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Prevalence of Internet Addiction and Its Relationship with Psychological Distress Among Medical Students in a Malaysian Public University

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ABSTRACT

The internet is an essential part of our daily lives. Studies have reported various impacts of internet addiction on humans, including anxiety, stress and depression. The current study explores the prevalence of internet addiction and its relationship with psychological distress among medical students in Malaysian public university. The current cross-sectional study was performed among second- to fifth-year Universiti Sains Malaysia (USM) medical students in the late 2019. The Internet Addiction Test (IAT) and the Depression, Anxiety and Stress Scale (DASS-21) were used to gather data. The data collected were analysed using the Statistical Package for the Social Sciences (SPSS) version 24.0. A Spearman correlation test and simple linear regression were used for the data analysis. A total of 386 medical students (96.5% response rate) participated in this study. Data analysis found that the prevalence of internet addiction among USM medical students was 6.7%. The results indicated a significant positive relationship between internet addiction and psychological distress. Extensive use of the internet was found to be associated with elevated levels of depression, stress and anxiety. Findings regarding the effects of internet addiction are similar to those in other studies conducted among Malaysian medical students. This study has provided essential insights into the relationship between internet addiction and psychological distress among medical students. Further investigation should be undertaken to explore other possibly addicted groups. Higher education providers should be aware of these internet addiction issues among their students and interventions should be introduced to tackle this problem.

Keywords: *Internet addiction, Academic performance, Medical students, Internet addiction test*

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BACKGROUND

The internet has become an integral part of our lives. With rapid advances in technology, internet users have increased tremendously over the past decades. Data show that internet users have reached more than 4.7 billion people worldwide (1). The number has increased during the COVID-19 pandemic as people spend more time on the internet studying, playing online games, shopping, watching movies, using social media and chatting. Internet access has benefited people by improving access to online information and providing new opportunities for social communication and entertainment (2). The internet is beneficial to students' academic performance. Its advantages outweigh its disadvantages (3). Widespread internet access has benefited people by providing new opportunities for social communication, entertainment, work and education.

Although the internet has offered advantages, its excessive use is associated with a psychiatric condition known as internet addiction. Studies have found that internet addiction might negatively impact educational, social and psychological well-being. Excessive internet usage among students might lead to internet addiction, adversely affecting their academic performance (4). Internet addiction mimics other forms of addiction and is characterised by the inability to inhibit internet use.

Some studies have highlighted the importance of studying internet addiction among university students because they are more vulnerable to developing internet addiction than the general population (2). Previous studies have reported that internet addiction exists among 4% of university students in the United States (5) and 16.8% in Italy (6). Studies among medical students showed even the worst figures. Meta-analysis reports indicate that the pooled prevalence of internet addiction among medical students from different countries is 30.1%. It is approximately five times that of the general population (7).

Several studies have investigated the prevalence of internet addiction among medical students in Malaysia. Ching et al. (8) conducted a study at the Universiti Putra Malaysia (UPM) and found that 36.9% of the study sample was addicted to the internet (8). A similar study was conducted among undergraduate medical students at the International Islamic University Malaysia (IIUM). The study found that internet addiction was prevalent in 22.8% of the sample (9). Another study conducted by Haque et al. (10) at the Universiti Sultan Zainal Abidin revealed that 81% of participants had mild to moderate internet addiction.

Regarding the association between internet addiction and psychological distress, a study was conducted among students from allied health colleges doing attachment and posting in Hospital Tengku Ampuan Rahimah, Klang. The study found that internet addiction was significantly associated with depression but not anxiety (11). Studies at the IIUM also found that depression, anxiety and stress symptoms were significantly associated with internet addiction (9).

Research on addictive internet use has increased, including its etiology and natural history (12). However, research in this area is still in its infancy (13). The classification of internet addiction is still not well established. Several diagnostic criteria and measures exist, but there are no widely accepted diagnostic criteria (14). Therefore, a consensus among experts regarding diagnostic criteria and measures is needed. Furthermore, it is crucial to improve reliability across studies on this issue. It is also essential to develop effective and efficient treatment approaches (12).

This study explores the prevalence of internet addiction among medical students at Universiti Sains Malaysia (USM) and its relationship with psychological distress.

METHODS

Study Design and Population

A cross-sectional design was utilised in this study. This research was performed at the USM Health Campus, Kelantan, Malaysia, and was conducted from June 2019 to February 2020. The calculated sample proportion was 355 with a non-response rate of 30%, giving the least sample proportion of 507. A single proportion formula calculated the sample size and a purposive sampling method was applied.

The second- to fifth-year USM undergraduate medical students undergoing a new curriculum programme were invited to participate in the study. First-year students were excluded from the study because they were new to the medical school (only two months during data collection). Students undergoing the old curriculum were also excluded because they had different modes of teaching that might influence their usage of the internet.

Data Collection Method

Data collection was done through a self-administered questionnaire. The questionnaire was distributed to the participants after their face-to-face teaching sessions. Written consent was obtained from them, and they were given instructions and information about the study. Each participant was given an identity number for tracking and filing information. It was made clear to them that the study would not influence their academic performance in any case.

Research Instrument

The research instrument consists of four parts. The first and second parts are comprised of questions to collect demographic data and items that can be used to evaluate the participants' purposes for using the internet. The third and fourth parts of the questionnaire consisted of items to assess internet addiction and psychological distress among participants using two validated instruments. The instruments were the Internet Addiction Test (IAT) and the Depression, Anxiety and Stress Scale (DASS-21) (15).

Internet addiction test

The IAT is a scale that comprises 20 items that measure the presence and dependency of adults on the internet. It is a self-reporting test that evaluates compulsive use of the internet. This 20-item questionnaire requires respondents to rate the items on a 5-point Likert scale covering how their internet use affects their daily routine, social life, productivity, sleeping patterns and feelings. The minimum total score was 20 and the maximum total score was 100. Three types of internet user groups were identified following the original scheme of the instrument (15). Respondents with IAT scores below 39 were classified as "non-addicted" and likeliest were average internet users, only having some problems controlling internet use. Respondents with IAT scores between 40 and 69 were classified as "possibly addicted" and those with 70 and above were classified as "addicted" and likeliest had encountered significant life problems due to excessive internet use (Table 1).

Table 1: Interpretation of IAT

IAT score	Interpretation
20–39	Non-addicted
40–69	Possibly addicted
70–100	Addicted

The IAT has high face validity, and its factor analysis shows good internal consistency and concurrent validity (16). Cronbach's α coefficient was 0.929. Apart from the original English version, this instrument has also been decoded in many languages, such as Chinese, Italian, French, Korean and Turkish.

DASS-21

To investigate the relationship between internet addiction and psychological distress, we used the DASS-21 (17). The 21-item scale is a set of three self-report measures designed to evaluate feelings of depression, anxiety and stress (18–20). Every DASS-21 scale encompasses seven items, separated into subscales with comparable substances. The instrument's validity and reliability were well established. The reliability coefficient of depression, anxiety and stress scales ranged from 0.81 to 0.97, and the three subscales showed a discriminative ability to differentiate between psychiatric and non-psychiatric patients (19).

Based on the DASS manual for student samples (17–18), depression, anxiety and stress levels were measured by summing up the subscale of the DASS-21. Each subscale score was categorised as normal, mild, moderate, severe, or extremely severe, as shown in Table 2.

Table 2: Interpretation of DASS-21

Meaning	Depression	Anxiety	Stress
Normal	0–9	0–7	0–14
Mild	10–13	8–9	15–18
Moderate	14–20	10–14	19–25
Severe	21–27	15–19	26–33
Extremely severe	≥ 28	≥ 20	≥ 34

Note: Based on scoring guide from the author, for short version (DASS 21-item), the total scores for each subscale are multiply sum by 2.

The DASS-21 was used in this study due to its validity and reliability. It also requires less time to administer. However, it is worth noting that the instrument is just a preliminary examination tool to evaluate depression, anxiety and stress and is not intended to substitute clinical analysis.

Statistical analysis

Following data collection, the data were entered into SPSS software, version 24.0. Descriptive statistics, such as frequencies and proportions, were calculated. Spearman's correlation was used to investigate the relationship between the internet addiction scores and psychological distress (anxiety, stress and depression) scores. The correlation coefficient, *r*, is interpreted as illustrated in Table 3. Simple linear regression was used to predict the relationship between internet addiction and psychological distress. Before the analysis, the assumptions were checked. Equal variances were examined using Levene's test and the normality of residuals by using the normal curve of the histogram. Equal variance was met if Levene's test was not significant. The normality of residuals was met if the normal curve of the histogram was distributed in a bell-shaped pattern.

Table 3: Interpretation of correlation coefficient, *r*

r	Interpretation
< 0.26	Poor
0.26–0.50	Fair
0.51–0.75	Good
0.76–1.00	Excellent

RESULTS

A total of 386 out of 400 (96.5%) medical students who participated in and completed the questionnaires were included in the analysis. Their demographic profiles are summarised in Table 4. The mean age was 21.62 (±1.387), and the majority of them were females (73.6%) and Malays (73.3%). The distribution of the participants based on the year of study was almost equal (year 2 = 109, year 3 = 100 and year 5 = 104). However, the number of participants from year 4 was slightly low (only 73).

Table 5 shows the prevalence of internet addiction among medical students according to different demographic variables. The overall prevalence of internet addiction among medical students was 6.7%. The prevalence of internet addiction among females (7.4%) was higher than males

(5%). In terms of year of study, the highest prevalence of internet addiction was among the third-year students (12%), and the lowest was among the fourth-year students (1.4%). The highest prevalence of internet addiction was recorded by other ethnic groups (11.1%), followed by Malay (8.1%), Chinese (2.6%), and Indian (1.8%).

Table 4: Demographic data of the participants, *n* = 386

Variables	Frequency (%)
Age (mean [year] ± SD)	21.62 (±1.387)
Year of study	
2	109 (28.2)
3	100 (25.9)
4	73 (18.9)
5	104 (26.9)
Gender	
Male	102 (26.4)
Female	284 (73.6)
Ethnic group	
Malay	283 (73.3)
Chinese	38 (9.8)
Indian	56 (14.5)
Others	9 (2.3)

Table 5: Prevalence of internet addiction among USM medical students, *n* = 386

Variables	Prevalence of internet addiction			Total *n* (%)
	Non-addicted *n* (%)	Possibly addicted *n* (%)	Addicted *n* (%)	
Total	167 (43.3)	193 (50.0)	26 (6.7)	386 (100.0)
Sex				
Male	46 (45.1)	51 (50.0)	5 (4.9)	102 (100.0)
Female	121 (42.6)	142 (50.0)	21 (7.4)	284 (100.0)
Year of study				
Second-year	33 (30.3)	67 (61.5)	9 (8.3)	109 (100.0)
Third-year	42 (42.0)	46 (46.0)	12 (12.0)	100 (100.0)
Fourth-year	37 (50.7)	35 (47.9)	1 (1.4)	73 (100.0)
Fifth-year	55 (52.9)	45 (43.3)	4 (3.8)	104 (100.0)
Ethnic group				
Malay	105 (37.1)	155 (54.8)	23 (8.1)	283 (100.0)
Chinese	21 (55.3)	16 (42.1)	1 (2.6)	38 (100.0)
Indian	38 (67.9)	17 (30.4)	1 (1.8)	56 (100.0)
Others	3 (33.3)	5 (55.6)	1 (11.1)	9 (100.0)

Relationship Between Internet Addiction and Psychological Distress

Table 6 shows the correlation between internet addiction scores and psychological distress parameters, such as depression, anxiety and stress scores. The results showed that internet addiction was positively correlated with depression, anxiety and stress. The correlation strength was fair, as the correlation coefficient was more than 0.25.

Further analysis by simple linear regression revealed that the internet addiction scores were significantly predicted by depression, anxiety and stress scores (Table 7). The analysis showed that when depression, anxiety and stress scores increased by 1 unit, internet addiction increased by 0.653, 0.693 and 0.731 units, respectively. Of importance, depression, anxiety and stress significantly contributed to the internet addiction levels of medical students.

Table 6: Correlation between psychological distress and internet addiction

Parameters	Internet addiction	
	r	*p*-value*
Depression	0.340	<0.001
Anxiety	0.332	<0.001
Stress	0.360	<0.001

Note: *Spearman correlation

Table 7: Relationship between psychological distress and internet addiction

Parameters	*b* (95% CI)	Correlation coefficient	*t*-statistic	*p*-value*	R^2	Adjusted R^2
Depression	0.653 (0.479, 0.828)	0.352	7.361	<0.001	0.124	0.121
Anxiety	0.693 (0.519, 0.867)	0.371	7.835	<0.001	0.138	0.136
Stress	0.731 (0.565, 0.897)	0.404	8.65	<0.001	0.163	0.161

Note: *Simple linear regression. Significant level, $p < 0.05$

DISCUSSION

This study has contributed several vital findings to the literature on internet addiction. First, the prevalence of internet addiction among the participants was 6.7%. Second, internet addiction was found to be correlated with psychological distress.

Adolescents are susceptible to internet attraction (20). Excessive internet use negatively impacted family relationships, self-esteem, life satisfaction (21–22) and academic performance (23). With the increased number of internet users, internet addiction has become an increasing psychological health problem in this digital era. Medical students are very susceptible to this alarming issue.

Prevalence of Internet Addiction

This study has found that 6.7% of the participants were classified as addicted, and 50% were possibly addicted to the internet. The finding is almost similar to a study conducted at King Abdul-Aziz University in 2017, which found that 53.75% of their medical students were addicted or possibly addicted to the internet (24). This prevalence rate is higher than that found by Kawabe et al. (25) in 2016. In their

study, only 2.0% and 21.7% of their 853 participants were classified as addicted and possibly addicted, respectively (25).

Local studies have found different findings. A study conducted in UPM found that 36.9% of their medical students were addicted to the internet (8). Another study conducted at IIUM found that 22.8% of their medical students were addicted to the internet (9). The results were relatively higher compared with our findings. However, the studies were conducted using different instruments. Therefore, we cannot simply make a fair comparison.

It is worth noting that this study's data was collected just before the COVID-19 pandemic hit Malaysia in March 2020. We believe that the prevalence of internet addiction might increase during the COVID-19 pandemic since most medical students stayed at their hostel or home during the movement restriction order. Face-to-face teaching and learning activities were not allowed during this time, and most of the teaching and learning sessions were conducted via video conference and e-learning portals. Therefore, their time spent on the internet most likely increased. The increase in internet usage might lead to internet addiction, as shown by studies in China that found substantial evidence of excessive internet use among Chinese children and adolescents during the COVID-19 pandemic (26).

Relationship Between Internet Addiction and Psychological Distress

This study showed that internet addiction positively correlates with depression, anxiety and stress. Linear regression analysis showed that psychological distress significantly contributed to the internet addiction levels of medical students. It suggests that as internet addiction becomes more severe, its relationship with depression becomes stronger. These findings are consistent with other studies. Younes et al. (6) have found significant correlations between potential internet addiction and insomnia, stress, anxiety, depression and self-esteem. Banjanina et al. (27) and Seki et al. (28) made the same conclusion from their study, particularly for depression.

Some studies have reported that people with depression or other mental health problems are susceptible to addiction to gaming and mobile phones (29–30), which also contribute to internet addiction. Kuss et al. (31) have found that depression is a significant factor in susceptibility to internet addiction. Regarding anxiety, other studies also found the same results supporting a significant relationship between internet addiction and anxiety among university students (32–33).

As far as the relationship between internet addiction and stress is concerned, other studies also found a significant relationship between the two. Jun and Choi (34) found that academic stress was positively associated with internet addiction. Internet usage might be one of the coping strategies used by stressed medical students. Further research is needed to explore the postulation.

In conclusion, this research has shed light on the prevalence of internet addiction among medical students. It is an alarming issue as internet addiction can be detrimental to their education progress and long-term career goals (35). Therefore, early identification and management of internet addiction and psychological distress among medical students is crucial to prevent any negative consequences.

RECOMMENDATION

Even though the data shows only 6.7% of the participants are addicted to the internet, the other 50% are possibly addicted and need further assessment. Medical schools should consider internet addiction among their students as an essential issue to be tackled. We suggest that all medical schools investigate the prevalence of internet

addiction among their students. Intervention should be planned as internet addiction can affect medical education progress and long-term career goals. Experts suggest that excessive internet usage by medical students may lead to internet addiction, which may adversely affect their academic performance (4). Further studies should be conducted regarding this claim, especially because there is evidence that the internet addiction rate among students with poor academic performance was significantly higher than others. Lastly, effective intervention to the problem must include not only internet addiction management but also the management of associated psychosocial distress issues, including depression, anxiety and stress.

Limitations

First, a contributory relation between internet addiction and mental distress cannot be concluded because of cross-sectional research. Specifically, the connection between internet addiction and psychological issues is associative, as found in this research. Subsequently, we do not exclude the likelihood that mental issues trigger internet dependency instead of the other way around. A cohort nature of the analysis would be more fitting to interpret the relationship's potential causal origin. Second, the research selection was drawn from just one institution. Since the examined institution is the country's largest academy in population, the participation of subjects from various other medical schools and universities may more adequately represent the situation under examination. Another constraint of this research is that it could not examine the demographic aspects contributing to internet addiction, academic performance, or psychological distress. In addition, while the results are compatible with the projections for internet addiction, academic success, and psychological distress, they do not indicate a cause-and-effect association. The actual scale of the impact was low.

CONCLUSION

This study found that the prevalence of internet addiction among USM medical students was almost similar to that found in other studies. As we can to psychological problems. Thus, there is a need to plan and implement programmes to promote healthy internet usage to minimise the impact of internet addiction's impact on individuals' psychological health.

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ETHICAL APPROVAL

This research was approved by the Universiti Sains Malaysia Human Research Ethics Committee [USM/JEPeM/19070443] on 14 November 2019.

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