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Prevalence of internet addiction among medical and non-medical students of International Islamic University Malaysia (IIUM), Kuantan

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Abstract

Internet addiction has become a serious problem with the increasing internet use, especially among college students and adolescents. Most of the available literature on internet addiction among college students was mainly related to medical students and showed a disturbing prevalence, however, this is not widely studied among non-medical students. This study describes the prevalence and factors associated with internet addiction among medical and non-medical students at International Islamic University Malaysia (IIUM), Kuantan. A total of 107 medical and 104 non-medical students of IIUM Kuantan participated in this cross-sectional study conducted from July 15, 2019, to August 25, 2019, using random sampling. The Internet Addiction Test (IAT) was distributed through social media platform. Descriptive statistics were used to describe the prevalence and socio-demographic characteristics of the respondents, while binary logistic regression was used to identify respondents' factors associated with internet addiction. The results showed that 67.3% of medical students and 65.4% of non-medical students were moderately addicted to the Internet. The significant predictors of internet addiction in medical students are age (OR 0.235 95% CI 0.068-0.812) and duration of internet use of 4-6 hours (OR 0.235 95% CI 0.068-0.812). Among non-medical students, the significant predictors were social networking (OR 0.137 95% CI 0.003-0.636), Internet TV (OR 3.574 95% CI 1.057-12.08), and time spent on the Internet from 4-6 hours (OR 0.247 95% CI 0.06-0.91). The prevalence of internet addiction among medical and non-medical students at IIUM Kuantan is of concern. Early identification based on these findings for each medical and non-medical faculty can be tailored to ensure successful intervention.

Keywords: *addictive disorders, internet addiction, medical students, non-medical students, youth*

Introduction

The internet is now an indispensable learning tool for students in higher education. Some of the activities for which students use the internet include searching for information, online courses, and communication. However, the internet can also be used for entertainment-related activities such as social media, gaming, and video streaming, which can lead to "addiction."

Griffiths (2000) stated in his study that internet addiction is associated with addictive disorders and can be placed in the same range as alcohol and drug use disorders. In addition, there are six criterias to operationally define addictions: Salience,

mood change, tolerance, withdrawal, conflict, and relapse. A study by Mythily *et al.* (2013) found that internet addiction is often related to comorbid psychiatric disorders and their symptoms.

Factors contributing to internet addiction include lack of rules for internet use at home, less likelihood of having confidants, feelings of sadness or depression, and perceived lower grades at school or work (Kuss *et al.*, 2013; Mythily *et al.*, 2013). Apart from these, other factors associated with internet addiction include the various functions of the internet, ease of access, user motivations, and impulsive browsing (Kapahi *et al.*, 2013).

Studies among medical students showed a worrisome prevalence of internet addiction, while studies among non-medical students were sparse (Ching *et al.*, 2017; Liu *et al.*, 2010; Pramanik *et al.*, 2012; Razieh *et al.*, 2012). Therefore, this study aims to describe the prevalence of internet addiction and its associated factors among medical and non-medical students at IIUM Kuantan.

Materials and Methods

Ethical consideration

Ethical approval was obtained from the Ethical Committee of International Islamic University Malaysia [IREC 2019-148].

Study design, population, and sampling method

This cross-sectional study was conducted among medical and non-medical students of Kulliyyah of Medicine and Kulliyyah of Science, International Islamic University Malaysia (IIUM), Kuantan Campus. The study was conducted from July 15, 2019, to August 25, 2019. A total of 107 medical and 104 non-medical students who are internet users participated in this study. Quota sampling was used to select participants, in which data collection is conducted until the number of participants reaches the sample size calculated using the quota. The representative of each study year was approached and the link to an online-based questionnaire was distributed through WhatsApp and Telegram applications.

Study tool

The questionnaire was divided into three parts. The first part consisted of socio-demographic questions. The second part contained questions about the participants' internet use, and the third part consisted of the Internet Addiction Test (IAT). This IAT instrument was developed by Young (1998), consists of characteristics of pathological internet use (PIU), and is a reliable measure worldwide (Young, 1998). The items are rated on a six-point scale regarding participants' experience of their Internet use. We used the English and Malay versions of the Internet Addiction Test (MVIAT). The MVIAT was validated among 162 medical students in Malaysia by Chong Guan et al. (2015). The Malaysian version of the IAT showed good internal consistency with a Cronbach's α of 0.91.

Data analysis

The collected data were entered and analyzed using IBM SPSS Statistics for Windows version 24.0. Chi-square and Fisher's Exact Test were used to determine the appropriate variables to include in the binary logistic regression analysis. The data with a p-value of > 0.05 were excluded from the binary logistic regression analysis.

Binary logistic regression analysis was conducted to determine the independent factors associated with internet addiction after adjusting for the possible confounding factors. Due to the small sample size with many exposed variables to evaluate the association factors, the backward elimination (likelihood ratio) method was used in the multiple logistic regression to remove insignificant variables.

Results

Table 1 shows the socio-demographic data of medical and non-medical students at IIUM Kuantan. The mean age for medical students and non-medical students is 22 years and 100% of them are Malays. About 80% of the respondents are female, while the percentage of male respondents in both programs is about 20%. Of the 107 medical student respondents, 37 (34.6%) are in the T20 income group, 36 (33.6%) are in M40, 30 (28%) are in B40, and only 4 (3.7%) are in the PGK (Pendapatan Garis Kemiskinan) income group. On the other hand, most non-medical students are from the B40 income group (45.2%) and only one from the PGK income group.

Table 1. Socio-demographic characteristics of medical and non-medical students in IIUM Kuantan (N=211).

Characteristics	Medical, N (%)	Non-medical, N (%)
Age (years)	*22.2(1.7)	
Gender		
Male	27(25.2)	21(20.2)
Female	80(74.8)	83(79.8)
Ethnicity		
Malay	107(100.0)	104(100.0)
Household Income		
T20	37(34.6)	20(19.2)
M40	36(33.6)	36(34.6)
B40	30(28.0)	47(45.2)
PGK	4(3.7)	1(1.0)

*Mean (sd)

Prevalence of internet addiction

Table 2 described prevalence of internet addiction among medical and non-medical students of IIUM. According to Xi Lu *et al.* (2015), an individual who gets IAT total score between 0 and 30 is deemed as normal Internet user, between 31 and 49 mild Internet user, between 50 and 79 moderate pathological internet users (PIU), and between 80 and 100 he is supposed to suffer from severe PIU. This study shows that more than half of medical students and non-medical students are under moderate PIU, namely (67.3%) and (65.4%), respectively. About 30% of medical students and non-medical students are categorized into mild addiction or mild internet user. There are more non-medical students than medical students who are severely PIU, namely 5% among non-medical students and 2% among medical students.

Table 2. Prevalence of internet addiction among medical students and non-medical students of IIUM Kuantan (N=211).

Internet Addiction	Medical Students		Non-medical Students	
	n	%	n	%
Mild	33	30.8	31	29.8
Moderate	72	67.3	68	65.4
Severe	2	1.9	5	4.8

Information on the internet usage for medical and non-medical students of IIUM Kuantan

Information about the internet usage of medical and non-medical students at IIUM Kuantan can be found in Table 3. Regarding the type of devices used, all medical students and non-medical students use smartphones to browse the internet, which means that every student owns a smartphone (100%). Furthermore, more than 80% of medical and non-medical students used laptops to browse the internet. In contrast, most students do not use smart TVs or tablets to browse the internet. Interestingly, there is only one student who has used the internet via a smartwatch.

In terms of similarity, both medical and non-medical students (more than 90%) used the internet for communication, entertainment, and social networking. In addition, more than half of both medical and non-medical students used the internet for online banking, shopping, and as a search engine.

However, more non-medical students than medical students used the internet for gaming, TV, and news, while a higher percentage of medical students used the internet for educational purposes.

It is also observed that most medical students spent 1-4 hours per day on the internet, while most non-medical students spent 4-6 hours per day on the internet. We can also observe a difference in the pattern of internet usage per day: The majority (91%) of medical students used the internet from 6 p.m. to 12 a.m., and very few used the internet outside these hours. In contrast, among non-medical students, 22% used the internet from noon to 6 p.m. and 67% used the internet from 6 p.m. to noon.

Association of internet addiction with age, duration spend on internet, online banking, social network, and internet TV

Table 4 and 5 is the multiple logistic regression analysis after simultaneous adjustment with possible risk factors. It showed that duration of internet use and age were the protective factors for medical students. Students who used the internet for 4-6 hours had a 77% lower risk of suffering from internet addiction than students who used the internet for more than 6 hours. Regarding age, internet addiction was 23.5% less likely when age increased by 1 unit.

Table 3. Information on the internet usage for medical and non-medical students of IIUM Kuantan.

Characteristic	Variables	Medical Students		Non-medical Students	
		n	%	n	%
Gadget for internet usage					
Smartphone	Yes	107	100.0	104	100.0
	No	0	0.0	0	0.0
Laptop	Yes	93	86.9	87	83.7
	No	14	13.1	17	16.3
Smart TV	Yes	6	5.6	7	6.7
	No	101	94.4	97	93.3
Tablet	Yes	21	19.6	11	10.6
	No	86	80.4	93	89.4
Smartwatch	Yes	0	0.0	1	1.0
	No	107	100.0	103	99.0
Purpose of internet usage					
Communication	Yes	106	99.1	102	98.1
	No	1	0.9	2	1.9
Online banking	Yes	68	63.6	71	68.3
	No	39	36.4	33	31.7
Entertainment	Yes	100	93.5	95	91.3
	No	7	6.5	9	8.7
Social network	Yes	103	96.3	95	91.3
	No	4	3.7	9	8.7
Shopping	Yes	60	56.1	62	59.6
	No	47	43.9	42	40.4
Games	Yes	48	44.9	54	51.9
	No	47	43.9	50	48.1
Internet TV	Yes	11	10.3	17	16.3
	No	96	89.7	87	83.7
Education	Yes	79	73.8	64	61.5
	No	28	26.2	40	38.5
News	Yes	45	42.1	49	47.1
	No	62	57.9	55	52.9
Search engine	Yes	92	86.0	88	84.6
	No	15	14.0	16	15.4
Duration spends on internet usage per day					
	1-4 hours	48	44.9	37	35.6
	4-6 hours	30	28	38	36.5
	> 6 hours	29	27.1	29	27.9
The usual time of using the Internet					
	6am-12pm	3	2.8	11	10.6
	12pm-6pm	6	5.6	23	22.1
	6pm-12am	97	90.7	70	67.3
	12am-6am	1	0.9	0	0.0

In contrast, among non-medical students, the significant associated factors were duration of internet use, internet use for social networking, and internet TV. Students who used the internet for 1-4 hours were 75% less likely to have internet addiction than those who used the internet for more than 6 hours. Those who used the internet for social networking were 85% less likely to have an internet addiction than those who did not use the internet for social networking. Those who used the internet for TV were 3 times more likely to have an internet addiction than those who did not use the internet. Otherwise, the other variables were not significant.

Table 4. Factors associated with internet addiction among medical students of IIUM Kuantan.

Medical students				
	Variables	Internet Addiction		
		aOR	95% CI	P
Time	1 - 4 hours	0.482	0.151 - 1.536	0.217
	4 - 6 hours	0.235	0.068 - 0.812	0.022
	> 6 hours	1		
Age		0.765	0.593 - 0.988	0.04

Table 5. Factors associated with internet addiction among non-medical students of IIUM Kuantan.

Non-medical students				
	Variables	Internet Addiction		
		aOR	95% CI	P
Time	1 - 4 hours	0.247	0.06 - 0.911	0.036
	4 - 6 hours	0.394	0.105 - 1.482	0.168
	> 6 hours	1		
Social Network	Yes	0.137	0.03 - 0.636	0.011
	No	1		
Internet TV	Yes	3.574	1.057 - 12.08	0.04
	No	1		

Discussion

67.3% of medical students and 65.4% of non-medical students are moderately addicted to the internet, followed by mild addiction (medical students: 30.8%, non-medical: 29.8%) and severe addiction (medical students: 1.9% and non-medical students: 4.8%). The prevalence is similar in both groups. However, more non-medical students are found in the severe addiction group. Of concern is that there are no students without addiction in either group. In a study conducted in Malaysia among UPM medical students, the prevalence of internet addiction was 36.9%, which is lower than our study (Ching *et al.*, 2017). Another study

from China also showed a lower prevalence of internet addiction, which was only 16.2% (Liu *et al.*, 2010). According to Pramanik *et al.* (2012), their findings reflect that many medical students suffer from mild to moderate addiction. In another journal by Razieh *et al.* (2012), the prevalence of non-medical students in universities in Iran was higher than that of severely addicted students, which is consistent with our findings.

The high prevalence of internet addiction in our study may be due to good internet access (Gedam *et al.,* 2018). According to Frangos *et al.* (2010), university students are most likely to develop internet addiction because internet access is freely available in the dormitory, and parents do not intervene. Another possible explanation for the high prevalence could be the high-stress level among medical and non-medical students, as reported in one of the local studies, in which 18.6% of the university students had moderate, and 5.1% had severe or extreme stress levels (Shamsuddin *et al.*, 2013). Consequently, the internet became their escape mechanism to relieve stress (Ceyhan, 2008). A study by Akin and Iskender (2011) on Turkish medical students showed that internet addiction was positively associated with depression, anxiety, and stress.

Our study had a balanced number of medical and non-medical participants, 107 and 104 students. In this study, male students outnumbered female students in both courses, which was also observed in a study done by UNISZA in Malaysia (Haque *et al.,* 2016). Furthermore, the average age of the students in this study was 22 years, which is slightly similar to another study in Malaysia with an average age of 21 years (Ching *et al.,* 2017). In addition, the results showed that most medical and non-medical students were from families with higher income groups between T20 and M40, which is consistent with another study by Al-Naggar *et al.* (2011) on university students that found similar results.

Overall, the preferred devices for internet use among medical and non-medical students were smartphones and laptops.

According to Srijampana *et al.* (2014), most medical students used mobile phones to access the internet, while laptops were the second most used device.

In our study, the internet was mainly used by both medical and non-medical students for communication, entertainment, and social networking. In another study, medical students with addiction problems used the internet mainly for social networking and chatting (Srijampana *et al.,* 2014). Students with internet addiction prefer to use the internet for nonessential purposes, such as social networking, rather than educational purposes, which may be due to the psychological characteristics of young adults, free access to internet services, and limited or no parental supervision (Gedam *et al.,* 2018).

Our results show that non-medical students tend to use the internet more for gaming, internet television, and news, whereas medical students tend to use it more for educational purposes. However, a comparative study of medical and dental students found that both used the same nonessential purposes, such as social networking and gaming (Gedam *et al.,* 2018). Furthermore, this study also shows that the duration of internet use per day was longer for the non-medical students. It could be due to the nature of their course of study, in which they may have days with fewer classes than medical students. A cross-sectional study among art, engineering, and medical students found that time spent on the internet per day was significantly associated with non-medical, art, and engineering students (Ganapathi, 2015).

Most of the time, both medical and non-medical students surfed the internet at a similar time, from 6 pm to 12 am. This could be because students are usually off during this time. Similar results were observed in Bhola & Mahakud's (2014) study of college students, where 90% of the participants used the internet during the night or late evening, while only 10% used it during the day. They concluded that this could be due to the sense of privacy that college students

want to maintain with fewer distractions during the evening hours.

Our study showed that time spent using the internet was significantly associated with internet addiction in both medical and non-medical students. Medical students who used the internet for 4-6 hours were 77% less likely to have internet addiction than students who used the internet for more than 6 hours (p=0.022).

Similarly, non-medical students who used the internet for 1-4 hours were 75% less likely to be addicted to the internet than those who used the internet for more than 6 hours (p=0.036). Therefore, it can be assumed that students who use the internet for more than 6 hours are most probably more likely to be addicted. However, in this study, the majority of both medical and non-medical students used the internet for less than 6 hours.

previous studies have shown that more time spent on the internet is significantly associated with addiction. A study conducted by Chaudhari *et al*. (2015) among medical students in an urban area of Western Maharashtra showed that more time spent on the internet daily was significantly associated with internet addiction.

The duration of time spent on the internet may be associated with the purpose of internet use. Most medical students used the internet for educational purposes (73.8%) compared to non-medical students who used the internet primarily for social networking (61.5%). Again, this could be related to the type of study, as medical students with a heavier curriculum are more likely to use the internet in their free time to revise and study than non-medical students. A study by Siraj *et al.* (2015) among 186 4th year medical students at Universiti Kebangsaan Malaysia (UKM) in 2011-2012 confirmed this. It found that students used the internet mainly for courses and assignments and that users who used the internet for more than 6 hours had higher CGPA.

We also found that 14% of non-medical students were more likely to have an internet addiction if they used the internet for social networking than those who used it for other purposes (p=0.011). In comparison, internet use for social networking was not a significant factor for internet addiction among medical students. This finding is consistent with Jafarkarimi et al. (2016) study, which found that 47% of Universiti Teknologi Malaysia (UTM) participants were addicted to Facebook, the most popular social network with more than 2.2 billion users. Compared to medical students who may have busy schedules and heavy subjects, non-medical students have the privilege of having more free time and easier subjects that do not require constant studying to use the internet for social networking.

Nowadays, students prefer to use the internet rather than television to watch their favourite shows, such as football games or a current television dramas. One of the many reasons for this is that there was only one TV for each dormitory block, and the range of TV channels was limited. On the other hand, internet TV offers the advantage of being able to watch any program at any time. Students also have high-speed internet access on campus. In our study, internet TV was found to be significantly associated with internet addiction among non-medical students (p-value=0.04). Students who use the internet for TV are 3 times more likely to be addicted to the internet. Approximately 16% of non-medical students are addicted to the internet using the internet for TV. This is consistent with a study by Moghavvemi *et al.* (2017) in which 20% of YouTube users are addicted. In comparison, fewer medical students who were addicted used the internet for TV (10%). Thus, it could be concluded that medical students are less interested in the internet TV or do not have more free time than non-medical students.

Our study shows that age significantly affects internet addiction in medical students (p-value=0.04). Internet addiction was 77% less likely for every one-unit increase in age. This is supported by a study by Mak *et al.* (2014), which found that students aged 20

years and younger were four times more likely to develop internet addiction. Younger age was a related factor for internet addiction (Lin *et al.*, 2011). This could be because students at older ages have better self-control and time management. In addition, medical students in their fourth and final year of study are more engaged in clinical work than preclinical medical students.

Conclusion

The prevalence of internet addiction in our study was almost the same for both medical and non-medical students except that there was a slightly higher percentage of non-medical students who were severely addicted. In this study, internet usage for social networks and TV are significant factors for internet addiction. Because six in every ten students in IIUM Kuantan are moderately addicted to the Internet, thus some measures should be taken into action. Health promotion programs concerning internet addiction are advisable to be implemented to ensure the good psychological well-being of students.

Limitations

The major limitation of this study was in terms of generalizability since it was conducted in a single centre. Therefore, a multicenter population-based study was highly recommended to confirm the association between internet addiction and university students.

The sample size in this study was not significant since the overall population in the study size was small. Thus, the results that were obtained in this study cannot represent the prevalence of internet addiction among university students in Malaysia.

Furthermore, the sampling method used in this study was convenient sampling, a non-probability sample. Therefore, once again, this study cannot be generalized. Moreover, this study did perform comparison analyses

between medical and non-medical students. Hence, the differences between both groups could not be statistically determined as significant. Therefore, it is recommended to do advanced regression analysis in future studies.

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References

Akin, A., Iskender, M. (2011). Internet addiction and depression, anxiety and stress. *International Online Journal of Educational Sciences*, 3(1),138–148.

Al-Naggar, R., Al-Dubai, S., Al-Naggar, T., Chen, R., Al-Jashamy, K. (2011). Prevalence and associated factors of smoking among Malaysian university students. *Asian Pacific Organization for Cancer Prevention International Association of Cancer Registries*, 12:619.

Bhola, R., Mahakud, G. (2014). A qualitative analysis of social networking usage. *International Journal of Research & Development of Health*, 2(1), 34–44.

Ceyhan, A.A. (2008). Predictors of problematic internet use on Turkish university students. *CyberPsychology & Behavior*, 11(3), 363-366.

Chaudhari, B., Menon, P., Saldanha, D., Tewari, A., Bhattacharya, L. (2015). Internet addiction and its determinants among medical students. *Industrial Psychiatry Journal*, 24(2),158.

Cheng, C., Li, A.Y. (2014). Internet addiction prevalence and quality of (real) life: A meta-analysis of 31 nations across seven world regions. *Cyberpsychology, Behavior, and Social Networking*, 17(12):755–760.

Ching, S.M., Awang, H., Ramachandran, V., Lim, S., Sulaiman, W., Foo, Y. *et al.* (2017) Prevalence and factors associated with internet addiction among medical students-A cross-sectional study in Malaysia. *The Medical Journal of Malaysia*, 72(1),7–11.

Chong Guan, N., Isa, S.M., Hashim, A.H., Pillai, S.K., Harbajan Singh, M.K. (2015). Validity of the Malay version of the internet addiction test. *Asia Pacific Journal of Public Health,* 31;27(2):NP2210–9.

Frangos, C.C., Fragkos, K.C., Kiohos, A. (2010). Internet addiction among Greek university students:

Demographic associations with the phenomenon, using the Greek version of Young's Internet Addiction Test. *International Journal of Economic Sciences and Applied Research*, 3(1), 49–74.

Ganapathi, A.V.P.R.C. (2015). Internet addiction and associated factors: a study among college students in South India. *Innovative Journal of Medical and Health Science,* 5(3),121–125.

Gedam, S.R., Shivji, I.A., Goyal, A., Modi, L., Ghosh, S. (2018). Comparison of internet addiction, pattern, and psychopathology between medical and dental students. *Asian Journal of Psychiatry*, 22,105–110.

Griffiths, M. (2000). Internet Addiction - Time to be taken seriously? *Addiction Research*, 8(5),413–418.

Haghighi, B.T., Othman, M., Hashim, F.H. (2011). Internet addiction and dependency: A case study in UNITEN, Malaysia. In: *ICIMU 2011: Proceedings of the 5th International Conference on Information Technology & Multimedia*. p. 1–4.

Haque, M., Rahman, N.A.A., Majumder, M.A.A., Haque, S.Z., Kamal, Z.M., Islam, Z., *et al.* (2016). Internet use and addiction among medical students of Universiti Sultan Zainal Abidin, Malaysia. *Psychology Research and Behavior Management*, 9,297.

Jafarkarimi, H., Sim, A.T.H., Saadatdoost, R., Hee, J.M. (2016). Facebook addiction among Malaysian students. *International Journal of Information and Education Technology*, 6(6),465–469.

Kandell, J.J. (1998) Internet addiction on campus: The vulnerability of college students. *Cyberpsychology & Behavior*, 1(1),11–17.

Kapahi, A., Ling, C., Ramadass, S., Abdullah, N. (2013). Internet addiction in Malaysia causes and effects. *iBusiness*. 05(02),72–76.

Kuss, D.J., Griffiths, M.D., Binder, J.F. (2013) Internet addiction in students: Prevalence and risk factors. *Computers in Human Behavior*, 29(3),959–966.

Leung, L., Lee, P.S. (2012) Impact of internet literacy, internet addiction symptoms, and internet activities on academic performance. *Social Science Computer Review*, 30(4),403–418.

Lin, M-P., Ko, H-C., Wu, JY-W. (2011) Prevalence and psychosocial risk factors associated with internet addiction in a nationally representative sample of college students in Taiwan. *Cyberpsychology, Behavior, and Social Networking*, 14(12),741–746.

Liu, X., Bao, Z., Wang, Z. (2010). Internet use and internet addiction disorder among medical students: A case from China. *Asian Social Science*, 6(1),28–34.

Mak, K-K., Lai, C-M., Watanabe, H., Kim, D-I., Bahar, N., Ramos, M., *et al.* (2014) Epidemiology of internet behaviors and addiction among adolescents in six Asian Countries. *Cyberpsychology, Behavior, and Social Networking*, 17(11),720–728.

Moghavvemi, S., Sulaiman, A.B., Jaafar, N.I.B., Kasem, N. (2017). Facebook and YouTube addiction: the usage pattern of Malaysian students. In: *International Conference on Research and Innovation in Information Systems (ICRIIS)*. p. 1–6.

Mythily, S., Qiu, S., Winslow, M. (2013). Prevalence and correlates of excessive internet use among youth in Singapore. *Annals of the Academy of Medicine Singapore*, 37(1),9–14.

Pramanik, T., Sherpa, M., Shrestha, R. (2012) Internet addiction in a group of medical students: A cross-sectional study. *Nepal Medical College Journal*, 14(1),46–48.

Razieh, J., Ali, G., Zaman, A., Narjesskhatoon, S. (2012). The relationship between internet addiction and anxiety in the universities' students. *Interdisciplinary Journal of Contemporary Research in Business*, 4, 942–949.

Salehi, M., Khalili, N.M., Hojjat, S.K., Salehi, M., Danesh, A. (2014). Prevalence of internet addiction and associated factors among medical students from mashhad. *Iranian Red Crescent Medical Journal*, 16(5).

Shamsuddin, K., Fadzil, F., Ismail, W.S.W., Shah, S.A., Omar, K., Muhammad, N.A., *et al.* (2013). Correlates of depression, anxiety and stress among Malaysian university students. *Asian Journal of Psychiatry*, 6(4),318–323.

Siraj, H.H., Salam, A.F., Ashiqin, N., Hasan, B., Hasan, N.A., Jin, T.H., *et al.* (2015). Internet usage and academic performance: A study in a Malaysian public university. *International Medical Journal*, 22,83-86.

Srijampana, V.V.G.R., Endreddy, A.R., Prabhath, K., Rajana, B. (2014). Prevalence and patterns of internet addiction among medical students. *Medical Journal of Dr. DY Patil University*, 7(6),709.

Xi, Lu., Kee, J.Y. (2015). Psychometric properties of the internet addiction test in a sample of Malaysian undergraduate students. *Psicología Educativa,* 21, 17-25.

Young, K. (1998). *Caught in the net: how to recognize the signs of internet addiction and a winning strategy for recovery*. New York: John Wiley & Sons, Inc.

Zhang, L., Amos, C., McDowell, W.C. (2008). A comparative study of Internet addiction between the United States and China. *CyberPsychology & Behavior*, 11(6),727–729.