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

Mohamed H. Taha, Khalid Shehzad, Ahmad S. Alamro, Majed Wadi

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 (w = 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.

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.

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.” Kendall defined Internet addiction

*Corresponding Author’s e-mails: mtaha@sharjah.ac.ae and mohamedhassantaha@gmail.com

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Problematic use of computers is a growing social issue which has been debated worldwide due to its potentially addictive qualities. Internet addicts prioritise the Internet and can cause severe stress on family, friends, work or the work environment. 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. 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. Evidence suggests that there can be a genetic predisposition to addictive behaviours.

IA is highly prevalent, especially among students and youths. Wieland et al. reported that in 2005 “around nine to fifteen million people in the United States used the Internet on a daily basis.” 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%.

Arab News reported in 2014 that Saudis are “wasting” eight hours a day on the Internet. Rashad Faqha, 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.”

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. The IAT questionnaire is a commonly used screening tool that examines uncontrollable Internet use. 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:

$$N = Z^2 \times P \times \frac{(1-P)}{d}$$  \hspace{1cm} [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 $d = 0.05$).

The sample size calculated was 216 [Equation 1], which was confirmed using a sample size calculator. 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].

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

| Characteristic | 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)      | 165 (80.4) |
| Alone on campus | 13 (10.7) | 3 (3.5) | 16 (7.7) |
| Other         | 2 (1.7)       | 0 (0)          | 2 (1)    |

**BMI** = body mass index.

| IAT score      | n (%)           |
|----------------|-----------------|
| Lower than average | 6 (2.9)       |
| Average user     | 56 (26.8)       |
| Possible addict  | 121 (57.9)       |
| Addict           | 26 (12.4)       |
Table 3: Distribution of Internet Addiction Test responses among medical students (N = 209)

| Items                                                                 | Does not apply | Rarely | Occasionlly | 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).
Internet Use and Addiction Among Medical Students in Qassim University, Saudi Arabia

an Italian high school. The development of new relationships with fellow online users in the current study was consistent with other studies in developing and developed countries. 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. 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

Aydın 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. 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. 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 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-based activities in order to determine the true level of IA in Qassim University’s medical students.

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

| Characteristic                          | n (%)                 | IAT score                                      | χ² | DF | P value* |
|----------------------------------------|-----------------------|-----------------------------------------------|----|----|----------|
|                                       | 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) | 12.557   | 3   | 0.006   |
| Female (n = 88)                        | 4 (4.55)              | 18 (20.45)                      | 48 (54.55)      | 18 (20.45) | 7.181   | 9   | 0.618   |
| Total                                  | 6 (2.87)              | 57 (27.27)                      | 120 (57.42)     | 26 (12.44) | 46.005  | 12  | 0.001   |
| BMI in kg/m²                            |                       |                                |                |      |          |
| <18.5                                  | 0 (0)                 | 12 (25.53)                      | 27 (57.45)      | 8 (17.02) | 13.961  | 6   | 0.03    |
| 18.5–24.9                              | 2 (1.89)              | 32 (30.19)                      | 58 (54.72)      | 14 (13.21) | 17.993  | 6   | 0.006   |
| 25.0–29.9                              | 2 (5.26)              | 10 (26.32)                      | 24 (63.16)      | 2 (5.26)  | 17.793  | 6   | 0.002   |
| ≥30                                    | 1 (5.56)              | 4 (22.22)                       | 11 (61.11)      | 2 (11.11) | 16.763  | 7   | 0.002   |
| Academic year of university education  |                       |                                |                |      |          |
| First year                             | 8 (11.43)             | 16 (22.86)                      | 37 (52.86)      | 9 (12.86) | 13.961  | 6   | 0.03    |
| Second year                            | 7 (11.29)             | 13 (20.97)                      | 29 (46.77)      | 13 (20.97) | 17.993  | 6   | 0.006   |
| Third Year                             | 5 (6.49)              | 17 (22.08)                      | 51 (66.23)      | 4 (5.19)  | 16.763  | 7   | 0.002   |
| Suffering from neck pain because of excessive Internet use | | | | | |
| Yes                                    | 0 (0)                 | 22 (21.78)                      | 64 (63.37)      | 15 (14.85) | 13.961  | 6   | 0.03    |
| No                                     | 2 (2.82)              | 22 (30.99)                      | 39 (45.93)      | 8 (11.27) | 17.993  | 6   | 0.006   |
| To some extent                         | 3 (8.11)              | 15 (40.54)                      | 16 (43.24)      | 3 (8.11)  | 16.763  | 7   | 0.002   |
| Neglecting adequate sleep to stay online | | | | | |
| Yes                                    | 2 (2.41)              | 13 (15.66)                      | 51 (61.45)      | 17 (20.48) | 13.961  | 6   | 0.03    |
| No                                     | 3 (3.33)              | 32 (35.66)                      | 46 (51.11)      | 9 (10)    | 17.993  | 6   | 0.006   |
| To some extent                         | 0 (0)                 | 14 (38.89)                      | 22 (61.11)      | 0 (0)     | 16.763  | 7   | 0.002   |
| Internet use has led to weight gain or loss | | | | | |
| Yes                                    | 0 (0)                 | 11 (14.67)                      | 51 (68)         | 13 (17.33) | 13.961  | 6   | 0.03    |
| No                                     | 3 (2.88)              | 32 (30.77)                      | 56 (53.85)      | 13 (12.5) | 17.993  | 6   | 0.006   |
| To some extent                         | 2 (6.67)              | 15 (50)                         | 13 (43.33)      | 0 (0)     | 16.763  | 7   | 0.002   |

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

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