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Original Article

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Internet addiction among undergraduate medical students in Myanmar: A cross-sectional study

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ABSTRACT

Objective: To determine the prevalence of internet addiction and its associated factors among undergraduate students attending medical universities in Myanmar.

Methods: Internet addiction was assessed using Young's internet addiction test. Multiple logistic regression analysis was applied to determine the factors associated with internet addiction. Altogether 950 students from all medical universities were included in the study voluntarily.

Result: The prevalence of internet addiction in the study population was 72.2% (95%*CI*: 69.3%, 75.0%). According to the results of multiple logistic regression analysis, age, percentage of pocket money spent for internet, time spent per day using the internet, peer pressure, health-related behaviours (irregular meals, sleep disturbances, and missing social gatherings), and academic performance (postponement of the study and inability to concentrate on studying) were significant predictors of internet addiction.

Conclusions: There is a high prevalence of internet addiction among Myanmar undergraduate medical students. Appropriate interventions, including promotion and strengthening of active and healthy lifestyles among students, should be implemented to prevent internet addiction and its adverse outcomes.

KEYWORDS: Internet addiction; Medical students; Myanmar; Undergraduate students

1. Introduction

Over the last few decades, a technological breakthrough with the invention of internet has significantly changed people's daily lives worldwide[1]. There are over 400 million internet users in the South-East Asia region. As of June 2021, the internet penetration rate in the region was as high as more than 70% in all countries except for Laos, Myanmar and Timor-Leste[2]. In Myanmar, the internet has been established since 2000. Although no more than half (*i.e.* 1 000 people in 2 000)[3] were able to access the internet at first, the internet penetration rate in Myanmar has become 33.4%[3] and 52.1%[4] of the total population in 2018

Significance

Magnitude of the problem of internet addiction among Myanmar medical students along with its associated factors were identified by the present study. The findings of this study could help in prevention and control of internet addiction among Myanmar medical students, which in turn would help improve the medical education in Myanmar.

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and 2021, respectively. In recent years, the internet has become an important part of a student's life due to various reasons. If used properly, the internet can yield fruitful results both academically and socioeconomically[5], whereas excessive or improper use can cause internet addiction[6,7]. Internet addiction is characterised by excessive and poorly controlled urges or behaviours to use internet that can cause distress or impairment[8,9].

Moreover, the internet has become an essential medium for communication as well as learning, which has been switched from conventional face-to-face to virtual learning during the COVID-19 pandemic era, especially for university students[10,11]. This combined with psychological and environmental factors, such as developmental stressors and increased accessibility to internet service, could predispose the development of internet addiction among university students too[12–14]. Internet addiction, also known as pathological internet use or problematic internet use[8,9] among university students, becomes a significant health and academic issue because it can create adverse consequences not only on physical and mental health, but also on academic performance[13]. Previous studies also reported that it had become a major behavioural health problem in many countries, including Asian and South-East Asian countries[12,13]. Moreover, medical education itself is regarded as stressful, and there are many reports of psychological morbidity among undergraduate medical students[15]. As little is known about the pattern and extent of the internet use among Myanmar medical students, this study was conducted to determine the prevalence of internet addiction and its associated factors among undergraduate medical students in Myanmar.

2. Subjects and methods

Before commencing the study, ethical approval was granted by the Research and Ethical Committee of the University of Medicine, Yangon(1), Myanmar, with the approval number of 75(REC)/UM1/2020.

2.1. Study design

A cross-sectional study was conducted among undergraduate medical students from all medical universities in Myanmar during June to November 2020. All undergraduate medical students were considered the study population. Epi-info version 7.0 was used in calculating the sample size. The prevalence of internet addiction among undergraduate medical students was estimated at 44.2%[6] and absolute precision was set at 5%. The minimum requirement of the sample size was 379 at a 95%*CI*. The anonymous online self-administered questionnaire was developed by investigators using Google forms and the English language. It was distributed using personal contacts and via word of mouth using emails and messenger apps such as Viber, Messenger, Telegram, and other social media, such as Facebook and Twitter. The present study utilised convenience sampling and online data collection because of the closure of the medical universities due to prohibitions against the use of random sampling and face-to-face interviews during COVID-19 in Myanmar.

The first part of the questionnaire was an informed consent form explaining the voluntary participation and confidentiality of the data. Data collection started on 25 June 2020. The participants were asked to respond only once, and the form settings allowed only one response per user. Inclusion criteria used in this study were any students currently attending in any University of Medicine in Myanmar at the time of data collection and being willing to participate in the study voluntarily. Therefore, informed consent was taken from the respondents for adults (⩾18 years of age). For those who were under 18 years of age, informed consent was received from either their fathers, mothers, or guardians. If no consent was given, students were not included in the study. A total of 950 students responded voluntarily to this study.

Internet addiction was assessed using Young's internet addiction test (YIAT)[16], which consists of 20 items on a 6-point Likert scale, ranging from 0 to 5 (0 = never; 1 = seldom; 2 = occasionally; 3 = frequently; 4 = often, 5 = always) for each item. The total scores of a respondent ranged from 0 to 100. The levels of internet addiction were categorised as none (total scores between 0–30), mild (31–49), moderate (50–79), and severe (80–100)[17–19]. Respondents in the mild, moderate, and severe categories were considered as those with internet addiction. The internal consistency (or) reliability of the YIAT in this study was excellent (Cronbach's alpha = 0.88).

The variables considered as the factors associated with internet addiction in the study were as follows:

1) Socioeconomic and demographic variables, such as age, gender, pocket money provided per month, and percentage of pocket money used for internet per month;

2) Factors related to the use of the internet, such as reasons for using the internet, duration of internet use, time spent (hours) a day to use the internet, frequency (daily or a few days in a week);

3) Health-related factors, such as sleep problems (insomnia, hypersomnia, late sleep, sleep pattern changes, waking up at midnight), junk food, irregularity in having meals, reduction of regular physical exercise, and inability to participate in social gatherings;

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4) Factors related to academic performance, such as (inability to concentrate on studying, poor achievement on class tests, missing class, and poor time management or postponement of the study).

2.2. Statistical analysis

After checking any missing data, data entry and analysis were done using the Stata version 11.0 statistical package. Mean, median, mode, and standard deviation were measured for quantitative variables, and frequency tables were drawn for categorical variables. The prevalence of internet addiction and a 95%*CI* were estimated. Multiple logistic regression analysis with a backward deletion strategy was applied to determine the factors associated with internet addiction. Any variable with $P \leq 0.25$ in univariate analysis was chosen as a candidate variable to be included in the multivariate analysis.

3. Results

The study included 950 students from five different medical universities, namely University of Medicine, Yangon(1), University of Medicine, Yangon(2), University of Medicine of Mandalay, University of Medicine, Magway, and University of Medicine, Taunggyi. Their general characteristics, including the name of the medical universities, are shown in Table 1. Most respondents were from the University of Medicine, Yangon(1) (53.1%). In contrast, the smallest number of students were from the University of Medicine, Taunggyi, the newest medical university in Myanmar, established in 2015. The majority of the participants were younger than 20 years old (50.4%), female (61.7%), with pocket money available per month of less than 100000 Myanmar kyats (MMK) (64.6%), and those who spent equal or less than 10% of their pocket money to access the internet (52.5%). Characteristics of the respondents including information related to internet use among them, and the exchange rate between MMK and the United States dollar (USD)[20] are also shown in Table 1. Almost all respondents (99.2%) used the internet daily, and more than half (55.2%) used the internet for one to six hours a day. The top three reasons for using the internet were to access social media (96.4%), to watch movies (94.4%), and for educational purposes (88.3%); the tool or gadget commonly used to access the internet was mobile phones/smart phones (94.2%), and the average duration (standard deviation) of internet use among students was 6.2 (2.1) years.

Table 1. Socioeconomic, demographic and baseline characteristics of the respondents.

Variables	*N*=950
Name of University	
UM 1, Yangon	505(53.1)
UM 2, Yangon	111(11.7)
UM, Mandalay	166(17.5)
UM, Magway	154(16.2)
UM, Taunggyi	14(1.5)
Age group (years)	
Mean age (SD)	20(1.7)
17–19	479(50.4)
20–25	471(49.6)
Sex	
Male	364(38.3)
Female	586(61.7)
Pocket money per month (MMK)	
Median (IQR)	100000(50000;150000)
≤100000	614(64.6)
>100000	336(35.4)
% of pocket money spent on the internet per month	
Median (IQR)	10(7–22.3)
≤Median	499(52.5)
>Median	451(47.5)
Mean duration (SD) of internet use (years)	6.2 ± 2.1
Frequency of internet use	
Daily	942(99.2)
A few times per week	8(0.8)
Time spent per day (hours)	
Mean (SD)	6.9 (3.1)
1–6	524(55.2)
7–12	385(40.5)
13–24	41(4.3)
Gadget used to access the internet	
Mobile phone	895(94.2)
Desktop	17(1.8)
Laptop	38(4.0)
Reasons for using the internet*	
Social media	916(96.4)
Watching movies	897(94.4)
Education	839(88.3)
Chatting	803(84.5)
For general information	771(81.2)
Gaming	514(54.1)
Shopping	456(48.0)
Email	325(34.2)
Looking for new friends	252(26.5)
Peer pressure	137(14.4)
Blogging	55(5.8)

Note: Data are expressed as *N* (%) unless otherwise specified. *Multiple responses allowed, IQR = Interquartile range, MMK = Myanmar kyats (1 USD = 1389.4 MMK during study period)[20], sd = standard deviation, UM = University of Medicine

Behaviours related to health and academic performance of the respondents are shown in Table 2.The prevalence (95%*CI*) of internet addiction among medical students was 72.2% (69.3%, 75.0%). Most students (43.2%) were in the mild addiction category. The severity of internet addiction is shown in Table 3.

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Table 2. Behaviours related to health and academic performance of the respondents.

Variables	*N*=950
Having junk food	
Yes	387(40.7)
No	563(59.3)
Irregularity in having meals	
Yes	159(16.7)
No	791(83.3)
Late sleep	
Yes	790(83.2)
No	160(16.8)
Waking up at midnight	
Yes	214(22.5)
No	736(77.5)
Sleep pattern changes	
Yes	644(67.8)
No	306(32.2)
Insomnia	
Yes	238(25.0)
No	712(75.0)
Hypersomnia	
Yes	257(27.0)
No	693(73.0)
Reduced physical activity	
Yes	602(63.4)
No	348(36.6)
Missing social gathering	
Yes	292(30.7)
No	658(69.3)
Missing class	
Yes	232(24.4)
No	718(75.6)
Postponement of the study	
Yes	583(61.4)
No	367(38.6)
Poor achievement on class tests	
Yes	239(25.2)
No	711(74.8)
Unable to concentrate in the study	
Yes	397(41.8)
No	553(58.2)

Data are expressed as *N*(%).

Table 3. Internet addiction among respondents.

Variables	*N*=950
Internet addiction	
Absent	264(27.8)
Present	686(72.2)
Severity of internet addiction	
None	264(27.8)
Mild	410(43.2)
Moderate	269(28.3)
Severe	7(0.7)

Data are expressed as *N*(%).

Multiple logistic regression analysis was done with a backward deletion strategy to assess the association between the characteristics of the respondents and internet addiction. Age group, percentage of pocket money spent on the internet, time spent per day, peer pressure, health-related behaviours (irregularity in having meals, late sleep, waking up at midnight, hypersomnia, and missing social gatherings), and academic performance (postponement of the study and inability to concentrate on studying), were found to have significant associations with internet addiction. On the other hand, frequency and duration of internet use, some health-related behaviours (having junk food, sleep pattern changes, insomnia), and some factors related to academic performance (missing class and poor achievement on class tests) did not show any significant association with internet addiction. although they have been chosen to be included in multiple logistic regression analysis (Table 4).

4. Discussion

The prevalence of internet addiction identified in this study was too high: 72.2% (95%*CI*: 69.3%, 75.0%). Previous studies have reported a varying prevalence of internet addiction among respondents. Similar studies conducted among medical students in Malaysia[10], Egypt[21] and Iraq[7], have revealed the high prevalence of internet addiction (>80% in all studies). A separate survey among Malaysian medical students also reported that almost all participants suffered at least mild internet addiction[22]. The World Health Organization has also disclosed that internet addiction has become an emerging behavioural public health problem[12]. In a previous meta-analysis, however, the prevalence of internet addiction among adolescents/students was less than 50%[13]. Similarly, the lower prevalence of internet addiction has been observed in studies carried out in Malaysia (28.9% among undergraduate students at a public university)[14], Tanzania (31% among allied health sciences and medical students)[23], India (44.2% among medical students)[6], Saudi Arabia (<10% among medical students)[24] and China (12.6% among medical students)[25]. The socio-demographic characteristics of the participants (age, gender, whether they are attending medical university or not, *etc.*) and time of the study (before or during COVID-19 pandemic period) would be responsible for these differences. Zhang *et al.*[26] concluded that internet addiction was more prevalent among medical students compared to other undergraduate students and the general population. Moreover, different tools and/or cut-off points to determine the presence and severity of internet addiction should also be taken into consideration in comparing the prevalence of internet addiction across the different studies. The authors of two previous meta-analyses also concluded that the discrepancy in assessment tools and cut-off points in defining internet addiction would be the source of heterogeneity in comparing the findings across the studies[13,26].

The most typical reason for using the internet among medical students identified in this study was to access social media or social networking. It is consistent with the findings of similar studies carried out in Malaysia and Iran[10,27].

Based on the results of multiple logistic regression analysis, socio-demographic characteristics of the students, such as age, percentage of pocket money, time spent per day using the internet, and peer pressure, were identified as possible risk factors for internet addiction. It means that the younger the age or the longer the time

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Table 4. Results of multiple logistic regression to identify the factors associated with internet addiction.

Variables	Univariate analysis		Multivariate analysis	
	OR (95%*CI*)	*P*	OR (95%*CI*)	*P*
Age(years)				
17–19	Reference		Reference	
20–25	0.6 (0.5, 0.9)	0.002	0.7 (0.5, 0.9)	0.038
Sex				
Male	Reference			
Female	1.0 (0.8, 1.4)	0.783		
Pocket money per month				
≤100000MMK	Reference			
>100000MMK	1.1 (0.8, 1.5)	0.508		
% of pocket money spent on internet per month				
≤10%	Reference		Reference	
>10%	1.6 (1.2, 2.1)	0.002	1.5 (1.1, 2.1)	0.014
Duration of internet use (Years)**	1.0 (0.9, 1.1)	0.165		
Frequency of use**				
Daily	Reference			
A few times per week	0.1 (0.03,0.6)	0.011		
Time spent per day (hours)				
1–6	Reference		Reference	
7–12	2.7 (2.0, 3.7)	<0.001	2.1 (1.5, 3.0)	<0.001
13–24	7.4 (2.2, 24.2)	0.001	4.0 (1.2, 14.0)	0.028
Gadget used				
Mobile phone	Reference			
Desktop	0.5 (0.2, 1.4)	0.210		
Laptop	0.7 (0.4, 1.4)	0.350		
Reasons for using internet*				
Social media	0.7 (0.3, 1.5)	0.343		
Watching movies**	1.6 (0.9, 2.9)	0.099		
Education**	0.5 (0.3, 0.8)	0.005		
Chatting	1.2 (0.8, 1.8)	0.303		
For general information**	0.5 (0.3, 0.8)	0.001		
Gaming**	1.4 (1.0, 1.8)	0.034		
Shopping**	1.3 (1.0, 1.7)	0.090		
Email**	0.6 (0.4, 0.8)	<0.001		
Looking for new friends**	1.2 (0.9, 1.7)	0.188		
Peer pressure	1.8 (1.1, 2.8)	0.014	1.9 (1.1, 3.3)	0.013
Blogging	1.4 (0.7, 2.7)	0.311		
Health-related behaviours*				
Having junk food**	1.7 (1.2, 2.2)	0.001		
Irregularity in having meals	9.0 (4.4, 18.7)	<0.001	4.4 (2.0, 9.5)	< 0.001
Late sleep	3.6 (2.6, 5.2)	<0.001	2.0 (1.3, 3.0)	0.001
Waking up at midnight	3.6 (2.3, 5.7)	<0.001	2.6 (1.6, 4.3)	< 0.001
Sleep pattern changes**	2.7 (2.0, 3.7)	<0.001		
Insomnia**	2.6 (1.8, 3.9)	<0.001		
Hypersomnia	2.3 (1.6, 3.2)	<0.001	1.5 (1.0, 2.3)	0.051
Reduced physical activity**	2.5 (1.9, 3.3)	<0.001		
Miss social gathering	2.4 (1.7, 3.4)	<0.001	2.1 (1.4, 3.1)	< 0.001
Academic performance*				
Missing the class**	2.4 (1.7, 3.6)	<0.001		
Postponement of study	3.6 (2.7, 4.9)	<0.001	2.7 (1.9, 3.8)	< 0.001
Poor achievement on class tests**	2.8 (1.9, 4.1)	<0.001		
Unable to concentrate on studying	4.3 (3.0, 6.0)	<0.001	2.6 (1.8, 3.8)	< 0.001

*Those with positive responses are shown, and they have been tested against those with negative responses.

**These variables did not show any significant association with internet addiction, although they have been chosen to be included in multiple logistic regression analysis

spent using the internet, the higher the tendency for internet addiction among medical students. However, regarding age, contradictory findings were observed in previous studies. Some studies reported that the respondent's age was not a determinant of internet addiction[7,23–25], while others revealed a significant association between them[22,28]. The time spent per day using the internet was consistently found to be associated with internet addiction in previous studies[6,13,23,24]. Although there was no significant association between gender and internet addiction in the present study, the association was significant in some studies[6,13,21,25]. Prior

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studies in Malaysia[22] and Iraq[7] also found that gender was not associated with internet addiction. In this study, using the internet for educational purposes was not included in the final model of multiple logistic regression analysis; only peer pressure was found to be a significant factor (Table 4). In contrast, using the internet for educational purposes was identified as a significant determinant of internet addiction in previous studies[6,7,14,23,24]. It means that the rational use of the internet should be focused on minimising the burden of internet addiction. Similar to the results of the present study, a previous study done in Turkey also found that peer pressure significantly influenced the occurrence of internet addiction[29]. A study done in China also discovered the significant relationship between monthly expenditure and internet addiction[25].

In this study, internet addiction was significantly associated with some health-risk behaviours (having meals irregularly, missing social gatherings, and sleep disturbances in the forms of late sleep, hypersomnia, and waking up at midnight), and the academic performance of the medical students (in terms of postponement of and failure to concentrate on studying). These findings were consistent with those of previous studies. Internet addiction was found to have a negative impact on the academic performance of the students in some studies[6,13,14,21,24], while others disclosed the presence of a significant relationship between health-risk behaviours (including eating and sleep disturbances) and internet addiction[13,21,30]. Loneliness or failure to take part in social gatherings was also determined to be an essential determinant of internet addiction in a previous similar study conducted in Turkey[31].

Although other risk behaviours, such as having junk food, reduced physical activity, insomnia, changing sleep patterns, missing class, and poor achievement on class tests were found to have a significant association with internet addiction in the univariate analysis, the association disappeared in the multivariate analysis. A Malaysian study[14] has reported the same finding.

5. Conclusions and recommendations

There is a high prevalence of internet addiction among Myanmar undergraduate medical students. It is also associated with some health-risk behaviours (irregular meals and sleep disturbances) and poor academic performance (postponement and inability to concentrate on studying). University authorities, including lecturers, government officials concerned with medical education, and medical students themselves, should be aware of these issues and develop appropriate interventions, such as screening for early detection of internet addiction, awareness-raising campaigns on the proper use of the internet and negative effects of internet addiction, and promoting active and healthy lifestyles among students, especially younger age groups to prevent internet addiction and its adverse outcomes. Further prospective studies should also be implemented in order to assess the trajectories of such a disorder.

The present study relied on self-reported information; hence, the data may be subject to recall bias and reporting errors. A causal relationship cannot be established in this study due to the utilisation of a cross-sectional study design. Besides, using non-random (or convenience) sampling would affect the representativeness of the samples included in the study. Therefore, the present study may not have good generalisability. Lastly, this study collected the data using online questionnaires, which might cause selection bias because students without internet access or those who did not use internet during the data collection were unable to participate. That could lead to the overestimation of the prevalence of internet addiction.

Conflict of interest statement

The authors claim there is no conflict of interest.

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Authors' contributions

Soe PP, Oo KM and Oo WM designed the study. All authors took part in questionnaire development and data acquisition (collection and entry). Data analysis was done by Oo WM. All authors not only drafted the initial manuscript but also reviewed and edited the manuscript, and approved the final version.

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