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# Factors Associated with Games Addiction among Internet Game Players Visiting Internet Gaming Cafes in Northern Sumatera

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**Abstract**

**BACKGROUND:** The prevalence of teenagers experiencing addiction game Indonesia continued to increase.

**AIM:** Study aimed to investigate factors associated with game addiction among internet game players visiting internet gaming cafes using Indonesian version the Game Addiction Scale (GAS) score.

**METHODS:** Cross-sectional was conducted from November to December 2020 at an internet gaming cafe in the Tanjung Sari village, Medan city. The study subjects were online game players at four internet gaming cafes. A structured interview was conducted on online game players before being assigned to fill out identity and answer the Indonesian version of the GAS questionnaire.

**RESULTS AND CONCLUSION:** Age, number of playing game mates, daily duration of sleep, weekly duration of playing online games, online game group membership, and parental monthly income were found to be associated with gaming addiction as measured by GAS scores. Meanwhile, educational background and monthly cost of playing games were found to be not associated with game addiction as measured by the GAS score.

## Introduction

More than 1 billion people played online games with 8% growth in the game industry in 2012. Niko Partners company estimated that China's online gaming market reached US$12 billion in 2013 [1]. In America, about 59% of the population are game users and surveys show that 97% are aged 12–17 [2]. In Indonesia, the majority of game users are aged 10–25 years. In 2016, the prevalence of teenagers experiencing game addiction in Indonesia continued to increase. In addition, the number of game players in Indonesia is increasing from 5% to 10% every year [3].

There have been numerous studies and debates on the characteristics associated with excessive game use to assess game addiction, game addiction scale (GAS). The questionnaire assesses seven criteria salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. In 2008, a study in Netherlands used GAS to investigate 573 participants and the prevalence of game addiction disorder to 65%. Furthermore, the study showed that the study subjects were predominantly aged 15 years and were male ($p < 0.001$) [4].

This study aimed to investigate factors associated with game addiction among internet game players visiting internet gaming cafes using Indonesian the GAS score.

## Methods

This was cross-sectional from November to December 2020 at an internet gaming cafe in the Tanjung Sari village, Medan city. This study has obtained approval from the Research Ethics Committee at the Faculty of Medicine, Universitas Sumatera Utara (No. 8781/KEP/USU/2020).

The study subjects were online game players at four internet gaming cafes in Tanjung Sari Village that operated 24 h/day with an average number of visitors about 25 people/day (fifty samples were taken from each cafe). The inclusion criteria were male aged 12–18-years-old who have been playing video games for at least 12 months, with score on the Indonesian version of the GAS at least 18, playing online games for at least 28 h/week, and playing games in multiplayer mode. Users of psychoactive substances (having a

history of using methamphetamine, amphetamines, opioids, cannabis, and benzodiazepines) were excluded from the study. By assigning type one error to be 5% and type two errors to be 20%, a minimum of 200 subjects was obtained.

A structured interview was conducted on online game players before being assigned to fill out identity and answer the Indonesian version of the GAS questionnaire. The questionnaire consists of seven questions about games they play in the past 6 months with a frequency rating scale consisting of 1 = never, 2 = almost never, 3 = sometimes, 4 = often, and 5 = very often. The total score indicating addiction is at least 18.9.17. The variables of interests in this study include age, length of education, number of friends playing online games, duration of sleep per day (hours), total monthly cost on online game play, weekly game play duration (hours), online game group membership, and parent's monthly income. Descriptive analysis, bivariate analysis with independent t-test or Mann–Whitney U and multivariate analysis were carried out to investigate the relationship of the variables studied with the GAS score all statistical analysis in this study using SPSS version 25.

## Results

This study carried out from November 2020 to December 2020 at four internet cafes with 24 h/day operational hours and average number of visitors of 25 people/day (fifty samples were taken from each internet cafe). The mean age of the visitors was 12–18 years.

The majority of the study subjects have finished 9 years educational program, (61%), unregistered in online game group membership (61.5%), spent more than 1 million rupiah per month for online games (59%), and with mean monthly parental income about five million rupiah per month (57%). The median age of subjects experiencing games addiction was 16 years (min 12, max 18). The median sleep duration was six (min 4 h, max 9 h) and the median playing time was 32 h (min 28 h, max 46 h). The median GAS score of the study subjects was 23.50 (min 18, max 31) (Tables 1-3).

**Table 1: Demographic characteristics**

| Variable | Median (min-max) | n |
|---|---|---|
| Age | 16 (12–18) | |
| Educational background | | |
| ≤9 years | | 122 (61%) |
| >9 years | | 78 (39%) |
| Parental monthly income | | |
| <Rp 5 million | | 86 (43%) |
| ≥Rp 5 million | | 114 (57%) |
| Number of friends | 9 (2–16) | |
| Monthly games cost | | |
| ≤Rp 1 juta | | 82 (41%) |
| >Rp 1 juta | | 118 (59%) |
| Daily sleep duration (hours) | 6 (4–9) | |
| Weekly playing duration (hours) | 32 (28–46) | |
| Games group membership | | |
| Yes | | 77 (38.5%) |
| No | | 123 (61.5%) |

## Discussion

Age, daily sleeping duration, number of friends playing online games, weekly playing games duration, online game group membership, and monthly parental income were found to be associated with games addiction as measure by Indonesian version of the GAS score in this study.

In individuals who are accustomed to playing online games, game play is a must, and will cause changes in activity in the dorsal striatum that are activated through dopaminergic innervation. The lack of individual ability in self-regulation in playing online games is the beginning of the problem of online game addiction. Initially, is disturbance in of the prefrontal cortex and ventral striatum which can cause disturbances in decision making which eventually initiates addictive behavior [1], [5].

This study illustrated the statistically significant correlation age with the Indonesian version of the GAS score. The majority of study subjects experiencing online game addiction were aged 12–16 years. This is in line with the study conducted by Milani *et al.* in 2017 in Italy showing mean age of 13.86 ± 2.32 ($p < 0.05$) [6]. At this age, the individuals more often have activities related to excitement. Online game addiction is associated with the release of dopamine which is the same as drug abuse. Overall online game addiction is associated with dysfunction in the dopaminergic system which causes individuals to experience failure to control the game and cause online game addiction [7], [8]. However, in contrast to the study conducted by Saquib *et al.* (2017) in Saudi Arabia, there was no relationship found between age and game addiction ($p = 0.82$) [9].

It was found that there was significant correlation between educational background with the Indonesian version of the GAS score in online game players. In contrast to the study conducted by Nagygyorgy *et al.*, in 2013 in Hungary, 51.2% of the subjects had an education of 9 years and found a significant relationship between educational background and online game addiction ($p < 0.001$) [10]. A study conducted by Hong *et al.* in 2017 in Korea and America did not a significant related between educational background and online game addiction ($p = 0.67$) [11].

Multivariate analysis conducted in this study revealed a significant correlation was found between sleep duration and the Indonesian version of the GAS score ($p < 0.001$, $r = -0.25$). This is in line with a study conducted by Lam *et al.* in 2008 in China, showing that sleeping <6 h/day is associated with online game addiction ($p = 0.001$) [12]. American Academy of Sleep Medicine stated that one of the factors causing difficulty in initiating sleep is the use of electronic media that lead users to continue to interact with multimedia devices, including video games. Teenagers generally possess

and use electronic items such as game consoles in their bedrooms [13].

**Table 2: Bivariate analysis of factors associated with game addiction as measured by GAS score**

| Variables | Mean or median | p |
|---|---|---|
| Educational background | | |
| ≤9 years | 24.19 ± 3.14 | <0.001 |
| >9 years | 22.40 ± 3.42 | |
| Parental monthly income | | |
| <5 million rupiah | 22.55 ± 3.47 | <0.001 |
| ≥5 million rupiah | 24.20 ± 3.10 | |
| Monthly games cost | | |
| ≤1 million rupiah | 22.32 ± 2.81 | <0.001 |
| >1 million rupiah | 24.31 ± 3.47 | |
| Games group membership | | |
| Yes | 22.42 ± 2.76 | <0.001 |
| No | 24.16 ± 3.53 | |
| Age | 23.49 ± 3.36 | <0.001 |
| Sleep duration | 23.49 ± 3.36 | <0.001 |
| Number of playing game mates | 23.49 ± 3.36 | <0.001 |
| Duration of playing | 23.49 ± 3.36 | <0.001 |

This study also illustrated a statistically significant correlation among weekly duration playing online games with the Indonesian version of the GAS score ($p < 0.001$ and $r = 0.36$). This is in line with a study conducted by Jap *et al.* in 2013 in Indonesia showing that playing online games more than 5 days/week was associated with online game addiction ($p < 0.001$) [14]. This is also in line with a study conducted by Karaca *et al.* in 2018 in Istanbul where individuals who played video games 3–6 h/day were associated with online gaming addiction ($p < 0.001$) [15].

**Table 3: Multivariate analysis of factors related with game addiction as measured by GAS score**

| Skor Game addiction scale | Correlation Coefficients | Regresi Multivariat β | p |
|---|---|---|---|
| Constant | | 22.87 | <0.001 |
| Age | −0.33 | −0.54 | <0.001 |
| Daily sleeping duration (hours) | −0.25 | −0.84 | <0.001 |
| Number of playing games mate | 0.25 | 0.28 | <0.001 |
| Playing games duration (hours) | 0.36 | 0.32 | <0.001 |
| Games group membership | 0.16 | 1.15 | <0.001 |
| Parental monthly income (million rupiah) | 0.19 | 1.31 | <0.001 |

Adjusted R2 = 61.7%

The number of playing online game mates was found to be significantly associated with the Indonesian version of the GAS score in this study ($p < 0.001$ and a value of $r = 0.25$). This is in line with the study of Wang *et al.* in 2013 in Hong Kong where online game players who have more than seven playing games were associated with online game addiction ($p < 0.001$) [16].

Monthly online game cost variable was taken out automatically in model 2 of multivariate analysis ($p = 0.95$). In contrast, a study conducted by Jap *et al.* in 2013 in Indonesia found a relationship between higher cost and online game addiction ($p = 0.01$). Subjects who are addicted to online games spend more money, related to computer rental fees and the cost of the genre of online games played [14].

Online game group membership was found to be significantly associated with Indonesian version of the GAS score ($p < 0.001$ $r = 0.16$) in this study. Similarly, Rho *et al.* in 2014 in Korea, illustrated a relationship between online game group membership and game addiction ($p < 0.001$) [17]. However, Jeong *et al.* in 2017 in Korea found no relationship between participating in the online game group membership and online game addiction ($p > 0.05$) [18].

There was a relationship found between monthly parental income and the Indonesian version of the GAS score ($p < 0.001$ and $r = 0.19$) in this study. However, Rho *et al.* in 2014 in Korea showed no relationship found between monthly parental income and online game addiction ($p = 0.17$) [17]. Choi *et al.* (2019) study in Hong Kong illustrated that one of the factors related to online game addiction is the economic status of an established family ($p < 0.001$). In particular, the lower the economic level of a family, the more likely both parents to work, and most of both parents work with long working hours and low income [19].

The strength this study is multivariate analysis conducted to investigate factors associated with game addiction. The limitation of this study is attributed to the cross-sectional design that is unable to establish the causal relationship.

## Conclusion

Age, number of playing game mates, daily duration of sleep, weekly duration of playing online games, online game group membership, and parental monthly income were found to be associated with gaming addiction as measured by GAS scores. Meanwhile, educational background and monthly cost of playing games were found to be not associated with game addiction as measured by the GAS score.

Further studies are expected to investigate the correlation of games addiction with criminal behavior.

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