Clinical Research

Internet addiction and its association with depression, anxiety, and stress symptoms among allied health students in Malaysia

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ABSTRACT

BACKGROUND Internet addiction (IA) is prone to be experienced by students and has become a major health concern. However, data on IA among allied health students are limited. This study aimed to describe the prevalence of IA and the association between mental health problems and IA among allied health students in Malaysia.

METHODS A cross-sectional study was conducted from July to December 2021 in three government-funded allied health training institutes in Malaysia. A total of 265 allied health students undertaking a diploma in nursing, medical assistant training, physiotherapy, occupational therapy, and diagnostic imaging were recruited using stratified random sampling. The Malay version of the IA test was used to measure IA, while depression, anxiety and stress scale-21 items were used to assess their mental health problems. A general linear model was used to analyze the association between IA scores and mental health problems.

RESULTS The prevalence of IA among allied health students was more than 80%, with 16.2% and 2.3% of them reporting moderate and severe IA, respectively. Higher depression ($p<0.001$), anxiety ($p<0.001$), and stress scores ($p = 0.002$) were associated with higher IA scores.

CONCLUSIONS There were significant associations between mental health problems and IA scores among allied health students. Future studies with rigorous scientific methods are necessary to explore mental health effects on IA. Early intervention is also needed to prevent mental health problems among allied health students to overcome the problem of IA.

KEYWORDS anxiety, depression, health professional students, internet addiction, stress, students

The internet allows social connections and immediate access to knowledge and information. However, excessive internet usage can lead to disturbing behaviors such as viewing pornography, online gambling, and excessive online shopping. Internet addiction (IA) is defined as uncontrolled, compulsive, and excessive behavior that may disrupt daily life and cause distress.[1] These negative behaviors cause lifestyle imbalances and social problems, which eventually may cause adverse effects on personal health.[2]

According to the Malaysian Communications and Multimedia Commission (MCMC) in 2020, internet users have escalated to 88.7%, with more than 98% used for communication purposes such as internet messaging. In comparison, the highest internet users are aged 20–24 years that encountered 34.1% of the current population.[3] MCMC in 2018 reported that

IA among Malaysians had reached alarming level, making the country having one of the highest IA rates in the Asia Pacific region. Although everyone may be at risk for IA, students are at higher risk than the general population. Based on their psychosocial and environmental characteristics, the younger population, especially college students, are at higher risk of IA due to time spent on the internet, less parental control, unlimited internet access in the university, internet usage for academic purposes, and stronger urge to use the newest technologies.[4] In recent years, internet usage among medical students has garnered considerable attention. A pooled prevalence of IA among medical students from 10 studies in a meta-analysis was reported to be considerably high, i.e., 30.1%.[5] However, only few data are available on the prevalence of IA among other health professional students such as nurses, physiotherapists, occupational therapists, or medical assistant students.

Excessive internet usage among students may lead to mental health problems.[6] On the contrary, previous studies suggested that psychological diagnoses such as mental health problems were also associated with IA.[7] Depression, anxiety, and stress were significantly and positively correlated with IA.[8,9] A previous study found that 24.4% of the respondents were likely to suffer from IA, and 28.8% were clinically diagnosed with depression.[10] Higher level of anxiety were also associated with higher internet addictive behaviors. Yücens and Üzer[11] found that anxiety was associated with IA, where individuals used the internet to escape from their negative emotions and find an alternative virtual world to avoid threats and challenges. In addition, mental health problems could also manifest as stress. In a local study, 20% of school-going students reported stress when assessed using the depression, anxiety and stress scale-21 items (DASS-21).[12]

Studies conducted among allied health students in Malaysia on the prevalence of IA and its associations with mental health problems are still limited. IA effects are detrimental not only to their mental health but also toward their study and clinical performance, which obligate them to be focused, attentive, and meticulous when dealing with patients during their clinical practicum. Conducting a study in this population would provide insights into the current situation. These future healthcare professionals are likely to be exposed to multiple stressors. Therefore, this study aimed to identify the prevalence of IA among allied health students in higher institutions in Malaysia, their level of IA, and the associations between mental health problems and IA for the future development of intervention measures.

METHODS

Study design and participants

We conducted a cross-sectional study using the stratified random sample among allied health students from three health training institutes in Malaysia. The institutes were randomly chosen from 11 allied health training institutes in Malaysia that offer diploma courses in nursing, medical assistant training, physiotherapy, occupational therapy, and diagnostic imaging. The sample population was chosen from the list of students who enrolled in the academic session from July to December 2021. The inclusion criteria included: 1) adults aged 18 years and above, 2) Malaysian citizen, 3) students who were in the first to third semester of their study period, 4) able to converse in the Malay language, 5) had been using the internet, and 6) able to provide informed consent. Students were excluded from the study if they were medically diagnosed with a mental illness and currently receiving treatment for their mental illness.

Sample size calculation

The estimated total population of the three training institutes was 850 students. The sample size was obtained following a previous study on the prevalence of IA and its determinants[4] and a sample size table by Krejcie and Morgan.[13] In total, 265 participants were recruited, with at least 10% of the participants selected randomly from each training institute.

Data collection

The self-administered questionnaires were sent to all three co-researchers as the site investigator for each study setting. The co-researchers were trained to provide uniform explanations to the eligible participants regarding the study purposes. The participants were informed about this study including their anonymity and voluntary participation. They were given the questionnaires and completed them in about 30 min.

Instruments

A set of questionnaires was used to assess the data. It was divided into three sections: section A consisted of sociodemographic characteristics (i.e., age, gender, and household income), section B included the Malay version of the internet addiction test (MVIAT),[14] and section C was comprised of the Malay version of the DASS-21 questionnaires.[15]

The internet addiction test (IAT) was developed by Young[16] to measure how internet usage may affect a person's daily activities, social relationships, rest and sleep patterns including mood changes, and productivity. The validity of the IAT was tested and displayed good internal consistency with Cronbach's alpha ranging from 0.90 to 0.93,[17] while the MVIAT had a Cronbach's alpha of 0.91.[14] This questionnaire had 20 items rated on a Likert scale from "rare" (point 1) to "always" (point 5). The scores ranged between 20 and 100. Higher scores represented a greater risk of IA. The respondents were classified into four levels of IA: "no addiction" (20–39 points), "mild addiction" (40–59 points), "moderate addiction" (60–79 points), and "severe addiction" (80–100 points).

The DASS-21 has 21 self-report items based on three subscales (depression, anxiety, and stress), with seven items in each subscale. The Malay version showed good internal consistency with Cronbach's alpha of 0.75, 0.74, and 0.79 for depression, anxiety, and stress subscales, respectively.[15] Each item consisted of a statement with four answers from 0 (indirectly describing my self-state) to 3 (very much or very often describing my self-form). Each score obtained was multiplied by two. For each subscale, a higher score denoted a higher risk of having depression, anxiety, and stress.

Ethical considerations

The study protocol was approved by the Research Ethics Committee, Universiti Kebangsaan Malaysia (Ref No: UKM PPI.800-1/1/5/JEP-2019-404, project code: FF-2019-300) and registered with the National Medical Research Registration (Ref No: NMRR-19-2479-49926). Before conducting this study, permission was obtained from the Training Management Division, Ministry of Health, Malaysia. Written consent was obtained from each student who agreed to participate in this study.

Statistical analysis

Data were analyzed using the SPSS software version 23 (IBM Corp., USA). Descriptive statistics on mean, standard deviation, frequency, and percentage were used to present the sociodemographic characteristics, prevalence of IA, and depression, anxiety, and stress scores. The associations of sociodemographic characteristics and mental health problems with IA scores were also determined. We used a generalized linear model to estimate both unadjusted and adjusted β and its 95% confidence interval (CI). All sociodemographic characteristics were included together in the analysis to obtain the adjusted values. Statistical significance was set at $p<0.05$.

RESULTS

Table 1 summarizes the sociodemographic characteristics, IA level, and scores of depression, anxiety, and stress of all participants. The mean age of the participants was 20.96 years old. Most of the participants were from the middle-income family.

Table 1. Sociodemographic characteristics, mental health, and internet addiction

Items	n (%) (N = 265)
Sociodemographic characteristics	
Age (years)	
Mean (SD)	20.96 (1.37)
Min–max	18–26
Gender	
Male	135 (50.9)
Female	130 (49.1)
Household income per month (MYR)	
<4,850	88 (33.2)
4,850–10,959	157 (59.2)
≥10,960	20 (7.5)
Mental health*, mean (SD)	
Depression	16.80 (8.11)
Anxiety	18.99 (10.00)
Stress	16.26 (8.75)
Internet addiction†	
Total score, mean (SD)	49.47 (12.46)
Level of addiction	
None, n (%)	49 (18.5)
Mild, n (%)	167 (63.0)
Moderate, n (%)	43 (16.2)
Severe, n (%)	6 (2.3)

MYR=Malaysian Ringgit; SD=standard deviation
*Malay version of depression, anxiety and stress scale-21 items (DASS-21); †Malay version of the internet addiction test (MVIAT)

Table 2. Generalized linear model of sociodemographic characteristics, mental health problems, and internet addiction (N = 265)

Characteristics	Unadjusted		Adjusted*	
	β (95% CI)	*p*	β (95% CI)	*p*
Age (years)	-6.59 (110.69–-2.48)	**0.002**		
Gender		**0.011**		
Male	-3.82 (-6.78–-0.86)			
Female	1.00			
Household income per month (MYR)		**<0.001**		
Low	-18.00 (-20.33–-15.68)			
High	1.00			
Mental health†				
Depression	1.13 (1.01–1.26)	**<0.001**	0.44 (0.23–0.65)	**<0.001**
Anxiety	0.95 (0.85–1.05)	**<0.001**	0.41 (0.20–0.63)	**<0.001**
Stress	1.05 (0.93–1.16)	**<0.001**	0.26 (0.04–0.48)	**0.002**

CI=confidence interval; MYR=Malaysian Ringgit
Dependent variable: internet addiction score. The higher the depression, anxiety, and stress scores, the more severe IA in each domain
*Adjusted for age, gender, and household income; †Malay version of depression, anxiety and stress scale-21 items (DASS-21)

Overall, the participants had a total IA score of 49.47 (12.46), and 81.5% had mild to severe IA. Of the 42 points for each subscale in DASS, anxiety had the highest score, with a total score of 18.99 (10.00).

Age, gender, household income, depression, anxiety, and stress were significantly associated with IA scores in the unadjusted analysis (Table 2). However, only mental health problems remained significantly associated with IA scores in the adjusted analysis (Table 2). The higher the IA scores were, the higher the depression ($p<0.001$), anxiety ($p<0.001$), and stress ($p = 0.002$) scores became.

DISCUSSION

This study reported that more than half of the allied health students had IA, with 2.3% reporting severe IA. A survey conducted in 2018 reported that only 22.8% of the Malaysian university students had IA, measured using the Malay version of the Chen internet addiction scale.[8] Other previous studies showed lower prevalence rates, i.e., from 7.9% to 25.2% in the United States and Europe.[18] Nonetheless, these previous studies were conducted before the coronavirus 2019 (COVID-19) pandemic. During the unprecedented prolonged COVID-19 pandemic, many countries had imposed lockdown, physical distancing, and home quarantines for some individuals. These precautionary measures, excessive digital activities, and limited face-to-face communication have skyrocketed digital entertainment.[19] The prevalence of IA during the COVID-19 pandemic has been reported to be higher than before, with a recent study showing a substantial IA score among 14.4% of Indonesian adults.[20] Similarly, university students in Jordan had a total score of IAT of 43.41±13.00, and 86.7% of the students reported mild to moderate levels of IA during the pandemic.[21] Likewise, a multinational survey reported that more than half (67.6%) of the medical students had IAT scores of 30, indicating high IA during the pandemic.[22] Generally, the prevalence of IA has been affected by the current pandemic globally, especially among students.

Our study focused on IA among allied health students who are generally young adults. This age group has a relatively high prevalence of IA, especially health students who have a five times higher prevalence than students in general.[5,23] Our participants were aged 18 and above; whereby 16.2% of them reported moderate IA, and 2.3% had severe IA. A descriptive correlational study conducted during the pre-pandemic period in Saudi Arabia reported that 38.4% and 2.1% of nursing students aged 18–30 years experienced moderate and severe IA, respectively.[24] During the COVID-19 pandemic, medical students from Turkey reported a substantially high IA prevalence of 43.1%.[25] Conversely, more than half (92.2%) of physiotherapy students aged 18 to 25 years from Poland reported a low level of IA score

during the COVID-19 pandemic.[26] Overall, health professional students such as nursing students in this age group are vulnerable to IA regardless of the pandemic period. This phenomenon is alarming as these students will become the future generation in the healthcare workforce.

The mental health problems in this study refer to the negative emotional states of depression, anxiety, and stress. Depressive symptoms include the self-reported feelings of low mood, low motivation, and low self-esteem; anxiety refers to physiological responses, and perceived fear and panic; meanwhile, stress is the state of emotional strain with tension and irritability.[27] Depression and anxiety disorders are diagnosed clinically, from fewer symptoms to a full-blown episode.[28] Differing from the emotional symptoms of depression, anxiety, and stress, IA manifests as behavioral symptoms such as spending about 40–80 hours a week online and sitting at the computer for a prolonged period with disrupted sleep patterns due to late internet surfing.[29] The findings in this study indicated that depression, anxiety, and stress symptoms had a significant and positive relationship with IA. These findings were similar to a study by Gupta et al[30] who showed a significant association between mental health problems and IA. Similar findings were observed among medical students from a Malaysian public university with increased DASS-21 scores and positive correlations between mental health problems and IA.[31] Another study had a theoretical model which proposed the direct influence of depression, anxiety, and stress on IA.[32] A study by Younes et al[9] also showed a significant association between the symptoms of depression, anxiety, and stress with IA ($p<0.001$). These previous studies had a similar study population to this study. However, most causality between the two variables cannot be inferred due to the nature of the study designs i.e., cross-sectional survey. Furthermore, IA has gathered serious attention from the mental health and psychiatric communities. Cho et al[33] suggested that depression and anxiety can increase the risk of IA. Alternatively, a review reported that individuals with IA had a 2–3 times higher risk of suffering from depression and anxiety.[34] Furthermore, this study was conducted during the COVID-19 pandemic when everyone relied heavily on internet usage. The internet has become a fundamental daily necessity, in which IA has been associated with mental health problems of health students, as suggested in this study. Early recognition of this issue and prompt actions are crucial for these students to stay focused while optimizing their learning process throughout the study period. Future research with rigorous study design is necessary to look into the actual causal relationship between mental health problems and IA in the long run.

There were few limitations in this cross-sectional study. First, the biological plausibility might be unclear on whether IA was the cause or consequence of mental health problems. Moreover, this study was limited to allied health students from three training institutes and did not involve other higher education institutions. Therefore, the results of this study may not be generalized to other populations. As this study was conducted during the COVID-19 pandemic, students might have relied heavily on online learning, which could manifest as IA. Moreover, self-reported questionnaires might be subjected to response bias.

Our findings provide insights into the current situation of IA and mental health problems among allied health students. The results will prompt the educators, parents, and students to acknowledge this phenomenon. Paying more attention to the behaviors and emotional states of the students is crucial for the early detection of IA and mental health problems. Strategies such as cognitive-behavioral group therapies may be needed as early intervention to overcome IA and mental health problems. Previous literature suggested that some factors including online gaming addiction, poor relationships with lecturers, and neglecting daily chores were significantly associated with IA.[35] We suggest future research to look into the potential causes of IA and include a larger sample size to tackle this issue and its long-term consequences. In addition, future studies should screen the duration of internet usage, including the purpose of internet usage in daily activities. Besides the study proposes, internet usage should also be considered to control bias. Furthermore, a longitudinal study may examine the causal relationship between mental health problems and IA among allied health students.

In conclusion, our findings showed significant associations between mental health problems and IA scores among allied health students. This study also revealed similar findings from previous studies. We suggest future studies with a more rigorous scientific method exploring the effects of mental health on IA

among allied health students. Early intervention is also needed to prevent mental health problems among allied health students to overcome the problem of IA.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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