level of 100% and digit span backward is 57%, so in digit span forward the possibility of people who are not addicted to games has normal attention with higher specificity than digit span backward.[42]

The results of this study are not in line with the results of research by Zahara A et al. which showed protective results, that gamers have a better level of concentration (attention in a long period) than people who are not gamers. In the results of Zahara's study, the prevalence of gamers was 34 (33%) out of 103 respondents. The incidence of game addiction or gamers in Zahara's study was higher than the study conducted. The difference in the results of this study with the study conducted by Zahara, could occur because of the genre and duration of playing games, where in Zahara's study it focused on DOTA 2 games

and specifically how long the duration of playing games was.[10]

The results of this study are in line with the research of Sara Prot et al. and Sri L.[3.8] Research conducted by Sara Prot concluded that increased time playing video games increases attention problems.[8] For confounding variables, namely autism and ADHD, it could not be done because there were no respondents who experienced these disorders.

The similarity of this study with that conducted by Zahara and Sara Prot, this study was conducted on a sample with an age range of 17-25 years and the same research design as Zahara, namely cross-sectional.

Some weaknesses in this study are that it has a number of respondents less than required. The lack of samples in this study meant that researchers were unable to further examine the relationship between online video game addiction and attention levels. In this study, researchers failed to check the number of remaining respondents needed so that the number of respondents or samples was less than required, this lack of samples was due to the COVID-19 pandemic which caused the research time to be cut short and the researcher's time constraints, for online data collection solutions were not carried out due to connection limitations that could cause the attention test not to run properly so that it could cause the results to be biased. The attention test conducted by the researcher also could not be conducted in a crowded place, because of the bottleneck model theory that limits a person's attention to something, so that if the attention test is conducted in a crowded or noisy place, it can reduce a person's level of attention to this attention test, which produces biased data.[23] In addition, the time for conducting the attention test is also limited, because a quiet room and sufficient time are needed so that the attention test can be conducted properly and without interference or distraction. Finally, the researcher did not examine the duration of playing online video games and the genre played, which are factors that are also related to attention.[8]

Conclusion

In this study, it was found that online game addiction affects the attention levels among students of the Pelita Harapan University Medical Students batch 2017, and changes in attention levels in the online game addiction group were a decrease in attention levels.

Conflict of Interest

The authors declared no conflict of interest.

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