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ORIGINAL ARTICLE

Prevalence and associated factors of Internet addiction among undergraduate students at Al-Beheira Governorate, Egypt

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Abstract

Objectives The study aimed to identify the prevalence and risk factors associated with Internet addiction (IA) among undergraduate students.

Methods In total, 608 undergraduate students aged 18–24 years were randomly included in a population-based cross-sectional study conducted during June–August 2018.

Results The prevalence rate of IA was (47.5%) with moderate and severe IA (35.5% and 12.0%, respectively). In multivariate logistic regression analysis, sociodemographic variables (age, gender, and residence) Internet use pattern factors (Internet use for entertainment, games, and communication purposes, spending more than 4 h per day using the Internet, Internet access at home, and smartphone use), lifestyle variables (lack of physical activity and sleeping less than 6 h daily) were found to be independently associated with Internet addiction.

Conclusions According to the results of this the study around 50% of undergraduate students are at risk for developing addiction to the Internet. Internet addiction was found to be associated with lifestyle and behavior factors.

Keywords Internet · Addiction · Undergraduate · Students · Behavior · Adolescent · Prevalence · Risk factors

Introduction

Easy accessibility, increasing affordability, and numerous Internet activities attract its users and provide a chance to communicate with people all over the world without any restriction leading to exaggerated use of the Internet and maladaptive Internet attitude that interferes with daily life (Moreno et al. 2011).

Prevalence of Internet use was 49% in Asia, 17% in Europe, and 11% in Africa (United Nations 2011). About 99.9% of Korean and 93% of US adolescents use Internet in daily life activities, and approximately 70% of European adolescents spend online for 2–4 h per day (Moreno et al. 2011; Holstein et al. 2014; Korean Statistical Information Service 2016).

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Increasing prevalence of the Internet has led to concerns about excessive Internet usage and its consequences on health and social functioning. Different terms have been used to describe Internet overuse, including Internet addiction, problematic Internet use, Internet dependency, compulsive computer use, and pathological Internet use, virtual addiction (Kuss et al. 2014).

Generally, addiction is defined as not to be able to give up a substance or behavior despite its harmful results. Addiction is not only about substances such as cigarettes, alcohol, or narcotic drugs but can also be behavioral like overeating, playing, television watching, and excessive use of the Internet or shopping (Durkee et al. 2012). Internet addiction (IA) or problematic Internet is also defined as inability to overcome the desire for excessive use of Internet, inability to spend time without being connected to the Internet, appearance of excessive tension and aggression in the absence of being connected to Internet, and the gradual deterioration of social, work, and family life (Korkmazer et al. 2019).

Internet addiction prevalence studies have reported wide variations. The prevalence ranged from 0.8 in Italy to 28%

in Hong Kong (Kuss et al. 2014). In Egypt, a study done on adolescents found a prevalence of IA and potential IA was 2.6% and 18.2%, respectively (Kamal and Mosallem 2013). Various studies revealed that young Internet users (especially those aged 18 and 24 years) were at a hazardous risk to Internet addiction as they make communication with others on social network rather than the real contact in life (Celik et al. 2015; Kim et al. 2017; Gündüz et al. 2017; Tsitsika et al. 2016).

Young people's daily life can negatively be affected by spending more time on Internet. IA has negative effects on many lifestyle-related factors such as management and deterioration of time, irregular eating habits, physical dysfunction, and shortening of the sleep period in adolescents (Salmela-Aro et al. 2017; Kuss et al. 2017; Afrin et al. 2017). Additionally, IA is associated with negative health consequences such as stress, depression, higher emotional and behavioral difficulties, attention-deficit/hyperactivity disorder, anxiety disorder, low self-esteem, shyness, social anxiety, and suicidal behavior and self-identity confusion (Poorolajal et al. 2019; Hsieh et al. 2019; Kumar et al. 2019; Blinka et al. 2015; Celik et al. 2015; Kim et al. 2017; Gündüz et al. 2017; Tsitsika et al. 2016).

A study was conducted in Oman, Internet use leading to a low husband–wife relationship in family life and low relationship between siblings in a family. Also it had effects on Omani families' traditional culture and beliefs (Abuiyada et al. 2016).

Internet addiction associated with poor academic performance of the students (Bhushan et al. 2018; Mohamed and Bernouss 2020), prolonged auditory reaction time an slower visual reaction time (Kannan et al. 2019) and associated with loss of emotional/behavioral control, emotional ties, and lower psychological well–being(Roser et al. 2016; Gedam et al. 2017).

Internet addiction has been associated with a wide variety of factors such as sociodemographic variables (e.g., gender, age, residence, socioeconomic status) lifestyle factors (smoking, alcohol use, sleep disturbance, and lack of physical activity), and excessive online behaviors (using the Internet for communicating via social networking sites, academic purposes, accessing online movie and music sites, online gaming, viewing online sexually explicit materials and pornography, online gambling, and online shopping) (Blinka et al. 2015; Bener et al. 2018; Lai and Kwan 2017; Vigna-Taglianti et al. 2017).

Internet addiction is an increasing worldwide problem. No study about Internet addiction has been carried out among undergraduate students in Al-Beheira governorate in Egypt. The present study aimed to determine the prevalence of Internet addiction and to identify its associated factors.

Method

Study design

A population-based cross-sectional study conducted during June–August 2018, at Al-Beheira Governorate. It is a coastal governorate in Egypt and located in the northern part of the country in the Nile Delta.

Participants

They were undergraduate students aged 18–24 years. The sample size was determined using Epi info, version 7.1.5, 2015. Based on the assumption that the IA was 50%, the precision was 5%, and 95% confidence level. A total 750 students were randomly selected. Only 608 students were entered in our study analysis and the remaining excluded due to missing questions in their questionnaire.

All the participants that were included in the survey gave their consent to participate in the research after the purpose of the study was explained to them and were informed that all collected data will be used for scientific purpose only. They were ensured of their strict confidentiality and anonymity before proceeding in the interview.

The students were recruited into the study during their free time or after finishing their lessons and going out the university building.

Data were collected using a self-administered questionnaire. The questionnaire consisted of two parts:

- *The first part* contains; (a) sociodemographic information; age, gender, residence, marital status, type of college, parent's education level, and socioeconomic status, (b) behavioral factors (lifestyle); smoking, whether they engaged in physical activities lasting at least 30 min every day, average typical sleep duration, average time spent on the Internet per day, the activities engaged in on the Internet (games, entertainment, communication, shopping), and the devices used for Internet access (smartphone, desktop computer, or laptop computer).
- *The second part* of the questionnaire was the Arabic version of Young's Internet Addiction Test (YIAT) to evaluated the Internet addiction level of the participants. The YIAT is a self-reported measure including 20 items that was developed by Kimberley Young. Each of items is rated on a five-point Likert scale from 1 to 5: score 1 = rarely, 2 = occasionally, 3 = frequently, 4 = often, and 5 = always (Ayatollahi et al. 2010). The final score is obtained by summing up the scores of all questions. The total score of the IAT ranges from 20 to 100 scores. The greater score represents a higher level of addiction. It classifies

Internet addiction into normal Internet use (20 to 49), (50 to 79) moderate Internet use (moderate addiction), and mean severe Internet use (severe addiction) (80–100) (Hawi 2013).

A pilot study consisted of 20 students (10 males and 10 females) to test the questionnaire was done. Question related to abuse or addiction to online pornography or Cybersex removed because response rate to answering it was 10% (due to culture and shameful) question related to Internet purpose use was classified into four question instead of one, also question about physical activity modified to include any activities such as walking to university or transportation station or home activities (especially for female) not just sporting. Tested participants had not been included in the study group.

Statistical analysis

Data were analyzed by the use of SPSS software, version 16.0 (SPSS Inc. Chicago, USA). Either χ^2 test was used to compare categorical variables. A multivariate analysis was also performed using multiple logistic regressions (with enter method where is all variables entered in the regression) to identify the predictors of the IA with estimation of odds ratios and 95% confidence intervals. All p values lower than 0.05 were considered statistically significant with 95% confidence interval.

Results

A total of 608 undergraduate students in Al-Beheira governorate were included in this study, 312(51.3%) were males, and 296 (48.7.0%) were female. The mean age was 20 ± 1.2 years. The prevalence rate of IA was (47.5%) with moderate and severe IA (35.5% and 12.0%, respectively).

Regarding socioeconomic factors, our study showed IA statistically a higher among male students ($p = 0.001$), students who aged less than 21 years ($p = 0.001$), and unban students ($p = 0.001$). There was no significant difference between the groups in consideration of socioeconomic and parental education level ($p = 0.48$, $p = 0.15$ and $p = 0.55$, respectively) (Table 1).

Regarding lifestyle of participant, there was statistically significant difference regarding the habit of smoking ($p = 0.001$), low physical activities ($p = 0.046$), and number of sleeping hours (< 6 h daily) ($p = 0.001$) between the groups.

Regarding the differences between IA and non-IA groups with respect to the Internet usage, IA was significantly higher among those who use the Internet for entertainment ($p = 0.001$), games ($p = 0.001$), and social communications ($p = 0.001$) but not significantly ($p = 0.3$) different regarding the Internet use for information searching.

Also the presence of home Internet access and smartphone Internet access was significantly different ($p = 0.001$ and $p = 0.001$, respectively) between IA and non-IA groups (IA group had higher daily Internet usage time (> 4 h/day) compared to non-IA group ($p < 0.001$)) (Table 2).

In multivariate logistic regression analysis, sociodemographic variables (age, gender, and residence (OR 2.7, CI [1.9–5.8], OR 1.9, CI [1.26–2.88], OR 1.67, CI [1.08–2.64], respectively) Internet use pattern factors (Internet use for entertainment, games, and communication purposes, spending more than 4 h per day using Internet, Internet access at home, and smartphone use) (OR 2.0, CI [1.21–3.36], OR 2.4, CI [1.44–4.0], OR 1.85, CI [1.22–2.8] OR 1.94, CI [1.26–2.88] OR 2.33, CI [1.42–3.36] and OR 1.55, CI [1.02–2.38], respectively), lifestyle variables (lack of physical activity and sleeping less than 6 h daily) (OR 4.3, CI [1.95–8.77] and OR 3.3, CI [1.88–5.8], respectively) were found to be independently associated with IA (Table 3).

Discussion

Rapidly increasing use of **I**nternet has made Internet an essential part in modern society. The negative effect of excessive, addictive, or maladaptive Internet use has attracted the attention. Internet addiction has become a major public health problem, especially in young people, where it is considered as a major social problem (Wu et al. 2015).

The present study revealed that the total prevalence of Internet addiction was 47.5%, with moderate and severe Internet addiction being 19.5% and 0.4%, respectively, and the remaining 52.5% of the students were considered normally Internet user. This result was higher than that reported in USA 0–26% (Moreno et al. 2011) and nearly the same that reported in Saudi Arabia (51.5%) (Abdel-Salam et al. 2019) and Iran (43.7%) (Hashemian et al. 2014).

Regarding gender differences, our study showed that the prevalence of IA was significantly higher in males than in females. This finding is inconsistent with two studies (Abdel-Salam et al. 2019; Wu et al. 2015) that reported that being male is at risk factor for IA. However, another study (Rücker et al. 2015) showed that females are more at risk to IA than males.

Internet addiction was significantly higher among student aged ≥ 21 years compared to students aged more than

Table 1 Relationship between sociodemographic factors and Internet addiction among undergraduate students (Al-Beheira Governorate Egypt, 2018)

Risk factors	Internet addict (moderate and severe)		Normal Internet user		X^2 test	p value
	N = 289	%	N = 319	%		
Age						
≤ 21	218	75.4	194	61.0	18.3	0.001
21+	71	24.6	125	39.0		
Gender						
Male	168	58.0	144	45.0	10.2	0.001
Female	121	42.0	175	55.0		
Residence						
Urban	226	78.0	204	64.0	14.9	0.001
Rural	63	22.0	115	36.0		
Socioeconomic status						
Sufficient	185	64.0	213	67.0	0.5	0.482
Non-sufficient	104	36.0	106	33.0		
Father's level of education						
Below secondary education	216	75.0	254	80.0	2.1	0.154
Secondary education and higher	73	25.0	65	20.0		
Mother's level of education						
Below secondary education	194	67.0	231	72.0	2.0	0.551
Secondary education and higher	95	32.0	88	28.0		

Table 2 Lifestyle and pattern of Internet use factors and Internet addiction among undergraduate students (Al-Beheira Governorate Egypt, 2018)

Risk factors	Internet addict (moderate and severe)		Normal Internet user		X^2 test	p value
	N = 289	%	N = 319	%		
Smoking	242	84.0	177	56.0	56.5	0.001
Physical exercise (low)	179	62.0	172	54.0	4.0	0.046
Sleep duration (< 6–7 h)	99	34.0	60	19.0	18.7	0.001
Internet use for information	174	60.0	206	64.0	1.1	0.30
Internet use for entertainment	219	76.0	145	46.0	58.0	0.001
Internet use for games	82	28.0	38	12.0	25.9	0.001
Internet use for communications	181	63.0	156	49.0	11.6	0.001
Average duration of Internet utilization (> 4 h/day)	124	43.0	97	34.0	10.2	0.001
Night time utilizing of Internet	160	55.0	168	53.0	0.02	0.513
Home Internet access	225	80.0	150	47.0	60.9	0.001
Smartphone Internet access	208	72.0	168	52.0	23.9	0.001

21 years; this is in agreement with previous studies (Host'ovecký and Prokop 2018; Bener et al. 2018; Lai and Kwan 2017).

Our findings are in accordance with (Salmela-Aro et al. 2017) study that reported a similar result; students living in the urban areas had more problems with Internet addiction than students from rural areas. This is explained by the fact that rural students spend more time in the farm helping their parents in field work and differences in ownership smartphones and availability of home Internet access in rural areas.

Our study found a significant relationship between IA and lifestyle habits (smoking, sleep duration less than 6 h daily, and lack of physical activities); this finding was supported by previous studies (Kawabe et al. 2016; Kuss et al. 2014; Afrin et al. 2017).

Table 3 Multivariate logistic regression analysis of risk factors of Internet addiction (Al-Beheira Governorate Egypt, 2018)

	p value	Adj. OR	CI (95%)
Low physical activity	0.001	4.13	1.95–8.77
Sleep duration (< 6–7 h)	0.001	3.31	1.88–5.8
Age	0.001	2.71	1.72–4.13
Internet use for games	0.001	2.41	1.44–4.0
Presence of Internet access at home	0.001	2.33	1.42–3.84
Internet use for entertainment	0.007	2.02	1.21–3.36
Average duration of interne utilization (4 h/day)	0.003	1.94	1.25–3.01
Gender	0.002	1.91	1.26–2.88
Internet use for communications	0.004	1.85	1.22–2.8
Residence	0.022	1.69	1.08–2.64
Smoking	0.113	1.63	0.89–2.99
Internet access device	0.042	1.55	1.02–2.38
Night time utilizing of Internet	0.064	1.53	0.98–2.37
Father's level of education	0.812	1.07	0.63–1.8
Mother's level of education	0.123	0.712	0.44–1.1
Internet use for information	0.321	0.560	0.18–1.77
Socioeconomic status	0.252	0.453	0.12–1.73

Accessing the Internet using smartphones significantly is a risk factor for IA. This finding is supported by previous studies (Ching et al. 2015; Alshehri et al. 2015). Smartphones always offer easy access, available at any time and any place, unlike a desktop or even a laptop computer.

In our study, Internet addict student used the Internet for entertainment, social communication, game playing purposes, and spending log time using Internet more than non-IA, while non-IA students used the Internet for information searching. This finding is consistent with other studies (Abdel-Salam et al. 2019; Alshehri et al. 2015). In multivariate logistic regression analysis, age, gender, and residence, Internet use for entertainment, games, and communication purposes, and spending more than 4 h per day using Internet, Internet access at home, smartphone use, smoking, lack of physical activity, and sleeping less than 6 h daily were found to be independently associated with IA. This finding was supported by other studies (Abdel-Salam et al. 2019; Alshehri et al. 2015).

Study limitation

First, the study used a cross-sectional design that measures the exposure and the outcome at the same time where inherent bias is more common. Second, data were collected subjectively rather than objectively due to anonymous self-administered questionnaire.

Conclusion

According to the results of this the study around 50% of undergraduate students is at risk for developing addiction to the Internet mainly due to lifestyle and behavior factors. Suggesting that, undergraduate students should be instructed to use the Internet properly.

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Compliance with ethical standards

Conflict of interest The authors declared any conflict of interest with respect to the authorship and/or publication of thus paper.

Ethical approval All procedures performed in this study were in accordance with the ethical standards of the Damietta Faculty of Medicine, Al-Azhar University, and National Research Committee and meet the ethical standard outlines in the Helsinki Declaration of 1975 as revised in 2000.

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