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Psychological Distress and Internet Addiction among Medical Students from a Malaysian Public University: A Comparison between Gender

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ABSTRACT

Introduction: Widespread use of the internet is a relatively recent phenomenon that is affecting different cultures worldwide in both positive and negative ways. This study aimed to determine the gender differences in the internet addiction among medical students in public university. **Methods:** 426 medical students from year one to four were invited to participate in the study. For data collection, we used a self-administered questionnaire consisting of socio-demographic and internet usage questions, the Internet Addiction Test (IAT) and the Depression Anxiety and Stress Scales 21 (DASS-21). **Results:** There were a total of 426 (270 female and 156 male) medical students included in this study. IA was high in both male and female students. There was a higher proportion of male students (44.9%) found to be addicted compared to female students (32.2%). There were positive correlations between the DASS-21 and IAT scores for both male and female students. For female students, longer hours spent online daily (p-value = 0.02), as well as high anxiety (p-value < 0.001) and depression scores (p-value = 0.037) were found to be most strongly associated with IA. Among male students, factors associated with IA were the availability of internet access at home (p-value=0.02) and high anxiety scores (p<0.001). **Conclusion:** IA was high in both male and female medical students, with higher anxiety raising the risk in both groups. In female students, a higher depression score was also found to be associated with IA.

Keywords: Internet addiction, Gender, Medical students, Malaysia

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INTRODUCTION

The internet first became available in the mid-1980s (1). Currently, the internet has become one of the most popular inventions of this era and is accessed by almost every age group for various purposes such as academic research, commerce, information exchange, communication, and entertainment. Obsessive use of the internet has a significant impact on individuals' psychology and lifestyle. The negative outcome of human-internet interaction is termed as internet addiction (IA).

Malaysia is a high middle-income country where the internet is widely available and commonly used by college and university students (2). From a survey done in 2016 by Malaysian Communications and Multimedia Commission, the highest percentage (93%) of internet users in Malaysia are those aged below 25 years which includes the university students. (3)

Despite the advantages associated with widely-available internet access in Malaysia which enable the university students to do the social networking as well as information search for their studies, however local studies showed that 36% of them addicted to their internet use and interfere with their daily activities (4).

IA is the result of psychological dependence on the internet while losing motivation to perform work-related activity once the addicted person logs on (5). There are various types of IA, including social networking, video gaming, online chatting, internet surfing of pornography sites and leisure web surfing.

Studies show that excessive internet use can produce a negative impact on students in terms of their physical well-being and academic performance (6). Studies in the past also showed significant association between IA and anxiety, stress and depression (1,7,8).

Past studies reported that there is significant association between gender and internet addiction (IA). A local

study showed that males are more likely to engage with internet addiction than females (9). This is consistent with a study done in China and Pakistan where males are more prone to develop IA (1,10). However, there is inconclusive result in Malaysia as another local study showed that there is no significant association between gender and in IA (11). Males tends to develop IA could be due to their behaviour of playing online games related to power and sexual fantasies (12). The proposed hypothesis behind this phenomenon is that by increasing the religiosity will results in decreasing the erotic motive and lower the rate of IA (13). Besides that, females are more religious because they are serious in their religious practice (13).

On the other hand, literature showed that there is a conflicting result in psychological impact between gender and IA. One of the study reported that females are more vulnerable and affected compared to males in experiencing the negative effect of IA (14). Interestingly, one study reported that there is significant association between IA and attention deficit among females compared to males (15). However, another study showed that IA was significantly associated with lower self-esteem in males (16). Based on the above result, there is little study to look at the gender difference in IA and depression. Thus, our study aims to determine the gender difference in factors associated with IA in Malaysia.

MATERIALS AND METHODS

A cross-sectional study was conducted among 426 medical students of the Universiti Putra Malaysia between March and September of 2013 (4). The study instruments utilized were a questionnaire on socio-demographic and internet usage, the Malay version of the Internet Addiction Test (IAT) and the Depression Anxiety and Stress Scales 21(DASS 21) (4). This study was approved by the Ethical Committee of the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM/TNCPI/RMC/JKEUPM/1.4. 18.1/F1). Results from this study regarding determinants of IA using multiple logistic regression were published in 2017 (4). We used the data of this study as a basis for ours and conducted further statistical analysis to determine differences in IA in the two gender groups.

Sample size calculation
The sample size was calculated using Epi Info 7 based on prevalence of 43% in a local study with power of 90%, significant less than 0.05 and 95% confidence interval (17). The minimum sample size calculated was 265. Considering of non-response rate of 30%, the final calculated sample size was 378.

Procedures of data collection
A universal sampling method was used in this study as all the year 1 to year 4 medical students were approached for this study after they have completed their regular classes.

Ethics approval and consent to participate
Ethics approval for this research study was obtained from the Ethics and Industry Research Committee of University Putra Malaysia. Written informed consent was obtained from the students for publication of this article.

Statistical analysis
Statistical analysis was done using the Statistical Package for Social Science (SPSS) Version 22.0. Gender differences in socio-demographic background and behavioural characteristics of internet usage were reported using descriptive statistics. The continuous variables were checked for normality test, skewness and kurtosis values. We completed the bivariate analysis by using the chi-square test for categorical data and the Mann Whitney test for continuous data because the data was not normally distributed based on the normality test, kurtosis and skewness result. We used logistic regression for multivariate analysis and set the level of significance at $p < 0.05$.

RESULTS

Gender differences in socio-demographic background
The study recorded data from 270 females and 156 male medical students (see Table I). There was no difference in the mean age between female and male students (p=0.138). The prevalence of IA in this study was 36.9%

Table 1: Gender difference in socio-demographic background

Variables	Female (*n*=270)	Male (*n*=156)	*p-value*
Age, years	21.5±1.4	21.7±1.5	#0.138
Year of study, median (IQR)	2 (3)	2 (3)	#0.188
Household income in Ringgit Malaysia, median (IQR)	3000(3500)	3000(3500)	#0.978
Ethnicity, *n*(%)			
Malay	173(64.1)	64(41.0)	**<0.001**
Chinese	74(27.4)	74(47.4)	
Indian	14(5.2)	17(10.9)	
Others	9(3.3)	1(0.6)	
Religion, *n*(%)			
Muslim	178(65.9)	65(41.7)	**<0.001**
Buddhist	64(23.7)	66(42.3)	
Hindu	14(5.2)	13(8.3)	
Christian	14(5.2)	12(7.7)	
Hometown, *n*(%)			
Rural	89(33.0)	51(32.7)	0.954
Urban	181(67.0)	105(67.3)	

* Chi square test. #Mann-Whitney U test. Significant p< 0.05

(4). More than half of the female students were Malay (64%), while the male students were mostly of Chinese origin (47%), followed by Malay (41%). There were significant differences in ethnicity and religion between male and female students (p<0.001) (Table I).

Gender differences in behavioural characteristic of internet usage

The characteristics of internet usage among male and female students are presented in Table II. Almost similar percentage of male (85.9%) and female (88.5%) students had home internet access. However, females (81.1%) had greater accessibility at their hostels than their male counterparts (70.5%). All students had access to internet accessible devices and a majority of students had portable devices (95% females and 85% males). Our study shows that male students spent significantly more days per week staying online compared to female students (p=0.001).

Table II: Gender difference in characteristic of internet usage of the study population

Variables	Female	Male	p-value
Availability of home Internet access, n(%)			
Yes	239(88.5)	134(85.9)	0.43
No	31(11.5)	22(14.1)	
Number of days spend online per week, median (IQR)	7(2)	7(0)	**0.001#**
Place to access internet, n(%)			
Hostel	219(81.1)	110(70.5)	**0.012***
Elsewhere	51(18.9)	46(29.5)	
Type of device used, n(%)			
Portable	257(95.2)	132(84.6)	**0.001***
Not portable	6(2.2)	11(7.1)	
Purpose of internet surfing, n(%)			
Education	14(5.2)	17(10.9)	**0.013**
Mixed	7(2.6)	13(8.3)	
Entertainment	132(45.9)	57(52.6)	
Mixed	124(48.9)	82(36.5)	
Internet addiction (IA) category, n(%)			
Yes	87(32.2)	70(44.9)	**0.009**
No	183(67.8)	86(55.1)	

* Chi square test. #Mann-Whitney U test. Significant p< 0.05

There is significant difference in the purpose of internet surfing between genders. Male students were surfing the internet for the entertainment whereas female students were surfing for both education and entertainment (p=0.013).

Correlation of IA score with DASS score among female and male students

IA was detected in 157 students (70 males and 87 females) but was significantly higher among male students (44.9%) compared to females (32.2%) (Table II). There was a direct positive correlation between the DASS-21 score and IA scores for both male and female students (Table IV).

Table III: Gender difference in Depression, Anxiety and Stress Score among Medical Students

Variables	Female (n=87)	Male (n=70)	p-value
Depression score, median (IQR)	4(8)	6(8)	0.066*
Anxiety score, median (IQR)	8(10)	6(10)	0.677*
Stress score, median (IQR)	10(10)	8(10)	0.305*

* Mann-Whitney U test

The psychological impact of IA on students was measured through assessing each students' DASS-21 depression, anxiety and stress scores (Table III). There were no significant differences in these scores between male and female students.

Table IV shows the correlation of IA score with depression, anxiety and stress score among female and male students. For female students, increase one unit in depression, anxiety and stress score will significantly increase the risk of developing IA by 0.4 (p<0.001). Whereas among male students, increase one unit in all scores will significantly increase the risk of developing IA by 40%.

Table IV: Correlation of IA score with depression, anxiety and stress score among female (n=87) and male (n=70) respectively

IA score	Female	p-value	Male	p-value
Depression	0.412	<0.001	0.207	0.01
Anxiety	0.409	<0.001	0.222	0.005
Stress	0.368	<0.001	0.191	0.017

Regression in factors affecting IA among female and male students

From logistic regression analysis, the duration of time spent online (p=0.02), the anxiety score (p<0.001) and the depression score (p=0.04) were found to be significantly associated with IA among female students (Table V). For every extra day spent online per week, the odds of female students to develop IA increased by 1.3. Additionally, increased in one unit of the anxiety and depression scores will increase the odds by 1.1.

For male students, there is significantly association

between IA and the availability of internet access at home (p=0.02) and the anxiety score (p=0.002). The odds of having IA among male students who had internet access at home was 3.7 times higher when compared to male students without home internet access (p=0.02). For every elevated one unit in the anxiety score, the odds of having IA is increased by 1.1 among male students. From this study, anxiety score appears to be persistent predictors of getting IA in both genders (p<0.05)

Table V: Regression to look at the factors affecting IA in female (n=87) and male (n=70) respectively

Variables	Female		Male	
	OR	p-value	OR	p-value
Age	-	0.2	-	0.897
Year of study	-	0.281	-	0.107
Ethnicity	-	0.934	-	0.33
Hometown	-	0.679	-	0.547
Availability of internet access at home	-	0.49	3.7	**0.02**
No of days online per week	1.3	**0.03**	-	0.217
No of hours online per day	1.1	0.024	-	0.381
Place to access Internet	-	0.089	-	0.457
Purpose of Internet usage	-	0.76	-	0.104
Depression score	1.1	0.037	-	0.51
Anxiety score	1.1	**<0.001**	1.1	**0.002**
Stress score	-	0.52	-	0.322

DISCUSSION

A total of 157 medical students (36.9%) were found to have IA in a previous study done at the Universiti Putra Malaysia (4). Our study investigated gender difference among these students in factors associated with IA. Our data showed there are several differences in terms of which factors contribute to IA in both genders.

In general, our study showed significantly higher IA rates among male students, which is comparable to the results obtained from previous studies done in other countries (18–20). Male students are prone to develop IA possibly due to their internet usage was prone towards achieving pleasure by playing online games and watching videos (16). Whereas female students used internet more for information searching and study-related activities (16).

In our study, female students are less likely to get IA than male students. The possible reason behind this is could be due to more than half of the female students (65.9%) were Muslims. Previous study showed that erotic motives decreased with increasing religiosity for Muslims (13). Furthermore, female students are more religious compared to male students as they take

seriously in their religious practice and appreciate the spiritual element of religion (13).

Our study shows that both male and students spent significantly more days per week staying online compared to female students (p=0.001). This is different with a previous study done among adolescent in China which showed no significant association between time spend online with the IA (7).

Consistent with previous studies, female students with IA are significantly associated with developing depression (21,22). Female students have greater tendency to develop depression because of the interaction between the psychological factors that are produced from a negative events and their adolescent biological changes (22). Females were greater influenced by the negative social environment and stress especially during their pubertal transition (22). Besides, the females used the internet mostly for information searching which lead them to spend less time with friends. This females behavioural pattern can cause social isolation and subsequently will result in depression(20).

From this study, we found that anxiety score appears to be persistent predictors of getting IA in both genders. This is similar with a study done in Turkey among university students (23). Students with IA may have social and psychological impairment such small social circle, loneliness, low self-esteem, low family function, and poor mental health. These impairments will cause them to become more addictive to internet which eventually will leads to anxiety and stress disorder (23).

The present study found widespread IA among university students which suggests that IA has become a public health issue in Malaysia. This study suggests that IA may cause in negative psychological and behavioural impact such as anxiety and depression, and females who had higher IA were more likely to have depression and anxiety than males. Considering the gender differences in IA highlighted in our study, targeted prevention and intervention strategies involving multi-disciplinary approach to reduce this behavioural issue are recommended.

To the best of our knowledge, our study is the first one in Malaysia which examines gender differences in psychological issues and IA in medical students. This study has some limitations. Firstly, it is only confine to one centre, and it is not a wide national study. However, in view of adequate sample size, it gives us a good picture on gender difference in factors associated with IA. Secondly, the major limitation of our study is that the cross-sectional research design of the study could not determine the causal relationships between IA and its significantly related variables. Thirdly, DASS is a screening tool and it is not a diagnostic tool for depression and anxiety score. Thus, the results of this

study should be interpreted with cautious. Fourthly, due to the unequal numbers in genders, the conclusions from this study must be considered tentative. Fifthly, in view of IA is a new area of psychiatric disorder and it has not specified in The Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5), thus there is lack of standardization in confirming the disease and its classification. Sixthly, even though there is potential presence of contamination and model misspecification when we dichotomise the continuous variable e.g. to classify the IA into presence and absence of IA. However, we also present the data in continuous form as shown in table 5. Thus, we have to interpret the result of this study within the context of its limitation. A prospective cohort study is therefore highly recommended to confirm the association between IA and university students.

CONCLUSION

In conclusion, our study found that every four in ten medical students were addicted to internet. Factors in males with IA are availability of internet access at home and anxiety score, whereas factors in females are time spend online, depression and anxiety score. Anxiety appears to be a persistent predictor with IA in both genders. Thus, a clinician must screen for IA among students with anxiety problem and vice versa, those who is addicted to internet activity, needs to be screened for anxiety disorder.

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