Sultan Qaboos University Med J, May 2019, Vol. 19, Iss. 2, pp. e142–147, Epub. 8 Sep 19
Submitted 10 Sep 18
Revisions Req. 25 Oct & 10 Jan 19; Revisions Recd. 11 Dec & 20 Jan 19
Accepted 26 Jan 19
https://doi.org/10.18295/squmj.2019.19.02.010

CLINICAL & BASIC RESEARCH

Internet Use and Addiction Among Medical Students in Qassim University, Saudi Arabia

*Mohamed H. Taha,[1,2] Khalid Shehzad,[3] Ahmad S. Alamro,[2] Majed Wadi[2]

إستخدام وإدمان الإنترنت عند طلاب كلية الطب بجامعة القصيم بالمملكة العربية السعودية

محمد حسن طه، خالد شهزاد، أحمد صالح العمرو، ماجد وادي

abstract: ***Objectives:*** This study aimed to measure the prevalence of Internet use and addiction and determine its association with gender, academic performance and health among medical students. ***Methods:*** This cross-sectional study was conducted between December 2017 and April 2018 at the College of Medicine, Qassim University, Buraydah, Saudi Arabia. The validated Internet Addiction Test questionnaire was distributed by simple random methods to medical students (N = 216) in the pre-clinical phase (first-, second- and third-years). A chi-square test was used to determine significant relationships between Internet use and addiction and gender, academic performance and health. ***Results:*** A total of 209 student completed the questionnaire (response rate: 96.8%) and the majority (57.9%) were male. In total, 12.4% were addicted to the Internet and 57.9 had the potential to become addicted. Females were more frequent Internet users than males (P = 0.006). Academic performance was affected in 63.1% of students and 71.8% lost sleep due to late-night Internet use, which affected their attendance to morning activities. The majority (59.7%) expressed feeling depressed, moody or nervous when they were offline. ***Conclusion:*** Internet addiction among medical students at Qassim University was very high, with addiction affecting academic performance and psychological well-being. Suitable interventional and preventive measures are needed for proper Internet use to protect students' mental and physical health.

Keywords: Internet; Addictive Behavior; Medical Students; Universities; Academic Performance; Saudi Arabia.

الملخص: الهدف: هدفت هذه الدراسة إلى قياس مدى انتشار استخدام الإنترنت وادمانه وتحديد ارتباط ذلك بالجنس والأداء الأكاديمي والصحة بين طلاب الطب بجامعة القصيم. **الطريقة:** أجريت هذه الدراسة المقطعية بين ديسمبر 2017 وأبريل 2018 في كلية الطب، جامعة القصيم، بريدة، المملكة العربية السعودية. تم توزيع استبيان اختبار إدمان الإنترنت الموثوق بطريقة عشوائية على طلاب كلية الطب وعددهم 216 في المرحلة ما قبل السريرية (السنوات الأولى والثانية والثالثة). تم استخدام اختبار مربع كاي لتحديد العلاقات ذات الدلالة الإحصائية بين استخدام الإنترنت والإدمان على إستخدامه وجنس الطالب وأدائه الأكاديمي وصحته. **النتائج:** أكمل 209 طلاب الاستبيان (معدل الاستجابة: 96.8%) وكانت الغالبية (57.9%) من الذكور. في المجموع، كان 12.4% مدمنين على الإنترنت و 57.9% لديهم القابلية على أن يصبحوا مدمنين. كانت الإناث أكثر تواتراً من الذكور (P = 0.006) في استخدام الانترنت. تأثر الأداء الأكاديمي في 63.1% من الطلاب وعانى 71.8% من الطلاب من قلة النوم بسبب الاستخدام في وقت متأخر من الليل، مما أثر على حضورهم للأنشطة الصباحية. أعربت الأغلبية (59.7%) عن شعورهم بالاكتئاب أو المزاج أو التوتر أثناء عدم الاتصال. **الخلاصة:** كان إدمان الإنترنت بين طلاب الطب بجامعة القصيم مرتفعًا جدًا، حيث كان للإدمان تأثير على الأداء الأكاديمي والصحة النفسية. هناك حاجة إلى تدابير تدخلية ووقائية مناسبة للاستخدام المناسب للإنترنت لحماية صحة الطلاب العقلية والبدنية.

الكلمات المفتاحية: الإنترنت؛ سلوك الإدمان؛ طلاب الطب؛ الجامعات؛ الأداء الأكاديمي؛ العربية السعودية.

Advances in Knowledge

- *The findings of this study indicate that Internet use and addiction among medical students at Qassim University, Buraydah, Saudi Arabia, is very high.*
- *Internet addiction ultimately affects students' academic performance and psychological well-being.*

Application to Patient Care

- *This study highlights the effect of Internet use and related health issues among medical students at Qassim University.*
- *Students would benefit from decreased Internet use to the level of not being addicted, which may also help improve health and academic performance.*

Addiction is defined as a "compulsive need for and use of a habit-forming substance," characterised by tolerance and well-defined physiological symptoms upon withdrawal; or broadly, "persistent compulsive use of a substance known by the user to be harmful".[1] Kandell defined Internet addiction

[1]College of Medicine & Medical Education Center, University of Sharjah, Sharjah, United Arab Emirates; Departments of [2]Medical Education and [3]Anatomy, College of Medicine, Qassim University, Buraydah, Saudi Arabia
*Corresponding Author's e-mails: mtaha@sharjah.ac.ae and mohamedhassantaha@gmail.com

(IA) as "a kind of psychological addiction representing the need to be active on the Internet".[2] Griffiths described IA as "a kind of technology addiction and a behavioural addiction similar to a gambling habit".[3]

Problematic use of computers is a growing social issue which has been debated worldwide due to its potentially addictive qualities.[4] Internet addicts prioritise the Internet and can cause severe stress on family, friends, work or the work environment.[4] In IA, unmanageable behaviours include compulsive use, a mental preoccupation with being online, lying or hiding the extent of true online behaviour and an inability to control online behaviour; no single behaviour pattern defines IA.

As with other addictions, IA provides a "high" feeling and addicts become dependent on that feeling. Internet addicts choose temporary gratification rather than seeking normal intimate relationships.[5] Furthermore, this addiction follows the progressive nature of other addictions: addicts struggle to control their behaviour but remain unsuccessful in their constant failure to do so, their loss of self-esteem grows, pushing them to proceed further into their addictive behaviours and finally, addicts experience a sense of powerlessness.[6] Evidence suggests that there can be a genetic predisposition to addictive behaviours.[4–6]

IA is highly prevalent, especially among students and teens.[7] Wieland *et al*. reported that in 2005 "around nine to fifteen million people in the United States used the Internet on a daily basis".[8] Furthermore, the rate of Internet use has increased 25% every three months. The prevalence rates of problematic Internet use is 30% or more in Chinese, Taiwanese and Korean populations. The overall prevalence rates of IA in North America and Europe is 1.5–8.2%.[9]

Arab News reported in 2014 that Saudis are "wasting" eight hours a day on the Internet. Rashad Faqiha, an expert in human development, stated that "7.6 million Saudi users have accounts on Facebook, more than 4.8 million use Twitter, and more than 1 million are on LinkedIn. Moreover, Saudis view YouTube videos 290 million times a day".[10]

This study aimed to measure the prevalence of Internet use and addiction among medical students at Qassim University, Buraydah, Saudi Arabia and determine associations between Internet use and sleep, eating habits, weight changes, exercise habits and academic performance. To the best of the authors' knowledge, this is the first study to analyse Internet use and determine the prevalence of IA in this setting.

Methods

This cross-sectional study was conducted at the College of Medicine, Qassim University from December 2017 to April 2018 using the Internet Addiction Test (IAT) questionnaire. The validated IAT questionnaire has been utilised in studies in Italy, Japan, Hong Kong, Kuwait, Malaysia and Egypt.[11–16] The IAT questionnaire is a commonly used screening tool that examines uncontrollable Internet use.[16] For the current study, the questionnaire was adjusted and sociodemographic parameters were added to the context of Saudi Arabia. A simple random sampling technique was used to collect data. The sample size was calculated using the following formula:

$$N = Z^2 \times P \times \frac{(1-P)}{d} \qquad \text{[Equation 1]}$$

where N is the sample size, Z is the Z statistic for the level of confidence, P is the expected prevalence or proportion (if expected prevalence is 20%, then $P = 0.2$) and d is the precision (if the precision is 5%, then $d = 0.05$).[17]

The sample size calculated was 216 [Equation 1], which was confirmed using a sample size calculator.[18] The population constituted 443 pre-clinical (in the first-, second- and third-year of the academic phase of training) medical students at Qassim University's College of Medicine. The questionnaire was distributed to 216 students.

The questionnaire was translated by forward and backward translation following recommended guidelines. The original English questionnaire items were included next to the Arabic translated items. Forward translation into Arabic was independently carried out by one bilingual professional translator (native Arabic speaker) and one bilingual psychiatrist who was familiar with the related terminology. The translators were asked to use standardised literary Arabic. The translations emphasised conceptual and cultural meanings rather than literal translations.

The questionnaire comprised 20 questions that examined the symptoms of IA based a five-point Likert scale (0 = not applicable, 1 = rarely, 2 = occasionally, 3 = frequently, 4 = often, 5 = always). The severity of IA according to the IAT was as follows: 0–30 points is 'no addiction'; 31–49 points is 'mild addiction'; 50–79 points is 'moderate addiction'; and 80–100 points is 'severe addiction'.

Sociodemographic data included age, gender, year of study, living situation and body mass index (BMI). Two other sections about Internet use and health, and Internet use and academic performance were added to the original questionnaire. The questionnaire was pretested on 30 students, who were not included in the present study, to ensure that the instructions and items were easily understandable and appropriate for this study. Most parts of the questionnaire revealed acceptable Cronbach's alpha values (mean = 0.917)

ranging between 0.873–0.961, which indicated that both instruments possessed good internal consistency and reliability.

Data were analysed using the Statistical Package for the Social Sciences (SPSS), Version 20.0 (IBM Corp., Armonk, New York, USA). Various descriptive statistics were used to calculate frequencies, means and standard deviation. A chi-square test was used to assess associations between Internet use and sleep, BMI, eating and exercise habits and academic performance.

Ethical approval was obtained from the Institutional Review Board and permission to conduct the study was given by the Dean of the College of Medicine (72/K/6-2017). Informed consent was obtained from all participants and confidentiality was ensured including the right to withdraw participation at any time.

Results

A total of 209 student completed the questionnaire (response rate: 96.8%) and the majority were male (57.9%). Most respondents (80.4%) were living with their families [Table 1]. The IAT showed that 12.4% were addicted to the Internet and 57.9% had the potential to become addicted [Table 2].

The majority (82.3%) of participants reported at least frequently staying online longer than intended. Most participants stated that at least frequently their academic performance was affected (62.2%), they would become defensive or secretive when anyone asked about their online presence (60.7%) and that they lost sleep because of late-night Internet use (70.8%), which affected their attendance at morning activities. More than half of the participants (58.9%) at least frequently expressed feeling depressed, moody or nervous when they were offline [Table 3].

Females indicated using the Internet significantly more than males (P = 0.006) and second-year students more than first- or third-year students (P = 0.001). There was a significant difference between the total IAT score and neck pain (P = 0.03) and a state of sleeplessness because of staying online (P = 0.006). However, there was no significant difference between total IAT score and BMI (P = 0.618), although, there was a statistically significant difference when students were asked if Internet use can lead to weight gain or loss (P = 0.002) [Table 4]. Study respondents also reported health problems including headaches, backache, weight gain, neck pain and other psychological problems as a result of Internet use [Figure 1].

Table 1: Characteristics of medical students who completed the Internet Addiction Test questionnaire at Qassim University, Buraydah, Saudi Arabia (N = 209)

Characteristic		n (%)		
		Male (n = 121)	Female (n = 88)	Total
Age in years	18–22	82 (67.8)	19 (21.6)	101 (48.3)
	23–26	38 (31.4)	67 (76.1)	105 (50.2)
	>26	1 (0.8)	2 (2.3)	3 (1.4)
BMI in kg/m^2	<18.5	25 (20.7)	23 (26.1)	48 (23)
	18.5–24.9	57 (47.1)	50 (56.8)	107 (51.2)
	25–29.9	22 (18.2)	14 (15.9)	36 (17.2)
	≥30	17 (14)	1 (1.1)	18 (8.6)
Academic year of university education	First year	46 (38)	23 (26.1)	69 (33)
	Second year	30 (24.8)	38 (43.2)	68 (32.5)
	Third year	45 (37.2)	27 (30.7)	72 (34.4)
Living/ residence status	Alone in college accommodation	20 (16.5)	3 (3.4)	23 (11)
	With family	86 (71.1)	79 (92.9)	168 (80.4)
	Alone off-campus	13 (10.7)	3 (3.5)	16 (7.7)
	Other	2 (1.7)	0 (0)	2 (1)

BMI = body mass index.

Table 2: Distribution of Internet Addiction Test scores among medical students (N = 209)

IAT score	n (%)
Lower than average	6 (2.9)
Average user	56 (26.8)
Possible addict	121 (57.9)
Addict	26 (12.4)

IAT =Internet Addiction Test.

Discussion

IA is a psychological issue with potential sociological effects.[19] The American Psychiatric Association included IA as a disorder in its supplement of the Diagnostic and Statistical Manual for Mental Disorders, Fifth Edition.[20] The current study showed that more than 80% of students at least frequently stayed online longer than intended. This finding is supported by Uzun *et al.*'s study conducted at a Turkish university.[19]

This study showed that 72.8% at least frequently neglected their household chores to spend more time online, which was slightly more than a study conducted at the Malaysian School of Medicine and more than a study conducted in Japan.[13,15] The present findings on respondents' preferences for Internet use over interaction with partners, colleagues and friends were inline with findings of studies conducted in Kuwait, Egypt and India, but was much lower than a study conducted at

Table 3: Distribution of Internet Addiction Test responses among medical students (N = 209)

Items	n (%)					
	Does not apply	Rarely	Occasionally	Frequently	Often	Always
Stay online longer than intended.	6 (2.9)	8 (3.8)	23 (11)	24 (11.5)	50 (23.9)	98 (46.9)
Neglect household chores to spend more time online.	7 (3.3)	13 (6.2)	37 (17.7)	42 (20.1)	85 (40.7)	25 (12)
Prefer Internet use to interaction with partner/ friends/colleagues.	43 (20.6)	24 (11.5)	25 (12)	64 (30.6)	39 (18.7)	14 (6.7)
Form new relationships online with fellow Internet users.	32 (15.3)	14 (6.7)	34 (16.3)	52 (24.9)	46 (22)	31 (14.8)
Others complain about the amount of time you spend online.	22 (10.5)	30 (14.4)	49 (23.4)	52 (24.9)	38 (18.2)	18 (8.6)
Grades or school-work suffer due to the amount of time you spend online.	16 (7.7)	29 (13.9)	38 (18.2)	60 (28.7)	36 (17.2)	30 (14.4)
Check e-mail before completing other necessary tasks.	20 (9.6)	27 (12.9)	40 (19.1)	56 (26.8)	47 (22.5)	19 (9.1)
Academic performance/attendance in awake time suffers due to Internet use.	18 (8.6)	24 (11.5)	37 (17.7)	64 (30.6)	41 (19.6)	25 (12)
Become defensive or secretive when anyone asks you about your online presence.	9 (4.3)	36 (17.2)	37 (17.7)	57 (27.3)	49 (23.4)	21 (10)
Block out disturbing thoughts about your life with soothing thoughts about the Internet.	10 (4.8)	26 (12.4)	30 (14.4)	60 (28.7)	44 (21.1)	39 (18.7)
Find yourself anticipating when you will go online again.	9 (4.3)	19 (9.1)	34 (16.3)	63 (30.1)	41 (19.6)	43 (20.6)
Fear that life without the Internet would be boring, empty and joyless.	8 (3.8)	22 (10.5)	34 (16.3)	56 (26.8)	46 (22)	43 (20.6)
Snap, yell or act annoyed if someone interrupts you while you are online.	15 (7.2)	33 (15.8)	41 (19.6)	63 (30.1)	35 (16.7)	22 (10.5)
Lose sleep due to late-night Internet use.	11 (5.3)	22 (10.5)	28 (13.4)	59 (28.2)	43 (20.6)	46 (22)
Feel preoccupied with the Internet when offline or fantasize about being online.	19 (9.1)	35 (16.7)	39 (18.7)	52 (24.9)	44 (21.1)	20 (9.6)
Find yourself saying "just a few more minutes" when online.	14 (6.7)	21 (10)	28 (13.4)	66 (31.6)	43 (20.6)	37 (17.7)
Try to cut-down the amount of time you spend online and fail.	18 (8.6)	15 (7.2)	34 (16.3)	59 (28.2)	51 (24.4)	32 (15.3)
Try to hide how long you have been online.	34 (16.3)	31 (14.8)	24 (11.5)	61 (29.2)	35 (16.7)	24 (11.5)
Choose to spend more time online than going out with others.	19 (9.1)	25 (12)	36 (17.2)	66 (31.6)	36 (17.2)	27 (12.9)
Feel depressed, moody or nervous when you are offline, which goes away once you are back online.	18 (8.6)	29 (13.9)	39 (18.7)	55 (26.3)	43 (20.6)	25 (12)

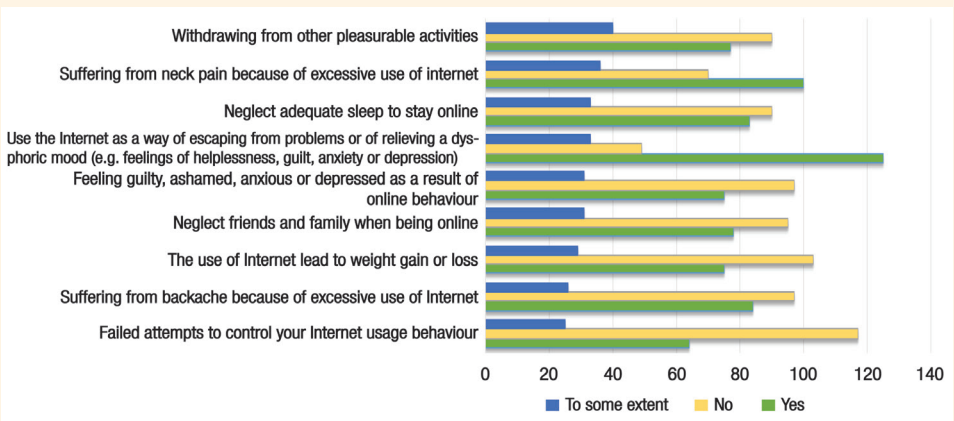

Figure 1: Frequency of relationship between Internet use and students' health (N = 209).

Table 4: Comparison between Internet Addiction Test scores of medical students and their characteristics and other variables (N = 209)

Characteristic		n (%)				χ^2	DF	*P* value*
		IAT score						
		Less than average	Average Internet user	Possible addict	Addict			
Gender	Male (n = 121)	2 (1.65)	39 (32.23)	72 (59.5)	8 (6.61)			
	Female (n = 88)	4 (4.55)	18 (20.45)	48 (54.55)	18 (20.45)	12.557	3	0.006
	Total	6 (2.87)	57 (27.27)	120 (57.42)	26 (12.44)			
BMI in kg/m²	<18.5	0 (0)	12 (25.53)	27 (57.45)	8 (17.02)			
	18.5–24.9	2 (1.89)	32 (30.19)	58 (54.72)	14 (13.21)	7.181	9	0.618
	25.0–29.9	2 (5.26)	10 (26.32)	24 (63.16)	2 (5.26)			
	≥30	1 (5.56)	4 (22.22)	11 (61.11)	2 (11.11)			
Academic year of university education	First year	8 (11.43)	16 (22.86)	37 (52.86)	9 (12.86)			
	Second year	7 (11.29)	13 (20.97)	29 (46.77)	13 (20.97)	46.005	12	0.001
	Third Year	5 (6.49)	17 (22.08)	51 (66.23)	4 (5.19)			
Suffering from neck pain because of excessive Internet use	Yes	0 (0)	22 (21.78)	64 (63.37)	15 (14.85)			
	No	2 (2.82)	22 (30.99)	39 (45.93)	8 (11.27)	13.961	6	0.03
	To some extent	3 (8.11)	15 (40.54)	16 (43.24)	3 (8.11)			
Neglecting adequate sleep to stay online	Yes	2 (2.41)	13 (15.66)	51 (61.45)	17 (20.48)			
	No	3 (3.33)	32 (35.56)	46 (51.11)	9 (10)	17.993	6	0.006
	To some extent	0 (0)	14 (38.89)	22 (61.11)	0 (0)			
Internet use has led to weight gain or loss	Yes	0 (0)	11 (14.67)	51 (68)	13 (17.33)			
	No	3 (2.88)	32 (30.77)	56 (53.85)	13 (12.5)	16.763	7	0.002
	To some extent	2 (6.67)	15 (50)	13 (43.33)	0 (0)			

*IAT = Internet Addiction Test; DF = degrees of freedom; BMI = body mass index. *Using chi-square test.*

an Italian high school.[12,14,16,21] The development of new relationships with fellow online users in the current study was consistent with other studies in developing and developed countries.[22,23] Approximately one-quarter of students received complaints about spending too much time online. This finding was lower than in a study conducted in Malaysia and Oman and much lower than in a study conducted in the USA.[9,15,24]

In the present study, almost two-thirds of students stated that their academic performance was affected by excessive Internet use. Many studies have reported the relationship between excessive Internet use and diminished academic performance.[25] In the present study, one-quarter of students stated that they check their e-mail before completing other necessary tasks. This proportion is much lower than in two studies conducted in Italy and the USA.[9,12] One-third of students declared that their attendance at class has been affected by excessive Internet use. This finding is lower than in other studies conducted in the region and slightly higher than in studies conducted in Western countries.[14,24,26]

Aydm and San stated that "self-esteem is an essential determinant of individuals' behaviours and activities" and determined that there is a robust connection between IA and self-esteem.[27] A large number of students (60.7%) in the present study showed defensive or secretive behaviour when anyone asked them about their online presence; these findings were in agreement with other findings in the literature.[17,26] The present study also showed that one-third of the students faced some obsessive behaviour related to Internet use. These findings are similar to those from a studies conducted in Malaysia, France and Hong Kong.[15,28,29] The current study showed that more than 70% of students at least frequently felt that excessive Internet use had affected their sleep; this finding is in-line with various studies that found that excessive Internet use can lead to sleep disorders, depression and low quality of work and study.[30–32]

However, the present study has some limitations. The results of this study cannot be generalised as only a small sample of students from one college in Saudi Arabia were included. Furthermore, it was not possible to conclude a cause-and-effect relationship between the factors and IA among students. The IAT instrument, although it gives some insight, does not fully differentiate between different types of Internet usage in relation to addiction. For example, some of the students may have been using the Internet for work- or research-related purposes. Further research is needed to determine the specific nature of Internet-based activities in order to determine the true level of IA in Qassim University's medical students.

Conclusion

IA is prevalent among medical students at Qassim University, showing that 12.4% of medical students are addicted to the Internet and 57.9% are at risk of becoming addicted. This study found a relationship between IA and students' health and their academic performance. Suitable interventional and preventive measures are needed to encourage proper Internet use to protect students' physical and mental health.

ACKNOWLEDGEMENT

The authors would like to thank all the students who participated in this study.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

FUNDING

No funding was received for this study.

References

1. Merriam-Webster's Dictionary. "addiction". From: https://www.merriam-webster.com/dictionary/addiction Accessed: Jan 2019.
2. Kandell. Internet addiction on campus: The vulnerability of college students. Cyberpsycho Behav 1998; 1:11–17.
3. Griffiths M. Does Internet and computer "addiction" exist? Some case study evidence. Cyberpsychol Behav 2000; 3:211–18. https://doi.org/10.1089/109493100316067.
4. Spada MM. An overview of problematic Internet use. Addictive Behav 2014; 1:3–6.
5. Young K. Internet addiction: Symptoms, evaluation and treatment. In: VandeCreek L, Jackson TL, Eds. Innovations in clinical practice: A source book. Florida, USA: Professional Resource Press, 1999; Pp. 351–2.
6. Reuter M, Montag C. Internet Addiction: Neuroscientific approaches and therapeutical interventions. New York, USA: Springer international Publishing, 2017. https://doi.org/10.1007/978-3-319-07242-5.
7. Kuss DJ, Lopez-Fernandez O. Internet addiction and problematic Internet use: A systematic review of clinical research. World J Psychiatry 2016; 6:143–76. https://doi.org/10.5498/wjp.v6.i1.143.
8. Wieland DM. Computer addiction: Implications for nursing psychotherapy practice. Perspect Psychiatr Care 2005; 41:153–61. https://doi.org/10.1111/j.1744-6163.2005.00038.x.
9. Weinstein A, Lejoyeux M. Internet addiction or excessive internet use. Am J Drug Alcohol Abuse 2010; 36:277–83. https://doi.org/10.3109/00952990.2010.491880.
10. Arab News. Expert: Saudis waste eight hours a day on Internet. Available at http://www.arabnews.com/saudi-arabia/news/680406 Accessed: Jan 2019.
11. Young K. Caught in the net: How to recognize the signs of Internet addiction – And a winning strategy for recovery. New York, USA: John Wiley & Sons, Inc., 1998. P. 31.
12. Bianchini V, Cecilia MR, Roncone R, Cofini V. Prevalence and factors associated with problematic internet use: An Italian survey among L'Aquila students. Riv Psichiatr 2017; 52:90–3. https://doi.org/10.1708/2679.27445.
13. Sato T. Internet addiction among students: Prevalence and psychological problems in Japan. Japan Med Assoc J 2006; 49:279–83.
14. Al-Menayes JJ. Dimensions of social media addiction among university students in Kuwait. Psychol Behav Sci 2015; 4:23–8. https://doi.org/10.11648/j.pbs.20150401.14.
15. Haque M, Rahman NA, Majumder MA, Haque SZ, Kamal ZM, Islam Z, et al. Internet use and addiction among medical students of Universiti Sultan Zainal Abidin, Malaysia. Psychol Res Behav Manag 2016; 9:297–307. https://doi.org/10.2147/PRBM.S119275.
16. Saied SM, Elsabagh HM, El-Afandy AM. Internet and Facebook addiction among Egyptian and Malaysian medical students: A comparative study, Tanta University, Egypt. Int J Community Med Public Health 2016; 3:1288–97. https://doi.org/10.18203/2394-6040.ijcmph20161400.
17. Srijampana VVGR, Endreddy AR, Prabhath K, Rajana B. Prevalence and patterns of internet addiction among medical students. Med J Dr DY Patil Univ 2014; 7:709–13. https://doi.org/10.4103/0975-2870.144851.
18. Creative Research System. Sample size calculator. From: www.surveysystem.com/sscalc.htm Accessed: Jan 2019.
19. Uzun AM, Unal E, Tokel ST. Exploring internet addiction, academic procrastination and general procrastination among pre-service ICT teachers. Mevlana Int J Educ 2014; 189–201. https://doi.org/10.13054/mije.14.18.4.1.
20. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th ed. Virginia, USA: American Psychiatric Association, 2013.
21. Patil SD, Deshmukh JS, Dagdiya KR. Prevalence and pattern of Internet addiction among medical students in Nagpur, Maharashtra. Int J Community Med Public Health 2017; 4:2412–16. https://doi.org/10.18203/2394-6040.ijcmph20172833.
22. Christakis DA, Moreno MM, Jelenchick L, Myaing MT, Zhou C. Problematic Internet usage in US college students: A pilot study. BMC Med 2011; 9:77. https://doi.org/10.1186/1741-7015-9-77.
23. Frangos CC, Frangos CC, Sotiropoulos I. A meta-analysis of the reliability of Young's Internet Addiction Test. From: http://www.iaeng.org/publication/WCE2012/WCE2012_pp368-371.pdf Accessed: Jan 2019.
24. Masters K. Social networking addiction among health sciences students in Oman. Sultan Qaboos Univ Med J 2015; 15:e357–63.
25. Samaha M, Hawi NS. Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. Comput Human Behav 2016; 57:321–5. https://doi.org/10.1016/j.chb.2015.12.045.
26. Whang LS, Lee S, Chang G. Internet over-users' psychological profiles: A behavior sampling analysis on Internet addiction. Cyberpsychol Behav 2003; 6:143–50. https://doi.org/10.1089/109493103321640338.
27. Aydm B, San SV. Internet addiction among adolescents: the role of self-esteem. Procedia Soc Behav Sci 2011; 15:3500–5. https://doi.org/10.1016/j.sbspro.2011.04.325.
28. Khazaal Y, Billieux J, Thorens G, Khan R, Louati Y, Scarlatti E, et al. French validation of the Internet Addiction Test. Cyberpsychol Behav 2008; 11:703–6. https://doi.org/10.1089/cpb.2007.0249.
29. Fu KW, Chan WS, Wong PW, Yip PS. Internet addiction: Prevalence, discriminant validity and correlates among adolescents in Hong Kong. Br J Psychiatry 2010; 196:486–92. https://doi.org/10.1192/bjp.bp.109.075002.
30. Lack DM. Presenteeism revisited. A complete review. AAOHN J 2011; 59:77–91. https://doi.org/10.1177/216507991105900205.
31. A'lamElhuda D, Dimetry DA. The impact of Facebook and others social networks usage on academic performance and social life among medical students at Khartoum University. Int J Sci Technol Res 2014; 3:41–6.
32. Mohammadbeigi A, Absari R, Valizadeh F, Saadati M, Sharifimoghadam S, Ahmadi A, et al. Sleep quality in medical students; The impact of over-use of mobile cell-phone and social networks. J Res Health Sci 2016; 16:46–50.