

Psychometric properties of the self-report questionnaire on occupational balance in university students with game addiction

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ABSTRACT

Background: The prevalence of adolescents and young adults playing games on the internet is increasing worldwide. However, excessive game playing can cause game addiction among adolescents. Studies have demonstrated that game addiction increases the risks of physical and mental health problems, leading to occupational performance issues. Nevertheless, what level of game addiction impacts health issues is controversial. Therefore, this study focused on occupational balance, an individual's perception of a proper amount and diversity of activities. The study demonstrated that occupational imbalance could lead to a decrease in an individual's occupational performance. However, an appropriate instrument for screening occupational balance in young adults with game addiction has never been studied yet, especially in a Thai version.

Objective: This study aimed to develop a self-report questionnaire on occupational balance for Thai university students with game addiction.

Materials and methods: The questionnaire consisted of 21 items divided into four dimensions, including the individual's perceptions of participating in meaningful activities, having the proper proportion of time to perform occupations, having the appropriate variety of occupations, and being satisfied with their health and well-being. In addition, the psychometric properties of a questionnaire were investigated.

Results: The questionnaire had sufficient validity and good internal consistency for screening occupational balance in Thai university students with game addiction. The questionnaire was divided into four dimensions, each with good construct validity and internal consistency.

Conclusion: The questionnaire was valid and reliable for evaluating occupational balance for Thai university students with game addiction. This information can provide a new occupational therapy instrument for identifying occupational balance in the population with game addiction.

Introduction

Nowadays, the prevalence of adolescents and young adults playing games on the internet is increasing worldwide.¹ Subsequently, the studies indicated that excessive game playing can result in numerous physical and mental health problems,² including game addiction.³ This is consistent with evidence of game addiction increasing progressively in the adolescent and young adult population.⁴ In the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), the World Health Organization (WHO) reported that internet gaming disorder or game addiction is a mental health condition defined as a continuous and repetitive pattern of gaming behavior.³

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Studies have shown that game addiction can lead to various public health issues, including impaired emotional control, attention deficit, and cognitive dysfunction.^{5,6} They also concurred that game addiction among adolescents increases the risks of physical and mental health problems, thus leading to occupational performance issues such as poor sleep quality.⁷ This aligns with studies reporting that game addiction decreases the chance of interpersonal interactions and good school performance.^{8,9} However, the severity of game addiction's impact on occupational performance remains controversial. Some studies have suggested that game playing can be beneficial in various ways, such as increased relaxation, cognitive processing, and visual perception.^{10,11} Therefore, researchers are looking for suitable predictors to screen occupational performance issues in individuals with game addiction.

It is known that occupational balance is one of the critical concepts used in occupational therapy interventions. Studies have shown that occupational balance relates to an individual's occupational performance.^{12,13} It is consistent with a study that demonstrated that occupational imbalance increases the risk of stress-related disorders and leads to an individual's poor occupational performance.¹⁴ Therefore, this study focuses on the concept of occupational balance for screening occupational balance issues in Thai university students with game addiction. Currently, many occupational therapists define occupational balance as an individual's satisfaction with their health and well-being.¹⁵ Some studies suggested that occupational balance involves an equilibrium of self-care, leisure, play, work, education, and sleep.¹⁶ In contrast, others define it as an individual's perception of having a proper amount and variety of activities.¹⁷ This study proposed a new definition of occupational balance,^{15,17-19} which includes four dimensions: 1) participation in meaningful activities, 2) appropriate allocation of time to perform occupations, 3) having an appropriate variety of occupations, and 4) satisfaction with health and well-being.

Occupational therapists are developing instruments or questionnaires to assess an individual's occupational balance. For example, Dur *et al.*¹⁹ developed a self-reported occupational balance questionnaire focusing on patients' perspectives rather than those of occupational therapists.¹⁹ Moreover, Wagman and Håkansson developed the Occupational Balance Questionnaire (OBQ), emphasizing satisfaction with the number and variety of occupations.²⁰ However, an appropriate instrument for screening occupational balance in young adults with game addiction has not been studied, especially in a Thai context.

Thus, this study developed a self-report questionnaire on occupational balance for Thai university students with game addiction based on the new definition mentioned above. The psychometric properties in designing the questionnaire were also investigated in this population. It is hoped that this research will provide a new occupational therapy instrument to identify occupational balance in adolescents and young adults with game addiction.

Materials and methods

Participants

The participants in this study were undergraduate students from Chiang Mai University. The inclusion criteria were: (1) being an undergraduate student, (2) having no history of psychiatric disorders, and (3) having no physical disabilities. Ethics approval was granted by the ethics committee of the faculty of Associated Medical Sciences, Chiang Mai University (Ethic number: AMSEC-66EX-034). All participants provided written informed consent.

The sample size calculation was calculated using G*Power software 3.1.9.7 (effect size=0.4, power of test=0.8, alpha=0.05, a two-tailed test). In this study, 200 undergraduate students were divided into two groups of 100 individuals: one group with game addiction and the other without it, to test construct validity using the known group technique. Game addiction was assessed using the game addiction screening test for children and adolescents.²¹ Additionally, the sample size for measuring the reliability of internal consistency was calculated using Bonett's formula.²² A single coefficient of Cronbach's alpha test was used to calculate the sample size. According to Bonett's formula, the value of Cronbach's alpha at null hypothesis (CA0) and the expected value of Cronbach's alpha (CA1) could be any value ranging from -1 to 1. CA0 is more than zero if the researcher assumes a high internal consistency of the questionnaire items.²² Thus, this study set the values of CA0 and CA1 as 0.55 and 0.7, respectively. It is known that the good power of a test can be 0.8 or greater. Therefore, the power of the test was set at 0.8 in this study. Moreover, the number of items in the questionnaire (k) and the probability of type I error (alpha) were also set as 21 and 0.05, respectively. Finally, one hundred and three undergraduate students with game addiction were used to measure internal consistency reliability (CA0=0.55, CA1=0.7, alpha=0.05, and power of test=0.8, k=21).

Research design of this study

Phase 1: Development of the self-report questionnaire on occupational balance for university students with game addiction.

The self-report questionnaire, featuring five Likert rating scales, was developed based on the occupational science tenet. According to occupational science, engaging in meaningful activities enhances individuals' awareness of their abilities and self-worth.²³ However, such engagement in meaningful activities should be balanced across various aspects, including participation in diverse daily activities, appropriate allocation of time to perform each activity, and overall satisfaction with health and well-being.^{17,18} In addition, occupational balance considers the perspective of roles, which are unique and vary for each person.¹⁹ Therefore, the developed questionnaire in this study consisted of five Likert rating scales with items of question to evaluate individuals' perceptions in four dimensions. The five Likert rating scales measured levels of agreement for each item: 1 point = strongly disagree, 2 points = disagree, 3 points = neither agree nor disagree, 4 points =

agree, and 5 points = strongly agree.

Subsequently, the content validity of the questionnaire was evaluated by five experts: 1) a psychiatrist who has experienced working with children and adolescents with game addiction; 2) an occupational therapist specializing in occupational balance; 3) two occupational therapists experienced in treating individuals with mental health problems; and 4) an occupational therapist experienced in developing occupational therapy assessment tools. In this study, a psychiatrist is a validator of questionnaires looking into the behavior of game addiction, such as the amount of time and frequency of game playing. Occupational therapists experienced in treating individuals with mental health problems are the validators of questionnaires looking into the game addict's perception of participating in

meaningful activities as well as the impact of game addiction on occupations. An occupational therapist specializing in occupational balance validates questionnaires looking into the accuracy of all relevant aspects of occupational balance. Moreover, an occupational therapist experienced in developing occupational therapy assessment tools is a validator of questionnaires looking into the precision of occupational therapy assessment tools. After that, the developed questionnaire was adjusted following experts' recommendations and was tested in a pilot study with 12 college students with gaming addiction. Finally, the self-report questionnaire consisted of five Likert rating scales with 21 items to evaluate individuals' perceptions in the four dimensions above. Each item of the questionnaire is shown in Table 1.

Table 1. Items of the self-report questionnaire on occupational balance in university students with game addiction.

Items of the questionnaire	Questions
Dimension 1: Individual's perception of participating in meaningful activities	
1	Basic activities of daily living hold meaning and value for you.
2	Instrumental activities of daily living hold meaning and value for you.
3	Health management activities hold meaning and value for you.
4	Rest and sleep activity hold meaning and value for you.
5	Education holds meaning and value for you.
6	Work holds meaning and value for you.
7	Leisure activities hold meaning and value for you.
8	Social participation activities hold meaning and value for you.
Dimension 2: Individual's perception of having the proper amount of time to engage occupations	
9	Each day, you allocate an appropriate time for each activity.
10	The distribution of time among occupations each day is appropriate.
11	Despite playing game every day or almost every day, you can still effectively manage your time and daily activities.
Dimension 3: Individual's perception of having a suitable range of occupations	
12	Each day, you typically engage in a variety of activities.
13	Your daily activities contribute to a good quality of life.
14	You prefer to focus on activities that align with your role each day.
15	Engaging in a variety of activities brings you happiness.
16	Each week, you often make time for activities outside of your education or work commitments.
Dimension 4: Individual's perception of being satisfied with their health and well-being	
17	You are content with your physical health.
18	You are content with your mental health.
19	You are satisfied with your relationships with close individuals such as family, close friends, and partners.
20	You are satisfied with your relationships with others, such as colleagues and strangers.
21	You are satisfied with your physical environment where you engage in activities.

Phase 2: Study of psychometric properties of the questionnaire.

In this study, the questionnaire's psychometric properties, including content validity, construct validity, and reliability, were investigated. Five experts assessed Content validity using the index of item-objective congruence (IOC), while construct validity was examined using the known-group technique. Additionally, internal consistency reliability was investigated in young adults with game addiction.

Data analysis

An IOC value of 0.5 or higher was considered acceptable.²⁴ Construct validity was tested using the known-group technique and analyzed with an independent t-test.²⁵ If the average scores of the two groups (those with and without game addiction) were significantly different, the questionnaire was regarded to have good construct validity.²⁵ Internal consistency of the questionnaire was assessed using Cronbach's alpha.²⁶ A Cronbach's alpha value of 0.7 or higher indicated good internal consistency.²⁶

A two-sided p-value of 0.05 was considered significant for all statistical tests.

Results**Demographic data of the participants**

The demographic data of the participants are shown in Table 2. The results showed that the average age of the participants in the groups with and without game addiction was 19.70 ± 1.29 and 20.02 ± 1.21 , respectively. Regarding financial status, the average monthly income in the groups with and without game addiction was 8387.37 ± 5862.28 and 7730.39 ± 4926.78 Baht, respectively. Furthermore, the average monthly expense related to games in groups with and without game addiction was 532.81 ± 781.22 and 49.23 ± 115.26 Baht, respectively. For time spent playing games, the average game time per day and week in the group with game addiction was 106.12 ± 63.15 min and 5.44 ± 1.62 days, respectively, while the average game time per day and week in the group without game addiction was 80.21 ± 66.92 minutes and 3.53 ± 2.42 days, respectively.

Table 2. Demographic data of participants.

Variables	Group with game addiction (N=103)	Group without game addiction (N=103)
Gender		
Male (N, %)	34, 33.01%	42, 40.78%
Female (N, %)	69, 66.99%	61, 59.22%
Age average (years)	19.70 ± 1.29	20.02 ± 1.21
Academic year		
1 st year (N, %)	34, 33.01%	39, 37.86%
2 nd year (N, %)	20, 19.42%	30, 29.13 %
3 rd year (N, %)	46, 44.66%	20, 19.42%
4 th year (N, %)	1, 0.97%	13, 12.62%
>4 th year (N, %)	2, 1.94%	1, 0.97%
Financial status		
Average income/month (Baht)	8387.37 ± 5862.28	7730.39 ± 4926.78
Average expense related to game/ month (Baht)	532.81 ± 781.22	49.23 ± 115.26
Time spent game playing		
Average game time per day (min)	106.12 ± 63.15	80.21 ± 66.92
Average game time per week (days)	5.44 ± 1.62	3.53 ± 2.42

Content validity of the self-report questionnaire on occupational balance for young adults with game addiction

The content validity of the questionnaire was tested using the index of item objective congruence (IOC) by five experts. Based on their recommendations, the questionnaire was revised to include definitions and examples of technical terms for better clarity for respondents. Finally, the 21-item questionnaire was used to test content validity. The results showed high overall congruences (IOC=0.92), particularly on the following dimensions: 1) participation in meaningful activities (IOC=0.93), 2) proper allocation of time to perform occupations (IOC=0.95), 3) appropriate variety of occupations (IOC=0.88), and 4) satisfaction with health and well-being (IOC=0.96).

Construct validity of the self-report questionnaire on occupational balance for young adults with game addiction

The construct validity of the self-report questionnaire was assessed to determine its effectiveness in evaluating occupational balance (Table 3). This assessment was conducted using the known-group technique with an independent t-test analysis. This result suggested that the questionnaire had good construct validity. Furthermore, the questionnaire revealed significant differences between the groups in each dimension: dimension 1 ($p=0.001$); dimension 2 ($p=0.002$); dimension 3 ($p=0.001$); and dimension 4 ($p=0.003$) (Table 3).

Table 3. Construct validity of questionnaire.

Items of questionnaire	Group with game addiction (N=100) (Mean±SD)	Group without game addiction (N=100) (Mean±SD)	p value
Average score of total items of the questionnaire	78.59±9.02	86.26±8.91	0.000*
Average score of all items in dimension 1	34.33±3.69	35.87±3.03	0.001*
Average score of all items in dimension 2	9.38±3.60	11.33±2.76	0.000*
Average score of all items in dimension 3	16.48±5.92	19.24±3.27	0.000*
Average score of all items in dimension 4	18.40±3.71	19.82±3.01	0.003*

Note: * $p < 0.05$ indicates the statistically significant average questionnaire scores between groups with and without game addiction.

Dimensions 1 to 4 correspond to the individual's perceptions of participating in meaningful activities, having the proper amount of time to engage in occupations, having a suitable range of occupations, and being satisfied with their health and well-being, respectively.

Reliability of the self-report questionnaire on occupational balance for young adults with game addiction

The sample used to investigate the internal consistency reliability was the same as the known-group technique cohort, explicitly focusing on individuals with game addiction. The test results using Cronbach's alpha coefficient indicated that all questionnaire items had a Cronbach's alpha coefficient of 0.83. Moreover, each dimension of the questionnaire demonstrated the following: dimension 1 (Cronbach's alpha=0.66), dimension 2 (Cronbach's alpha=0.71), dimension 3 (Cronbach's alpha=0.76), and dimension 4 (Cronbach's alpha=0.80).

Discussion

Some studies have shown that game playing has beneficial effects, such as enhancing cognitive function and promoting relaxation.^{10,11} However, excessive game playing can cause several public health problems, such as impaired emotional control, attention deficits, or cognitive dysfunction, leading to game addiction.^{5,6} Therefore, deciding what level of game addiction impacts health issues is controversial. This study focused on occupational balance, defined as the equilibrium in performing daily occupations, such as self-care, education, work, leisure, and play.¹⁶ It is possible that excessive time spent on one activity, such as game playing, may cause loss of occupational balance and lead to health issues. This is consistent with the definition of occupational imbalance, which is spending excessive time on one activity, leading to poor quality of life.¹⁸⁻²⁷ Additionally, studies have reported that occupational balance is related to individual occupational performance.^{12,13} It is known that occupational performance is an essential component for exploring health issues.²⁸ Therefore, it seems likely that occupational imbalance caused by game addiction may lead to a deficit in occupational performance in game addicts and lead to poor quality of life. This is consistent with studies that demonstrate the effects of game addiction on performance and effectiveness in daily life activities such as sleep, education, and work achievement. Game addiction also affects participation in daily life activities of individuals through a loss of emotional control, attention deficit, and cognitive impairment.^{8,9,29-31} Therefore, the concept of occupational balance may be

used as a predictor of health issues in game addicts via decreasing occupational performance in daily occupations and activities relevant to the role of the individual.

Occupational therapists are currently developing instruments or questionnaires to assess the occupational balance of an individual based on its definition. Many occupational therapists clarify the meaning of occupational balance differently, such as perspectives of an individual on participation in diverse daily activities, appropriate allocation of time spent in performing each activity, or satisfaction with health and well-being.^{17,18} However, there are no instruments or questionnaires for evaluating all definitions of occupational balance. For example, a self-reported occupational balance questionnaire focuses on the patient's perspectives rather than those of occupational therapists.¹⁹ In contrast, the Occupational Balance Questionnaire (OBQ) focuses on satisfaction.²⁰ Therefore, the questionnaire in this study was developed based on a new definition that focuses not only on the appropriate amount of variety and time spent on daily activities but also on the importance of satisfaction with health and well-being and doing purposeful and meaningful activities. This study developed a Thai version of the instrument to screen occupational balance in individuals with game addiction, based on the new concept of occupational balance in four dimensions: participation in meaningful activities, appropriate allocation of time to perform occupations, having an appropriate variety of occupations, and satisfaction with health and well-being. After that, the psychometric properties testing of the questionnaire was conducted. It was found that this study is the first to validate and establish reliability of such a questionnaire for Thai university students with game addiction. Moreover, the psychometric properties in each dimension of the questionnaire were tested, and the results were as follows.

In dimension 1, eight questionnaire items assess an individual's participation in meaningful activities. It has been known that occupational balance consists of both the temporal aspect and of the valued or meaningful occupations.¹⁸ The results of this study showed that dimension 1 of the questionnaire has good content and construct validity. This finding indicates that the questionnaire can accurately measure an individual's perception of participating in meaningful activities.

However, the internal consistency of items in dimension 1 was questionable (Cronbach's $\alpha=0.66$), indicating response variability. This variability may stem from differences in how individuals perceive participation in meaningful activity. Additionally, individuals may have distinct characteristics and daily occupational patterns that influence their lifestyle. For example, some individuals may find education significant, while others may not. Thus, the internal consistency value of items in dimension 1 reflected variation in responses.

In dimension 2, three questionnaire items assess the individual's perception of having a proper proportion of time to perform activities. It is consistent with a study that defined occupational balance as an individual's perception of adequate time spent on each activity.¹⁸ Another study demonstrated that game addiction is positively correlated with increased time spent playing games,³² which can subsequently lead to an inability to perform daily activities and result in occupational imbalance. The results of this study showed that the items in dimension 2 have acceptable levels of validity and reliability. Therefore, the questionnaire is suggested to be an effective tool for measuring occupational balance among Thais addicted to game playing, specifically in the dimension of having a proper proportion of time to perform occupations.

In dimension 3, five questionnaire items assess the individual's perception of having the appropriate variety of occupations. It is consistent with a study that reported that a variety of occupations is an important aspect of occupational balance.¹⁷ Furthermore, occupational balance emphasizes doing or engaging in a diverse range of occupations,¹⁷ related to health and well-being.³³ This study found that the validity and reliability of items in dimension 3 were acceptable. Therefore, the questionnaires are recommended as an effective tool for measuring occupational balance among Thais addicted to game playing, specifically regarding having the appropriate variety of occupations.

In dimension 4, five questionnaire items assess the individual's perception of satisfaction with health and well-being. It is established that health and well-being are closely related to occupational balance.¹⁸ The items in dimension 4 represent physical, mental, and social engagement satisfaction, aligning with the World Health Organization's definition of health and well-being.³⁴ This study's results indicated that the validity and reliability of items in dimension 4 were acceptable. Therefore, the questionnaire has the potential to effectively measure the satisfaction of Thais addicted to game playing with their health and well-being.

This study developed a new instrument for evaluating occupational balance, focusing on an individual's perception of performing daily activities in four dimensions, as mentioned above. Occupational balance is unique to each person and reflects their specific occupations and lifestyle performances. The value and meaning of occupations may vary among individuals. This study demonstrated that the questionnaire has acceptable validity and reliability for assessing occupational balance among Thai adolescents

and young adults with game addiction. However, this study cannot test the exploratory factor analysis due to the limited sample size. In the future, the questionnaire needs to be tested to confirm the construct validity. Therefore, it suggested that the findings of this study can contribute to the development of new occupational therapy tools for identifying and addressing occupational balance issues in populations addicted to gaming. Moreover, it can serve as a valuable tool for exploring individual occupational concerns and for future planning of occupational therapy interventions for Thais addicted to game playing.

Conclusions

This pioneering study demonstrated that the self-report questionnaire exhibits acceptable validity and reliability in evaluating occupational balance among Thai adolescents and young adults with game addiction. These findings introduce a new occupational therapy instrument to identify occupational balance issues in such a population.

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Conflict of interest

The authors declare no conflict of interest.

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