



# Relationship Between Internet Game Addiction, Depression, Social Behaviour, Mental Health and Sleep Quality : Structural Equation Modelling

Panel Situmorang<sup>1\*</sup>, Ariani Pongoh<sup>2</sup>, Yogik Setia Anggraeni<sup>3</sup>, Difran Nobel Bistara<sup>4</sup>, Norma<sup>5</sup>, Susanti<sup>6</sup>, Alva Cherry Mustamu<sup>7</sup>

<sup>1</sup>Departement of Nursing, Poltekkes Kemenkes Sorong, West Papua, Indonesia.

Email : [situmorangpanel@gmail.com](mailto:situmorangpanel@gmail.com)

<sup>2</sup> Department of Midwifery, Poltekkes Kemenkes Sorong, West Papua, Indonesia.

Email : [ani.pongoh@yahoo.co.id](mailto:ani.pongoh@yahoo.co.id)

<sup>3</sup> Department of Nursing, Poltekkes Kemenkes Sorong, West Papua, Indonesia.

Email : [yogik.setia89@gmail.com](mailto:yogik.setia89@gmail.com)

<sup>4</sup> Departement of Nursing, Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama, Surabaya, Surabaya, Indonesia.

Email: [nobel@unusa.ac.id](mailto:nobel@unusa.ac.id). Orcid ID: <https://orcid.org/0000-0002-7995-5509>

<sup>5</sup> Department of Nursing, Poltekkes Kemenkes Sorong, West Papua, Indonesia.

Email : [normepid@gmail.com](mailto:normepid@gmail.com)

<sup>6</sup> Departement of Nursing, Stikes Adi Husada, Surabaya, Indonesia.

Email: [susanti1303@gmail.com](mailto:susanti1303@gmail.com). Orcid ID : <https://orcid.org/0000-0003-1053-2361>

<sup>7</sup> Department of Nursing, Poltekkes Kemenkes Sorong, West Papua, Indonesia.

Email : [alvamustamu@gmail.com](mailto:alvamustamu@gmail.com). Orcid ID : <https://orcid.org/0000-0002-6682-514X>

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## Abstract

Due to the rapid growth of the internet game market, many students participate in playing the game, and it causes many adverse effects on themselves and socially. This study aims to determine the relationship between Internet games and Depression, Social Behaviour, Mental Health, and Sleep Quality among health students. A cross-sectional online survey study was conducted among health college students in 2021. All participants (n = 508; mean age (SD) = 19.01 (1.41) responded to an online survey that included the Indonesian version of the internet game addiction scale (IGA Scale), PHQ-9 Modified For Adolescents, Social Behaviour Inventory (SBQ), MHSF-III and, Pittsburgh Sleep Quality Index (PSQI). structural equation analysis showed that online game addiction was negatively related to mental health (p-value 0.007). ) but not to sleep quality and disturbance, depression, and social behaviour (p-value 0.453, 0.114, and 0.881). The current research increases knowledge about Relationship Between Internet Game Addiction, Depression, Social Behaviour, Mental Health, and Sleep Quality. Internet game addiction can be problematic for mental health problems, but regarding Depression, Social Behaviour, and Sleep Quality, further testing needs to be done.

**Keyword :** Internet Game Addiction, Depression, Social Behaviour, Mental Health, Sleep Quality, Structural Equation Modelling

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## Introduction

Due to the rapid growth of the internet game market, many students participate in playing the game, and it causes many adverse effects on themselves and socially. The World Health Organization (WHO) has now officially declared internet game addiction a mental disorder for the first time in the 11th Revision of the International Classification of Diseases (ICD-11). Internet game addiction causes several signs, such as losing control and wanting to play continuously, so playing is a priority over social life. Teenagers dominate these online game players (D. Kim et al., 2022; Pontes et al., 2021; purwaningsih, 2021).

Internet game players in Indonesia are the most in Southeast Asia, where there are about 43.7 (56%) million internet game players, dominated by teenage boys. Some research results state that internet games are associated with mental disorders, anxiety disorders, social behaviour, and poor sleep patterns. However, this relationship has not been fully synthesized quantitatively. Internet game addiction is a genuine clinical disorder phenomenon that needs attention. Individuals susceptible to this disorder are influenced by genetic factors, psychogenesis, and personality characteristics (Gandaputra et al., 2021).



Individual susceptibility can influence adolescents towards addiction tendencies and shows that IGA disorders in adolescents are a real problem that needs attention. There is still controversy regarding the classification of Internet game addiction as a mental illness. Several previous studies found that internet game addiction has similarities with behavioural addiction and impulsive behaviour and causes anxiety, depression, and other psychological stress. But other studies also found that internet games can cause happiness in players, reduce depression and anxiety, improve cognitive abilities, and even be used as a new job. Apart from that, there is no addiction in most internet game players (N. Kim et al., 2020; Rodríguez Rodríguez et al., 2021; Zhao et al., 2021).

Previous research has found that IGA is directly related to sleep problems, but a direct relationship to depression, anxiety, and mental health has not been proven (Lai et al., 2020; Segerstrom & Miller, 2004). To make IGA classified as a mental disorder, all populations must confirm cognitive issues. This study will demonstrate the disparity between different people, namely Health students, and directly related to mental and social health and sleep behaviour.

## Materials and Methods

### Study participants

The survey research design was applied in this study using a purposive sampling technique. The target population in this study were students of midwives, nurses, and nutrition at all levels at the Health Polytechnic of the Ministry of Health, Sorong, which was spread over three different districts, namely Sorong, Manokwari, and Fakfak. All students who play internet games are the respondents of this study. Data collection was carried out in August-September 2021. The questionnaire was filled out using an online survey using a Google® form distributed via WhatsApp® provided by the campus academic section. Before the questionnaire was developed in the online form, it had been translated into Indonesian. Respondents' consent was obtained before participating in this study online. Participants conducting this study volunteered to participate in this study. Participants include email addresses to prevent duplicate responses. To limit duplication of responses, respondents were asked to provide an email address. This study has received approval from the Research Ethics Committee of the Health Polytechnic of the Ministry of Health, Sorong number DM.03.05/6/045/2021, dated 28 July 2021. The survey sample size was used in this study, and we tried to keep the sample size as large as possible to represent the results.

### Measure

The questionnaire includes demographic questions and six questionnaires, namely the Pittsburgh Sleep Quality Index (PSQI), Internet Game Addiction Scale (IGA), mental health screening form-iii (MHSF-III), Social Behaviour Questionnaire, and PHQ-9 Modified For Adolescents (PHQ-III). A. Consent forms and questionnaires were made in Indonesian.

### Demographic information.

Demographic information collected includes age, gender, current semester, domicile, Living with, Number of brothers, Ethnic group, and Game name.

### Pittsburgh Sleep Quality Index (PSQI).

This questionnaire assesses sleep quality and disturbance over a 1-month time interval through 19 item questions, four open-ended questions, and 14 questions rated on a Likert scale from very poor (3) to very good (0). The components of this questionnaire consist of subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, drug use, and daytime dysfunction. The validity and reliability tests of the Indonesian questionnaire version were 0.89 and 0.79 (Buysse et al., 1989).

### IGA Scale

The internet game addiction questionnaire consists of 11 questions on a 5-point Likert scale. From "very consistent" to "very inconsistent," the consistency between the subject's actual situation and the questionnaire items is scored from "4 points" to "0 points, respectively". Respondents who have high scores have the possibility of suffering from IGA. A score of <20 is considered normal behaviour, a score of 20 - <30 is regarded as a fun online game, and a score of 30 is considered an IGA. The results of the questionnaire reliability test showed that Cronbach's score was 0.856 (Wu et al., 2022).



### Mental health

The MHSF-III consists of 18 questions to screen for mental health disorders. Components in this questionnaire to assess mental health treatment history, need for medication, hallucinations, depressive disorders, suicidal behaviour, nightmares and flashbacks, phobias, aggressive behaviour, paranoid delusions, sexual problems, eating disorders, mania, panic attacks, anxiety disorders, obsessive compulsions, gambling problems, and learning problems. The results of the questionnaire reliability test showed that Cronbach's value was 0.80) (Ruiz et al., 2009).

### Social Behaviour Inventory (SBQ)

The SBQ consists of 28 statement items used to assess social anxiety. Participants were asked how often they tried to perform well and controlled shaking concerning their environment. This assessment uses a Likert scale (Never = 0, Sometimes = 1, Often = 2, Always = 3). The results of the questionnaire reliability test showed that Cronbach's score was 0.878 (Chiu et al., 2021; Evans et al., 2021; Gray et al., 2019).

### PHQ-9 Modified For Adolescents (PHQ-A)

The PHQ-9 was used to assess depressive mental disorders through 13 questions consisting of 9 closed questions with a Likert scale (never = 0, several days = 1, more than half a day = 2, almost every day = 3) and four open-ended questions for Review the history of feelings in the past few months or years. PHQ-9 has been found to have high sensitivity (73%) and high specificity (98%) for diagnosing major depression in the adult population. Among adults, the score on the PHQ-9 has also been used to determine the severity of a possible diagnosis in the following way: a score of 5-9 is considered minimal depression, 10-14 is regarded as mild major, 15-19 is moderate major, and 20 is severe significant. The PHQ-9 component contains functional impairment (item 10) which asks how much symptoms they experience and interfere with daily activities. The results of the questionnaire reliability test showed that Cronbach's value was 0.84 (Cumbe et al., 2020; Kroenke et al., 2001; Sebera et al., 2020)

### Data analysis

The data collected for the study were analysed using Smart PLS version 3.3.9 (*SmartPLS*, n.d.). We used Structural Equation Modelling to determine the relationship between internet game addiction and sleep quality and disorders, mental health, depression, and social behaviour.

### Results

Descriptive statistics of online game users on Health students

A total of 508 students of health (nurses, midwives, and nutrition), diploma III and undergraduate, participated in this study. The average respondent is 19.01 years old and female (52.8%) who are currently undergoing education in the second year (38%). Most of the respondents came from non-Papuan ethnic groups (53.1%) with more than one relative (51%), but while undergoing education, they had to live alone (51.8%) in Sorong (38.8%). The type of Internet game being played is Mobile legend (49.4%). The data are presented in table 1.

Table 1. Descriptive statistics of online game users on Health students

Variable	N	%
Age, mean (SD)	19.01(1.41)	
<b>Sex</b>		
Male	240	47.2
Female	268	52.8
<b>Years</b>		
1	170	33.5
2	193	38.0
3	145	28.5
<b>Living with</b>		
Family	245	48.2
Alone	263	51.8
<b>Number of brothers</b>		
More than 1	259	51.0
Only 1	249	49.0
<b>Ethnic group</b>		
Others	270	53.1
Papuan	238	46.9
<b>Domicile</b>		
Fak-fak	171	33.7



Manokwari	140	27.6
Sorong	197	38.8
<b>Game name</b>		
Free fire	125	24.6
Mobile legend	251	49.4
PUBG	132	26.0

### Structural Equation Modelling on the Relationship Between Internet Game Addiction, Depression, Social Behaviour, Mental Health, and Sleep Quality

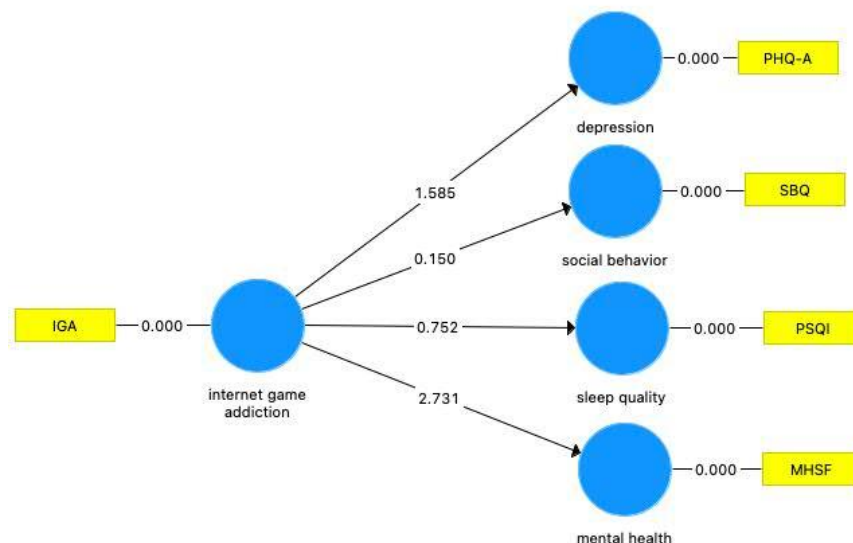
Using Smart PLS version 3.3.9, we performed a structural equation analysis to examine the relationship between internet game addiction and sleep quality and disturbances, mental health, depression, and social behaviour. Online game addiction was negatively related to mental health (p-value 0.007) but not to sleep quality and disturbance, depression, and social behaviour (p-value 0.453, 0.114, and 0.881). The data are presented in 2.

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Table 2. The relationship between internet game addiction and sleep quality and disorders, mental health, depression, and social behaviour

	(O)	(M)	STDEV	T Statistic	P Values
internet game addiction -> depression	-0,070	-0,071	0,044	1,585	0,114
internet game addiction -> mental health	-0,117	-0,117	0,043	2,731	0,007
internet game addiction -> sleep quality	0,031	0,027	0,041	0,752	0,453
internet game addiction -> social behaviour	0,006	0,001	0,043	0,150	0,881

This argument leads to findings that indicate internet game addiction harms mental health but does not affect sleep quality and disturbances, depression, and behaviour in health students. In other words, mental health can influence a person to be addicted to playing online games. Figure



1 has more explanatory power to the closeness of the relationship.

Figure 1. Structural Equation Modelling on the Relationship Between Internet Game Addiction, Depression, Social Behaviour, Mental Health and Sleep Quality

### Discussion

In this study, we aim to elucidate the association of various video game playing habits with the mental state of Health students. Our results reveal that online game addiction is negatively associated with mental health but not related to sleep quality and disturbance, depression, and social behaviour in this large sample. We know that undergoing lectures on the Health campus has very high stress compared to other disciplines. We assume that the result of learning stress causes them to run away and find pleasure in playing online games that can be done anywhere (Wacks & Weinstein, 2021; Zamani et al., 2009).

On the other hand, online games create more excellent online connections between players because they can communicate and play games together and find fun. This may affect social conditions in the real world. However, in reality, friends who are partners in online games are also friends in the real world, so this study also proves no relationship between internet game addiction and social behaviour (Barr & Copeland-Stewart, 2022).

Solitary social behaviour may be felt in the family who live with the respondent because the respondent is busy playing games and does not care about the condition of his house or even the people



who live with him. However, if the relative who lives with him plays the game, there is no problem with his social behaviour. In addition, some of the respondents lived alone in this study because they were overseas students, so there were no problems with their social behaviour (Dumrique & Castillo, 2018; Wong & Lam, 2016).

The results presented are generally the same as previous studies on mental health issues. However, our study found more about the variables that could explain that internet game addiction should not be included in mental health disorders and still needs to be tested in subsequent studies. It still needs to be tested on the reasons for playing the game. The reasons for playing online games cause addiction can be being rejected by their peers, low self-esteem, the person's feelings before playing the game, and finally need to think about the long-term consequences (Nugraha et al., 2021; Wang et al., 2019).

Regarding sleep quality, someone addicted to online games gets several negative consequences, one of which is a disturbed sleep-wake cycle and poor sleep quality. However, please note that using a mobile phone is generally different from playing online games. Playing games online can set the level of timing for playing but using the phone to watch movies or videos is not. Curiosity when watching movies is very high compared to playing online games (Kristensen et al., 2021). In line with the research of (Nugraha et al., 2021), sleep quality worsens with increasing levels of excessive cell phone use. Mobile phones include many features, such as access to the internet and social networks, messaging, video, multimedia, and navigation. So this study also proves that online games have no relationship with sleep quality in a large sample.

In our opinion, online games can be a positive way to escape the adverse problems of the natural world and connect with people who share the same feelings and problems. Thus, it is necessary to distinguish between long-term perspectives to help us understand the differential correlation between video game addiction.

In short, it seems possible for us to assess the impact of addiction to playing this online game and need to know the reasons for playing the game so that it becomes addicted.

#### Limitations and Future Directions

This study aimed to reveal the relationship between online gaming with mental conditions and sleep quality using a cross-sectional approach and requires caution in interpreting causal relationships. So it is not clear whether these factors cause someone to play online games or vice versa. We recommend a longitudinal study by determining the causal pathway's appropriate model. Future research can focus on the long-term impact on academic achievement supported by sociodemographic factors of the respondents. Furthermore, we relied on self-reported data, but it would be helpful to support our findings with evidence coming from sources such as peers and caregivers, or parents. In addition, it is also necessary to know the reasons they play these online games.

#### Conclusion

The current research increases knowledge about Relationship Between Internet Game Addiction, Depression, Social Behaviour, Mental Health, and Sleep Quality. Internet game addiction can be problematic for mental health problems, but regarding Depression, Social Behaviour, and Sleep Quality, further testing needs to be done. Including gamers' reasons for playing video games and the game, genres help deepen understanding of the specific and distinct associations between video games and psychological health. This knowledge can help develop adequate interventions that are put in place before the onset of the psychological disorders that may accompany potentially problematic video games. Educators and mental health practitioners should be aware of the adverse effects of addictive mobile games, as this is a common phenomenon nowadays. In particular, attention should be paid to teenage boys addicted to mobile games, as they may suffer more from social anxiety.

#### Ethics Statement

In our online survey, participants were given information on voluntary participation, risks, confidentiality/anonymity, and the right to withdraw. While participants were not signing a separate consent form, consent was obtained by completion. We implemented agreed procedures to maintain the confidentiality of participant data.

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#### Author Contributions

PS, YSA, AP, and ACM compiled and designed this study. N collects and prepares data. ACM, DNB & S analysed the data and wrote the script.

#### Conflict of Interest Statement

The authors declare that the research was conducted without any commercial or financial relationships construed as a potential conflict of interest.

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