

The Prevalence and Predictive Factors of Internet Addiction and Its Relationship with Emotional Intelligence among Medical Students

Abstract

Introduction: Abundant applications of the Internet in recent years have resulted in emerging of a phenomenon known as “Internet addiction.” The present study was conducted with the aim of investigating the prevalence of Internet addiction (IA) and its relationship with emotional intelligence (EI) among students of Qazvin University of Medical Sciences. **Methods:** The present cross-sectional study was carried out on 325 medical students who were studying at five faculties of Qazvin University of Medical Sciences (School of Medical, School of Paramedical Sciences, School of Health, School of Nursing and Midwifery, and School of Dentistry). In order to collect data, three instruments were used including (1) a checklist for demographic characteristics, (2) IA test, and (3) Schutte EI Scale. Descriptive statistics (frequency, mean, and standard deviation), Pearson correlation, and multivariate linear regression were performed to analyze the data. **Results:** The results showed that the prevalence of moderate and severe levels of IA was reported to be 12% and 0.3%, respectively. Moreover, 31.4% of the students were normal users and 56.3% had a mild addiction to the Internet. The results also showed an inverse and significant relationship between IA and EI ($r = -0.163$, $P = 0.003$). Regression model showed that Internet usage time ($\beta = 0.34$, $P < 0.001$), total EI ($\beta = -0.2$, $P = 0.002$), and using social media ($\beta = 0.18$, $P = 0.007$) significantly predicted the prevalence of IA at all levels of the severity of IA. **Conclusion:** The results of this study showed an inverse and significant relationship between IA and EI among medical students. Therefore, we can take an effective step to increase students’ emotion and improve their coping skills by holding special workshops and classes so as to prevent them from IA.

Keywords: Emotional intelligence, Internet addiction, medical sciences, student

Introduction

The Internet, as a global computer network, was first introduced in the late 1960s and entered Iran in 1992.^[1] Iran currently ranked the first among the countries of the Middle East in terms of the numbers of Internet users.^[2,3] Problematic Internet use (PIU) is highly prevalent in adolescents and young adults in East Asian population.^[4] One of the most important problems that are associated with the Internet is Internet addiction (IA).^[2] PIU is often caused by IA, which is now growing in the society and known as an epidemic in the 21st century.^[5,6] IA is a very broad concept, and there is no conclusive definition or consensus about this phenomenon. Despite the need to achieve a uniform definition and its inclusion in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, researchers and practitioners have faced difficulties

in designating IA as an impulse-control disorder.^[7] Recent studies have shown that a rapid increase in the number of Internet users increases the prevalence of IA.^[8] The prevalence of IA has also increased in various groups such as university students. For example, the results of a survey showed that around 25% of university students had a moderate or severe addiction to the Internet.^[9] Researchers in the field of cyberpsychology, such as Talbott,^[10] Young,^[11] Kandell,^[12] Davis *et al.*,^[13] Knox *et al.*,^[14] Anderson,^[15] and Li *et al.*,^[16] have all emphasized on the addictive nature of the Internet, especially among university students.^[17] An increasing number of studies conducted in this area suggest that IA disorder is a psychological and social disorder, and emotional regulation plays a central role in the prevention of addictive behaviors.^[18,19]

Emotional intelligence (EI) is a term dedicated to a wide range of individual

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differences that should be a combination of emotion and intelligence.^[20] EI is defined as the individual's ability to effectively perceive, understand, regulate, and express emotional events. Thereby, EI is a construct that explains how emotions are perceived, regulated, and expressed with more or less skill.^[21]

A number of studies concerned the relationship between IA and EI; however, all these studies have suggested different perspectives on IA and EI. For instance, Sanghvi and Rai conducted a study on students and found that there was no significant relationship between IA and EI.^[22] In another study on high school students conducted by Kant, he suggested that there was a negative relationship between IA and EI.^[23] Furthermore, Ranjbar and Bakhshi found that there is a high heterogeneity between meta-analysis studies, and on the whole, there was a moderate and inverse relationship between IA and EI; however, it seems that there is a relationship between different personal, social, and cultural traits. Hence, more evidence is needed to confirm this claim.^[24] Based on the results of the mentioned studies, the exact relationship between IA and EI is unknown; thus, the type (negative or positive) and the magnitude of this relationship between these two concepts are still the subject of discussion.

The addictive nature of the Internet among the university students has been acknowledged by various researchers.^[17] Moreover, according to the results of the mentioned studies, one of the effective factors in the tendency of university students to overuse the Internet is the lack of attention to their EI. Therefore, the aim of this study is to investigate the prevalence and predictive factors of IA among medical students and determine its relationship with EI.

Methods

Design and participants

The present study used a cross-sectional design and was conducted at Qazvin University of Medical Sciences through convenience sampling, in 2017. Participants of this study were students who were studying at Qazvin University of Medical Sciences and willing to participate. This university has five faculties (School of Medical, Paramedical Faculty, School of Public Health, School of Nursing and Midwifery, and School of Dentistry). In order to collect the data, the researchers first referred to each faculty and received the list of the student. Afterward, the researchers randomly selected the samples from the list. Then, the researchers referred to the students during their recess between classes with the coordination of the education section and faculty members. After explaining the study objectives, the researchers asked the willingness of the students in participation. If a student agrees, a questionnaire is given to the student for completing and returning at the same day to the researchers.

The sample size was calculated to be 350 using the results from the study of Akhavi *et al.*,^[25] which examined the

relationship between IA and EI in students of Kharazmi University and the following formula:

$$n = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2}{w^2} + 3 = \frac{(1.96 + 2.32)^2}{-0.23} + 3 = 350$$

$$w = \frac{1}{2} \ln \left(\frac{1+r}{1-r} \right)$$

Finally, 325 students participated in the present study, and 25 were excluded due to their unwillingness to participate.

Measures

The instruments used in this study included (1) a checklist for demographic characteristics, (2) IA test (IAT), and (3) Schutte EI Scale (SEiS).

Demographic questionnaire

The first part was a questionnaire for demographic characteristics that included age, gender, marital status, history of mental illness, average of hours using the Internet during the week, Internet usage time, and the reason for using the Internet during the week (e.g., sending E-mails, downloading music and photos, playing online games, chatting, and searching educational articles).

Internet addiction test

The second part was IAT, which contains 20 items that measure the presence and severity of Internet dependency among adults. Answers are based on a six-point Likert scale from 0 (never) to 5 (always). In this test, in order to calculate the prevalence of IA, the total scores are concerned in which they are divided into four levels: normal (<21), mild addiction (21–29), moderate addiction (30–39), and severe addiction (40–100). This instrument has been used in many different studies in abroad and in Iran and is completely reliable and valid. It is a standard questionnaire, and its validity and reliability were reported in previous studies with Cronbach's alpha of 0.90. The reliability of the Persian version of this questionnaire confirmed in studies by Nastizai with Cronbach's alpha of 0.81^[26] and Ghasemzadeh *et al.* with Cronbach's alpha of 0.88.^[27]

Schutte Emotional Intelligence Scale

The third part was the SEiS which is a 33-item scale that was first generated by Schutte *et al.*,^[28] who used the model of EI developed by Mayer and Salovey^[29] to design the SEiS. The items of this scale evaluate four subscales of optimism, appraisal, skills, and utilization. Each item in this scale is answered on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).^[30] This instrument has been used in many different studies in abroad and in Iran and is completely reliable and valid. It should be noted that the translation and adaptation of this instrument were done by Javid on 234 male and female students in Tehran secondary schools.^[31] He reported the

total reliability of this scale to be 0.81 based on Cronbach's alpha.

Ethical considerations

The study was approved by the Ethics Committee of Qazvin University of Medical Sciences (ethics code: IR.QUMS.REC.1397.291). All participants were informed about the voluntary nature of participation, with the option to withdraw from the study at any time. We also guaranteed the confidentiality of the participants' personal information. In addition, we obtained informed consent from each participant.

Statistical analysis

Descriptive and inferential statistics were used to analyze the data using the via the SPSS version 23 Software (IBM, Chicago, United States of America). Frequency, mean, and standard deviation were used to describe the participants' demographic characteristics. Pearson correlations were used for analyzing the correlation between EI and IA. Finally, predictive variables on the level of students' IA were determined, and the coefficients were estimated using multivariate linear regression. IA scores are standardized using the Kolmogorov–Smirnov test. The assumption of the independence of errors was confirmed using the Durbin–Watson test, and the assumption that the variables of the model are not linear was confirmed using the variance inflation factor (VIF) values. The variables are entered in the modal using a step-by-step method. $P < 0.05$ was considered to be statistically significant in all tests.

Results

The mean age of the students was 23.13 ± 5.06 years ranging from 18 to 49. The majority of students were female (74.2%), single (84.9%), undergraduate students (43.4%), unemployed (75.7%), and lived in the dormitory (66.8%) [Table 1].

The results showed that the prevalence of moderate and severe levels of IA was 12% and 0.3%, respectively. More details on the severity of IA among students are presented in Table 2.

The majority of students used the Internet as a source for sending E-mail (68%), chatting (76%), searching for educational articles and scientific subjects (57.8%), and fashion (51.4%) [Table 3].

The results showed that the mean score of total EI among students was 139.36 ± 23.21 , and the highest score was related to the dimension of "optimism" (47.16 ± 8.96). Furthermore, the results showed that the dimension of optimism was the only dimension of the EI that had a statistically significant relationship with the type of Internet connection ($P = 0.036$).

The results also showed an inverse and significant relationship between EI and IA ($r = -0.163$, $P = 0.003$). Among the subscales of EI, the subscales of optimism

Table 1: Demographic characteristics of students

Variables	Frequency (%)
Gender	
Female	241 (74.2)
Male	84 (25.8)
Marital status	
Married	49 (15.1)
Single	276 (84.9)
Education level	
Associate degree	14 (4.31)
Undergraduate	142 (43.7)
Master	33 (10.15)
Mph	2 (0.62)
Doctoral	116 (35.69)
Resident	18 (5.54)
Profession status	
Employed student	79 (24.3)
Student	246 (75.7)
Residence	
Dormitory	217 (66.8)
Nondormitory	108 (33.2)

Table 2: Severity of Internet addiction among students

Variables	Frequency (%)
Severity of IA	
Normal	102 (31.4)
Mild	183 (56.3)
Moderate	39 (12)
Severe	1 (0.3)

IA: Internet addiction

($r = -0.22$, $P < 0.001$), utilization ($r = -0.11$, $P = 0.04$), and skills ($r = -0.11$, $P = 0.04$) had an inverse and significant relationship with IA. Therefore, with an increase in the score of EI, we have faced a decline in students' IA [Table 4].

In the present study, the results of the Pearson correlation coefficient showed that there was a significant and inverse relationship between the total EI and scientific knowledge ($r = -0.14$, $P = 0.01$). Furthermore, among the reason for using social media, the most significant relationship was between searching for educational articles and scientific topics ($r = -0.14$, $P = 0.01$) and games and entertainments with the total score of EI ($r = 0.16$, $P = 0.007$).

The results of regression model showed that Internet usage time, total EI, and using social media are among the factors predicting the prevalence of students' IA ($P < 0.05$). Furthermore, the results of analysis of variance of the examined independent variables could predict 20% of the students' IA changes as much as $R^2 = 0.21$ regarding the statistics of $F = 17.25$ and $P < 0.001$ [Table 5].

Discussion

This study investigated the prevalence and predictive factors of IA and its relationship with EI among medical students

of Qazvin University of Medical Sciences. The results showed that there is an inverse and significant relationship between EI and IA that this finding is consistent with the studies done by Seyyedani,^[1] Jafari and Fatehizade,^[17] Smaeeli Far *et al.*^[32] (2014), and Kant^[23] and in contrast to studies done by Beheshtian,^[2] Sanghvi and Rai,^[22] and Juneja and Sethi.^[30] The results of this study showed that 31.4% of the students were normal users according to Yang IAT, whereas 56.3%, 12% and 0.3% had a mild, moderate and severe addiction to the Internet, respectively. Only 0.3% of students had a severe addiction to the Internet, and this finding was consistent with recent studies that were mentioned earlier. The prevalence of severe level of IA varies widely between 1.6% and 30% in adolescents as well as different societies and cultures,^[8] and university students seem to be more addicted to the Internet than other groups in the society that maybe this is because of the reason that university students are struggling to create a strong sense of identity and meaningful relationships throughout the Internet.^[30]

In the present study, it was shown that browsing scientific websites and scientific databases as well as using E-mail is one of the main reasons for using the Internet that this finding was in line with the results of Doosti Irani *et al.* study.^[33] In the present study, the results of the Pearson correlation coefficient showed that there was a significant and inverse relationship between the total EI and scientific knowledge ($r = -0.14, P = 0.01$). This indicates the importance of the individuals' activities and EI in some professions that their works are dependent on the Internet. Researchers in the field of medical sciences, like other researchers, need to use the Internet continuously for activities such as accessing electronic databases and publishing articles. This continuous use may lead to addiction in predisposed people and have a negative impact on their occupations.^[34]

Trace of emotion can be directly or indirectly observed in every single moment of individuals' lives. The subscales of EI include appraisal of emotions in own self and others, regulation of emotions, and utilization of emotions.^[35-37] Mayer and Salovey found that one of the important benefits of emotion regulation is the improvement of negative emotions and the development of positive and pleasant emotions; therefore, people, who are able to regulate their emotions, have more ability to compensate for negative emotional states by participating in pleasant activities, and emotional power plays an important role in the adjustment of stress and psychological health.^[29]

In the present study, regression model showed that Internet usage time ($\beta = 0.34, P < 0.001$), total EI ($\beta = -0.2, P = 0.002$), and using social media ($\beta = 0.18, P = 0.007$) significantly predicted the prevalence of IA at all levels of the severity of IA. Furthermore, among the reason for using social media, the most significant relationship was between searching for educational articles and scientific topics ($r = -0.14, P = 0.01$) and games and entertainments with the total score of EI ($r = 0.16, P = 0.007$). Waldo *et al.* concluded that there is a significant difference in the level of EI with the reasons for using the Internet: they found that students, who mainly use the Internet for research, had a higher level of EI, whereas those, who used the Internet to play video games, had lower score that this is due to a reduction in the social interaction; when their time is spent on more video games, it can lead to another form of

Table 3: Various aspects of Internet use among students

Variables	Frequency (%)
Type of Internet connection (multiple choice)	
Home ISPs	30 (9.2)
Connecting to the Internet through VPN/Wi-Fi in dormitory/university	38 (11.7)
TD-LTE	132 (40.6)
Using different ways of connecting to the Internet	125 (38.5)
Type of social networking services (multiple choice)	
Combination of Telegram, WhatAapp, Instagram, and Facebook	238 (73.2)
Telegram and Instagram	87 (26.8)
The reason for using social media (multiple choice)	
Sending email	268 (82.4)
Games and entertainments	261 (80)
Pursuit of professional activities	258 (79.4)
Educational articles and scientific topics	267 (82.1)
Finding a partner	235 (72.3)
Participation in environmental activities	247 (76)

ISPs: Internet service providers, VPN: Virtual private network, TD-LTE: Time-division long-term evolution

Table 4: The results of Pearson correlation coefficient between Internet addiction and emotional intelligence and its subscales

	<i>r</i> (<i>P</i>)				
	Total IA	Appraisal	Skills	Utilization	Total EI
Optimism	-0.220 (<0.001*)	0.693 (<0.001*)	0.795 (<0.001*)	0.823 (<0.001*)	0.932 (<0.001*)
Total IA		-0.098 (0.077)	-0.113 (0.042*)	-0.112 (0.044*)	-0.163 (0.003*)
Appraisal			0.664 (<0.001*)	0.651 (<0.001*)	0.844 (<0.001*)
Skills				0.766 (<0.001*)	0.909 (<0.001*)
Utilization					0.872 (<0.001*)

* $P < 0.05$ statistically significant. EI: Emotional intelligence, IA: Internet addiction

Table 5: The predictive factors of Internet addiction among students using linear regression model

Variables	Unstandardized regression coefficient <i>B</i>	SE	Standardized regression coefficient β	<i>P</i>	<i>t</i> -statistic	95% CI β		VIF
						Lower	Upper	
Constant	38.688	7.045		<0.001	5.492	24.7	52.5	
Internet usage time	0.237	0.045	0.343	<0.001	5.304	0.15	0.32	1.009
Total EI	-0.168	0.053	-0.207	0.002	-3.143	-0.27	-0.062	1.043
Using social media	1.464	0.535	0.180	0.007	2.736	0.4	2.5	1.037

$F=17.25$, $P<0.001$, $R^2=0.21$, Adjusted $R^2=0.2$, Durbin-Watson=1.98. EI: Emotional intelligence, SE: Standard deviation, CI: Confidence interval, VIF: Variance inflation factor

addiction to the Internet called cyber gaming addiction.^[38] In another study done by Parker *et al.*, they found that EI is a strong predictor of behavioral addiction such as addiction to the Internet and video games among both groups of Internet users and gamers.^[39]

The present study is similar to other studies in terms of data collection instruments and a similar sample of students. For instance, in the studies of Saraiva *et al.*,^[7] Hamissi *et al.*,^[40] and Smaeeli Far *et al.*,^[32] it was shown that there is an inverse and significant relationship between the severity of IA and EI. Similar to the study of Dalbudak *et al.*, it can be concluded that individuals with a high level of EI know how to evolve in different situations.^[41] These people have the ability to understand and analyze their emotional experiences and others. This ability makes it possible to regulate the emotions and resist unnecessary behaviors such as addiction.^[42]

Limitation

The cross-sectional design in this study is a limitation because no causality between the variables can be made. Furthermore, using a self-reported questionnaire is another limitation of the study. Specifically, the recall bias and social desirability are strong confounding factors in the self-reported design. Finally, the convenience sampling restricted the generalizability of the present study, that is, the present study's findings can only apply to the students in Qazvin University of Medical Sciences.

Conclusion

One of the most important concerns of the society is the overuse of the Internet among students. According to the results of the study, students' EI can prevent them from IA. It is suggested that health-care professionals achieve adequate information about the proper use of the Internet and implement the necessary programs to prevent IA, such as education of EI skills, which is very important and deal with challenges of today's life, because it could put the dimensions of the personality under the influence of education in the family education centers.

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Conflicts of interest

There are no conflicts of interest.

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