

Investigating the Relationship Between Internet Addiction and Academic Achievement of Medical Students (2013)

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ABSTRACT

Intensive use of the internet can be associated with negative psychological consequences and behavioral changes. These consequences affect different aspects of life including physical, mental and spiritual health and academic performance of the students as users. In this regard, this study is an attempt to determine the rate of internet addiction and its relationship to academic achievement among medical students of basic sciences studying at Tehran University of Medical Sciences.

In this cross-sectional study, a sample size of 417 participants had been selected by stratified random sampling. To collect data a demographic questionnaire and a Farsi version of Young Internet Addiction Test was used. Descriptive statistics (frequency distribution, frequency Percent, mean and standard deviation) and inferential statistics (Pearson correlation test, chi-square and t-test) were used to analyze data.

57 out of 417 participants of the study (15.2%) had internet addiction. There was a significant relationship between time spent on the internet ($p \leq 0.001$) and number of failed credits in the semester prior to the study ($P \leq 0.02$ and $r = -0.136$). Internet addiction was not significantly associated with sex, age, age of the first internet use, parental education and academic achievement. By medical students of basic sciences internet addiction had no significant relationship with academic achievement; however, to study the effects of Internet addiction on other aspects of medical students' life is suggested.

Keywords: Internet Addiction, Academic Achievement, Medical Students

INTRODUCTION

Internet as a growing phenomenon is almost accessible everywhere; therefore, because of its easy availability, the amazing number of users is on the rise. [1] Easy internet access and its worldly spread have affected all aspects of human life. Shield quoting McLuhan, believes that the world has become a global village in which everyone has the ability to communicate with others and has easy access to the latest news and world events [2] There are many uses for the internet and it has numerous advantages

not ignoring the disadvantages. Meanwhile, internet overuse and misuse leads to undesirable consequences for the individual health and leads to negative behavioral changes [3].

In the virtual world, addictive use of the internet is a new hidden phenomenon which is not known by many users [3-4]. Internet addiction was introduced by Goldberg is pathological obsessive use of the internet that is manifested by isolation symptoms including depression, loneliness, anxiety and lack of self-confidence. This phenomenon adversely affects physical,

mental and spiritual health of individuals and leads to negative consequences on the society [5].

A wide body of research has been reported on the positive and negative effects of Internet use. Sanders reported an inverse association between Internet use and family relationships among adolescents (low communication with mother and friends) [3]. According to Young, highly educated people are more at risk of Internet addiction [6]. Scherer found that students addicted to Internet who are mainly males (72%), use it 11 hours per week [7]. According to Kubey *et al.* using internet for entertainment is associated with serious damages to personal performance, academic problems, sense of loneliness and sleep disorders [1]. Nastizae (2009) in University of Sistan and Baluchestan, Iran found that internet addicts are more prone to health risk factors than regular users ($P \leq 0.01$); moreover, depression and anxiety are more common among them [3]. According to Dargahi, Internet addiction is more prevalent among adolescents of 15-19 years of age, and singles who commonly use the Internet at school and home [8].

Nademi in a study on Mashhad university students found that 77% of the study participants are at risk of Internet addiction and in 14% of their internet dependency affected their academic performance. In addition, internet addiction was significantly more prevalent in male students than females [5]. According to Moeedfar *et al.*, Internet addicts suffer school and work failure [1]. Ahmadi in a study on the 4342 high school students found that 22.2% of them were internet addicts, most of whom were males, and indicated that there was a significant relationship between internet addiction, sex and education of parents ($P \leq 0.001$) [9].

However, Namazi *et al.* reported no significant relationship between Internet use and depression among users [3]. Accordingly, Miltiadou believed that self confidence in internet users is higher [10]. Wheeler *et al.* believed that internet use enhances creative thinking and social communications in the users [1]. Zare and Kadivar also found that Internet users are more creative and self-efficient than non-users [12]. Alavi quoted by Kim, *et al.* in their studies on Internet addiction and its psychological

outcomes reported no psycho-logical symptoms for Internet addiction [1]. Global research on Internet addiction shows controversial findings, and since to the best of our knowledge no study has been done on the relationship of Internet addiction and academic achievement of Iranian medical students of basic sciences, this study is an attempt to investigate this phenomenon among medical students of Tehran University of Medical Sciences.

MATERIALS AND METHODS

This applied cross-sectional study was carried out to determine the rate of internet addiction and its relationship to academic achievement of medical students of basic sciences of Tehran University of Medical Sciences (Hemmat and Poursina Campuses, 2013). Considering the 95% confidence level, 90% power and correlation coefficient ($r=0.28$) of similar studies [1-5], and an estimated design effect of 1.5, minimum sample size was estimated 315. Each semester was defined as a stratum and samples were selected by stratified random sampling. Finally, the sample size reached to 417 (Table 1).

Table 1. Distribution of the semester of undergraduate medical students of Basic Sciences studying at Tehran University of Medical Sciences

Semester	Count	Percent
3	90	21.6
4	221	53.0
5	106	25.4
Total	417	100

Data were collected using a questionnaire including demographic information and Farsi version of Young Internet Addiction Test [1], Demographics included: age, sex, marital status, place of residence, Grade Point Average (GPA) of the two consecutive previous academic semesters, GPA of the last high school year, level of education of parents, daytime hours of internet use and age of the first Internet use.

Farsi version of Internet Addiction Test (Young, 1998, translated and validated by Alavi, 2010) was used for the purposes of the study and its permission to use was secured from Sinai Cognitive Behavioral Research Institute, Tehran, Iran.

The reliability and validity of the Farsi version of this 21-items five-point likert-scale questionnaire were confirmed by Alavi in a cross-sectional survey on 233 internet users studying at Isfahan university (internal consistency 0.82, external validity 0.79). In his study, the correlation coefficient was significant ($P \leq 0.05$) [13]. Moreover, face and content validity of this version was examined by 5 psychologists and 5 educationalists ($n = 10$) and the modified Farsi version was used to gather data. Test-retest reliability of the questionnaire was confirmed by 10 students with a one week lapse. The reliability of the questionnaire was confirmed according to the Pearson correlation coefficient ($r = 0.87$). The research project was approved by the university research committee and school of graduate studies. The questionnaire was distributed among participants of the study while the researcher was available on the site for more clarifications. Moreover, since criteria for GPA was participants' disclosure, they were encouraged to mention their scores as correct as possible while it was emphasized that their scores will be kept confidential. In addition, they were announced that in case that they are interested to know the results of the study they can contact the researcher present at the site (RMK) through her email address.

The collected data were analyzed by descriptive statistics (frequency distribution, frequency percent, mean and standard deviation) and inferential statistics (Pearson correlation coefficient and Chi-square). In this study, internet addiction was an independent variable which was measured on the basis of the sum of the scores with the cut-off point of 44 (estimated by Young Internet Addiction Test). It must be emphasized that the score of each participant obtained from the test is the criterion to detect internet addiction rather than the time spent on the internet, and the academic achievement criterion was the average GPA for two consecutive semesters prior to the study and high school diploma.

RESULTS

Most of the study participants were studying at the 4th semester of medical school (53%), 58% of which were female and 42% male. More than 50% of the participants were located in the age

group of 21-22 years (51.9%). The participants were living in personal residences or dorms, 53.5% and 46.5%, respectively. Most of the participants (96.4%) were single and 31.2% of them spent 1 to 1.99 hours per day on the internet. 61.5% of the participants reported a history of internet use since they were 10-14 years. Overall, the study participants mean age of the first internet use was 12 years and 6 months. GPA of the 80% of the participants at their final year of high school was 19-20. Demographic characteristics of the participants are presented in Table 2. (Table 2)

15.2% out of 417 participants of the study had internet addiction; in other words, they got greater than 44 score from internet addiction questionnaire. From those studied in the third, the fourth, and the fifth academic semesters, internet addiction was reported 16.5%, 14.9% and 14.8%, respectively.

In students with GPA of 11-13.99, 14-16.99 and 17 and above in a semester prior to the study, internet addiction was 26.1%, 16.2% and, 12.5%, respectively. Chi-square did not show a significant relationship between sex and Internet addiction ($P \geq 0.05$) and between study semester and Internet addiction.

Pearson correlation coefficient showed no significant linear relationship between Internet addiction and the previous semester GPA ($r = -0.085$, $p = 0.10$). Similarly, chi-square showed no significant relationship between Internet addiction and the previous semester GPA ($P = 0.217$). In students with a cumulative GPA of 11-13.99, 14 to 16.99, and 17 and above in the two consecutive semesters prior to the study, 7.1%, 15.5%, and 17.6% had internet addiction, respectively. Pearson correlation coefficient, showed no significant linear relationship between Internet addiction and the mean average of the previous semesters GPA ($P = 0.37$ and $r = -0.048$). Similarly, chi-square showed no significant relationship between Internet addiction and the GPA of the two consecutive semesters prior to the time of the study. ($P = 0.579$).

According to the GPA of students in the final year of high school, those in the group scored lower than 17, 17-18.99 and 19-20, 14.3, 10 and 16.8%, were internet addicts.

Table 2. Demographic characteristics of students

1.	Gender	Woman	243(%58.4)	
		Man	173(%41.6)	
2.	Age (years)	mean± SD	21.01±1.46	
3.	Marital status	Single	402(%96.4)	
		Married	15(%3.6)	
4.	Semester	Term 3	90(%21.6)	
		Term 4	221(%53)	
		Term 5	106(%25.2)	
5.	Residence status	Dorm	222(%53.5)	
		Private house	193(%46.5)	
6.	Internet use at place of residence	Yes	%96.2	
7.	Using the Internet at the University	Yes	%88	
8.	Internet use in places other than the home and university	Yes	%57.1	
9.	Daily time spent on surfing the Internet (hours)	mean± SD	2.84±3.81	
10.	Age of first contact with the Internet	mean± SD	12.51±2.82	
11.	Employment	Yes	44(%10.7)	
12.	GPA (last semester)	mean± SD	16.29±1.54	
13.	Last two consecutive semesters GPA	mean± SD	16.32±1.39	
14.	GPA (Last year of high school)	mean± SD	19.17±0.98	
15.	Parental education	Mother	Less than high school diploma	43(%11.1)
			Diploma and Advanced Diploma	146(%37.6)
			Bachelor's degree or higher	199(%51.3)
		Father	Less than high school diploma	25(%6.5)
			Diploma and Advanced Diploma	103(%26.5)
			Bachelor's degree or higher	259(%67)
16.	Successful passed course credits(previous semester)	Yes	336(%87.8)	
17.	Number of failed course credits	mean± SD	3.13±1.69	

Pearson correlation coefficient, showed no significant linear relationship between Internet addiction and GPA of the last high school year (P=0.25, r= - 0.060). Chi-square showed no

significant relationship between Internet addiction and last year of the high school GPA (P=0.417).

In the age group of 25 and above, and 21-22 years 16.7% and 16.2% of the students were internet addict, respectively. Pearson correlation coefficient (P=0.62, r= -0.025) showed no significant linear relationship between Internet addiction and age. Chi-square showed no significant relationship between Internet addiction and age (P=0.415).

From those students who had access to the Internet at their residence, 15.6% were internet addict. Chi-square showed no significant relationship between internet access at the students' place of residence and internet addiction (P=0.347).

In students who passed all their courses in a semester prior to the study, internet addiction was 13.9%., while this rate was 24.4% in those who failed all their courses. However, it has no statistical significant relationship.

On the contrary, chi-square showed a significant relationship between the number of failed credits in the semester prior to the study and internet addiction (P=0.02). It means that Internet addiction in those who failed in less than 3 credits was 44.4% and in those who failed in 3 or more credits was 12.5% (negative correlation) (Table 3).

Table 3. Frequency distribution of Internet addiction based on the number of failed credits in the last semester of medical students of Basic Sciences Tehran University of Medical Sciences

Internet Addiction	Without Addiction		Addicted		Sum	
	Number failed	Percent	Number	Percent	Number	Percent
Number of failed credits in the previous semester						
<3	10	55.6	8	44.4	18	100
≥3	21	87.5	3	12.5	24	100
Sum	31	73.8	11	26.2	42	100
Chi-square test	P=0.020, df=1, $\chi^2=5.430$					

In those who used the Internet for less than one hour a day, Internet addiction was 6.1%; and for those who spend 5 hours or more a day on the Internet it was 36.1%. Chi-square showed a significant relationship between Internet addiction and time spent on the Internet (P≤0.001) (Table 4).

Table 4. Frequency distribution of Internet addiction based on daily time spent on the internet among Medical Students of basic sciences in Tehran University of Medical Sciences

Internet Addiction	Without Addiction		Addicted		Sum	
	Number	Percent	Number	Percent	Number	Percent
Daily time to use the internet (Hour)						
< 1	31	93.9	2	6.1	33	100
1-1.99	97	97	3	3	100	100
2-2.99	72	80.9	17	19.1	89	100
3-3.99	33	75	11	25	44	100
4-4.99	15	71.4	6	28.6	21	100
≥5	23	63.9	13	36.1	36	100
Total	271	83.9	52	16.1	323	100
Chi-square test	P<0.001 , df=5 , X ² =31.432					

The highest internet addiction rate was seen in those who had their first contact with the internet between 5 and 9 years of age (17.8%). Chi-square showed no significant relationship between age of the first contact with the internet and Internet addiction. (P=0.786)

In this study, there was no significant relationship between parental education and Internet addiction (mother p=0.752 and father p=0.357). Internet addiction was the lowest in those whose mothers and fathers were under diploma (10.5% and 4.3% respectively) that was inconsistent with findings of Ahmadi [9].

DISCUSSION

57 out of 417 participants of the study (15.2%) were internet addicts. There was a significant relationship between internet addiction and duration of internet use (P<0.001). However, there was no significant relationship between sex, age, age of the first Internet use, academic achievement and parental education with internet addiction.

From 417 participants of the study, 15.2% (n=57) had internet addiction. This rate was similar to the studies of Alavi, *et al.* [1], Anderson [14], Dargahi [8], and Solhi *et al.* [15] that may be due to the increasing use of the internet in the youth and university students and their similar characteristics. The results show that 15.9% of females and 14.1% of males were addicted to the Internet. Chi-square showed no significant relationship between sex and internet addiction (P=0.62), which is consistent with the

results of Bullen Pat *et al.* who mentioned equal chances of Internet addiction between men and women [1], but it is inconsistent with the results of Anderson [14], Nademi *et al.* [5], Cengiz [16], Kuss *et al.* [17] and Solhi *et al.* [15] who found more prevalence of internet addiction in men than women, in other words a significant relationship between sex and Internet addiction. Chi-square showed no significant relationship between Internet addiction and measures of academic achievement in one or two consecutive semesters prior to the study and the last high school year GPA, which was not consistent with Young who reported an intensive decline in the scores [4]. The findings of this study were not consistent with Pirzadeh who reported 8.4% educational decline in University of Payam Noor, Isfahan due to the Internet use [18].

However, the findings of this study are consistent with the results of Miltiadou who believed that internet use will increase self-confidence in students, and findings of Wheeler *et al.* who believed that Internet usage will reinforce creative thinking and improves social interactions, and findings of Zare Zadeh and Kadivar who believed that Internet users are more creative and self-efficient than non-users [3,0,11.12]. In this study, internet addiction rate was 13.9% for the students who passed all their course credits in a semester prior to the study. Although there was no significant relationship between passing the courses in the semester prior to the study and Internet addiction (P=0.066), chi-square test showed a significant relationship between number of failed courses in the semester prior to the study and internet addiction (P=0.02). Therefore, internet addiction rate among those who failed in less than 3 credits was 44.4%, and was 12.5% in those who failed in 3 credits or more, which may be due to ever-increasing use of the Internet among university students. In addition, type of course credit (theoretical or applied) may be the determining factor. In this study there was a significant relationship between Internet addiction and time spent on the Internet (P=0.001). In those who spent less than one hour a day on the Internet, addiction rate was 6.1% and in those who spent more than 5 hours a day on the Internet the rate was 36.1%, which were more than the rates reported by Solhi *et al.* who

mentioned that internet addiction (internet usage more than 3 hours a day) was seen in 18% of students in their study [15].

The results of this study showed that the participants spent more time on the internet than those participated in Young study, in which Internet addicts spend 8 to 40 hours a week on the internet [4]. All these findings indicate the growing use of the Internet over the past few years. In most studies, internet addiction was more prevalent in the age group of 15-19 and 20-29 among high school and university students [1, 8,16, 17]. In this study, There majority of Internet addicts were 25 years and above, and 21-22 years, respectively (16.7% and 16.2%) which was consistent with Solhi *et al.* who found most internet addicts in age group of 19 to 25 years old [15]. In this study, 15.5% of singles were Internet addicts and 7.7% of married students had internet addiction; however, there was no significant relationship between marital status and Internet addiction which was similar to Dargahi Study [8]. In this study, the highest level of internet addiction was seen in those who had their first contact with the internet between 5-9 years of age (17.8%); however, there was no significant relationship between the first age of internet use and internet addiction ($P=0.786$), which was inconsistent with the results of Ni *et al.* [19].

CONCLUSION

Since to the best of our knowledge this is the first study conducted on the internet addiction of medical students of basic sciences, although no significant relationship was found between their Internet addiction and academic achievement, it is recommended that further studies be conducted on this relationship with other aspects of medical students' life and mental health in a larger scale to detect probable risk factors. In addition, due to the importance of the issue, it is suggested that at the time of university entrance all students complete internet addiction questionnaire and it be filled out periodically or in longitudinal studies so that internet addiction be diagnosed as soon as possible and necessary measures taken to improve undesirable mental and physical consequences of internet addiction.

ETHICAL ISSUES

To perform the study, ethical permission of the research committee of the university and informed consent of the participants were secured.

CONFLICT OF INTEREST

Authors have no conflict of interest.

AUTHORS CONTRIBUTION

The paper is part of a Master's thesis. Author 1 was contributed as MSc student, author 5 was thesis supervisor. Other authors collaborated as the supervisory committee.

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REFERENCES

- [1] Alavi S S, Meracii M, Jannatifard F, Islamic M, Haghghi M. Assess psychiatric symptoms associated with Internet addiction among university students in the city. *Journal of Hamadan University of Medical Sciences and Health Services*, 2010.17(2): 57-65.
- [2] Shields M K, Behrman R E. Children and Computer Technology: Analysis and Recommendations, *J The Future of Children*. 2000;10(2):4-30.
- [3] Nastizae N. The relationship between general health and internet addiction. *Journal of research in Zahedan University of Medical Sciences*, 2009;11(1): 57-63.
- [4] Young kimberly S. Internet addiction: symptoms, evaluation and treatment. 27 jul, 2012; Available from: <http://netaddiction.com/articles/symptoms.pdf>
- [5] Nademi F. Saidi Rezavani M. Evaluation of Internet use and psychosocial outcomes in Mashhad university students. Site; 2006 Available from: <Http://bpdanesh.ir/detailnews.asp?id=907>
- [5] Dargahi H. Internet addiction and its effective factors in Tehran residents of District 2 West. *Quarterly monitoring*,2007.6(3): 265-72.
- [6] Young kS. Internet Addiction: The Emergence of a New Clinical Disorder. *Cyber Psychology & Behavior*. 2009;1(3): 237-44.
- [7] Scherer K. College life on-line: Healthy and unhealthy Internet use. *Journal of College Student Development*.1997;38(6):655-65.

- [8] Dargahi H. Internet addiction and its effective factors in Tehran residents of District 2 West. *J Quarterly monitoring*. 2007;6(3): 265-72.
- [9] Ahmadi K. Internet Addiction among Iranian Adolescents: a Nationwide Study[internet]: *Acta Medica Iranica*; 2014.52(6): 467-72
- [10] Miltiadou M. Computer-Mediated Communication in the Online Classroom. *Inter-national Journal of Educational Telecommuni-cations*. 2001;7(4): 407-19.
- [11] Wheeler S, Waite S J, Bromfield C. Promoting creative thinking through the use of ICT. *Journal of Computer Assisted Learning*. 2002;18(3):239-80.
- [12] Zare Zadeh K, Kadivar P. Comparison self-efficacy between users and non users of internet, *SID*. 2006;23(1): 111-33.
- [13] Alavi SS. Young's Internet Addiction Scale: Master of Psychology thesis. Isfahan University of Medical Sciences, Sinai Research Institute cognitive (mental equipment); Iran, 2010
- [14] Anderson KJ. Internet Use Among College Students: An Exploratory Study. *Journal of American College Health*.2001; 50(1): 21-26.
- [15] Solhi M, Farhand H, Armon B. Frequency of Internet Addiction Disorder in the undergraduate School of Public Health, Tehran University of Medical Sciences, 2011. *Razi journal of Medical Sciences*. 2013;20(106): 40-47
- [16] Cengiz S. An analysis of Internet addiction levels of individuals according to various variables. *The Turkish online journal of educational technology*. 2011;10(4): 60-66. Available from : www.tojet.net/articles/v10i4/1047
- [17] Kuss DJ, Griffiths MD. Online Social Networking and Addiction-A Review of the Psychological Literature. *Int J Environ Res Public Health*. 2001;8(9): 3528-3552
- [18] Pirzadeh A. Evaluation of internet addiction among students of Payam Noor University Khndzh unit. web site; 2009 [cited 8 August, 2012]; Available from: <http://www.magiran.com/view.asp?type=pdf&ID=972948&1=fa>
- [19] Ni X, Yan H, Chen S, Liu Z. Factors influencing internet addiction in a sample of freshmen university students in China. Web site; 2012[cited June, 2009]; Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19445631>