

## The Prevalence of Internet Addiction and its Association with Depression, Anxiety, and Stress, among High-School Students

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### Abstract

#### Introduction

The Internet is an integral part of our everyday life. Aside from its positive effects, what have garnered researchers' attention are its adverse side effects and adolescents' addiction to it. The present study aimed to determine the prevalence of Internet addiction and its relationship to anxiety, stress, and depression among Iranian high-school students in Shahr-e Kord, Iran.

#### Materials and Methods

The current cross-sectional study was conducted on 417 high-school boys and girls in Shahr-e Kord in 2016. In order to gather data, a two-section questionnaire was applied. It included personal information and Young's Internet Addiction Test, which explored the status of Internet addiction, and the Depression Anxiety and Stress Scales 21 (DASS-21), which investigated anxiety, stress, and depression among the students. The data were analyzed using SPSS version 20.0 software.

#### Results

As for the prevalence of Internet addiction, 69.5% of the students were normal users, 27.6% had a mild addiction to the Internet, and 2.9% were severely addicted to the Internet. The results revealed that the mean score of anxiety, depression, and stress among the Internet Addiction was significantly higher than that among the normal Internet users ( $P < 0.001$ ).

#### Conclusion

Given the prevalence of Internet addiction among students in this study which is similar to some Europe countries and its significant association with anxiety, stress, and depression, it appears necessary to plan to take interventional measures and educate students about the optimal use of the Internet.

**Keywords:** Anxiety, Depression, Internet addiction, Iran, Stress, Students.

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## 1- INTRODUCTION

The Internet is regarded as one of the most powerful media in the 21st century and more than 90% of adolescents use it for getting information (1). The Internet is integral to our daily life and its rapid progress has provided lots of opportunities for communication, information exchange, and social interactions (2). One of the most serious public health issues accompanying the widespread growth in the number of Internet users is Internet addiction (3). Since 1990, the excessive use of the Internet has been extensively explored particularly in some Western and Asian countries (4). Internet addiction is described with expressions such as Internet dependence, inevitable Internet use, problematic Internet use, and compulsive Internet use (5). Internet addiction always refers to the excessive and uncontrollable use of the Internet, which leads to negative consequences, the appearance of mental illness signs, and incompatibility in relationships (6).

According to recent reports, the prevalence of Internet addiction ranges from 0.3% to 0.7% in America and 0.8% in Italy, whereas its prevalence is much higher in Asian countries (7). Studies show that Internet addiction rates vary among students from different countries. It is 18% in England, 12.3 to 15.3% in Taiwan, 21.9% in China, 34.7% in Greece, and 39.6% in Iran (8-12). Seventy-five percent of studies on Internet addiction refer to the relationship between Internet addiction and depression while 57% of them refer to the association between Internet addiction and stress (13). In research conducted on 50 adult Internet addicts by Bernardi and Pallanti in 2009, 15% of the patients suffered from generalized anxiety disorder, 15% from social anxiety disorder, and 7% from stress (14). Apparently, the phenomenon of Internet addiction exists among adolescents most because 2% of studies in Italy have focused on adolescents

and have demonstrated that the prevalence of Internet addiction was 5% (7). Other studies have indicated that Internet addiction is a growing problem among European adolescents, so that approximately 4% of those in the 11-18 age range have been abusing the Internet (6). According to research by Wallace in 2014, young people are dependent on the Internet so as to study, communicate, socialize, and play (15). Various results have indicated that the excessive use of the Internet by adolescents accompanies poor social functioning, poor school performance, low self-esteem, and low life satisfaction (3).

The excessive use of the Internet restricts the time that students should spend on social interactions and religious as well as recreational activities, which could provide them with social support and make them feel competent (1). In a study on 303 Turkish high-school students in 2013, Ozturk et al. showed that 6.6% of the students were severely addicted to the Internet and the prevalence of their anxiety disorders was more than that for non-addicts. Moreover, depression, emotional disturbance, and conduct problems were positively correlated with the Internet addiction score (16). Numerous studies have been carried out on Internet addiction over the last 15 years; however, there are still substantial disagreements on this serious issue and its relationship to mental health, which might be due to social, cultural, and economic reasons (7).

A study showing cultural differences was performed in 6 Asian countries, namely Hong Kong, Malaysia, China, the Republic of Korea, the Philippines, and Japan. The highest risk of Internet addiction and social anxiety was in the Philippines and Japan, while the highest level of Internet addiction and depression was in Hong Kong and Malaysia (3). As a result, given cultural and social differences in different areas, the growing number of Internet users among adolescents, the concern over Internet

addiction and its adverse psychological and behavioral effects, particularly poor school performance, and the absence of extensive studies on this group, the present study aimed to determine the prevalence of Internet addiction and its association with anxiety, depression, and stress among Iranian high-school students in Shahr-e Kord, Iran, in 2016.

## 2- MATERIALS AND METHODS

### 2-1. Study design and population

The present cross-sectional research was both descriptive and analytical. The statistical population consisted of all public high-school students in seventh, eighth, and ninth grades in Shahr-e Kord, Iran. It was 7,283 (4,150 boys and 3,133 girls). The sample size was determined to be 417 (209 boys and 208 girls). The sampling was stratified and systematic random. The sample size formula was as follows:

$$n = \frac{z^2 \times p(1 - p)}{d^2}$$

In this formula, the **z** represents a 95% confidence coefficient, the **p** stands for an estimate of the prevalence of Internet addiction among the students (which was not available and was therefore considered to be 0.5, where the maximum sample size was obtained), and the **d** represents precision, which was considered to be 0.05. In the sampling method, two school districts were regarded as two strata. District 1 included 16, and District 2 included eight public high- schools.

Using systematic random sampling, one all-boy high school and one all-girl high school were selected out of every four high schools. Totally, four and two schools were respectively chosen from District 1 and District 2. Next, 70 students were selected from each school systematically randomly.

### 2-2. Methods

Researchers were referred to selected schools and distributed questionnaires among students. In addition, while they were completing the questionnaires, one of the researchers was present there so as to help and fully answer the students' questions.

### 2-3. Measuring tools

In order to collect data, two questionnaires were applied. The two-section questionnaire included personal information and Young's Internet Addiction Test (YIAT), which consisted of 20 questions and the respondent was expected to answer each question on the basis of a five-point Likert scale (1 = rarely, 2 = occasionally, 3 = sometimes, 4 = often, and 5 = always). The score ranges were defined as follows: 20-49 as normal user, 50-79 as mild Internet addict, and 80-100 as severe Internet addict.

The Depression Anxiety and Stress Scales 21 (DASS-21), included 21 questions and had three subscales, namely depression, anxiety, and stress, where the options were defined as follows on the basis of the Likert scale: 0 = not at all, 1 = slightly, 2 = moderately, and 3 = very (3, 17). In 2010, Alavi et al. explored psychometric properties of YIAT to validate the questionnaire. Using Young's Diagnostic Questionnaire (YDQ), the correlation of scores resulting from the questionnaire was measured and its correlation coefficient was calculated at 50%, showing its great validity (18). In a study by Shayegh et al. in 2009, the reliability of the test was assessed at 0.88 using Cronbach's alpha, which showed very high reliability (19). In a study by Asghari Moghadam et al. in 2008, the internal consistency coefficients of depression, anxiety, and stress were 0.93, 0.90 and 0.92, respectively. In 2011, Zandi et al., reported that the internal consistency of the scale using Cronbach's alpha was 0.94 for depression, 0.92 for anxiety, and 0.89 for stress. These findings respectively

indicate the desirable validity and reliability of the examined scale (17, 20).

#### 2-4. Inclusion and exclusion criteria

Those students who used the Internet over the two previous months entered the study. Incomplete questionnaires were excluded from the study.

#### 2-5. Ethical consideration

It must be mentioned that principals, students, and parents had been briefed about objectives of the research. Moreover, written consent had been obtained from the students' parents before they were included in the study.

#### 2-6. Data Analyses

Following data collection, the data were entered into the SPSS software, version 20.0. Pearson's correlation coefficient was used to show the relationship between the Internet addiction score and scores of anxiety, stress, and depression. Spearman's correlation coefficient was employed to show the relationship of the Internet addiction score to the parents' education and the students' birth order and grade. The independent t-test was applied to show the mean score of the two genders' Internet addiction and also to show the mean score of Internet addiction in proportion to the parents' jobs. Significant level was considered of  $P$ -value  $\leq 0.05$

### 3- RESULTS

Out of 417 students who had participated in the study, 209 (50.1%) were boys and the others were girls. The mean age of the students was  $13.8 \pm 1$  years old,

and 142 (34.1%) were in eighth grade. The majority of them, i.e. 186 (44.6%), used social networking sites. Moreover, 48.9% of the fathers had a university education, 52.5% of them were self-employed, 41.2% of the mothers had a university education, and 71.7% of mothers were self-employed. In addition, as for birth order, the majority of the students were firstborn (**Table.1**).

Spearman's correlation coefficient revealed that there was a direct relationship between the Internet addiction score and the students' grades ( $r = 0.167$ ,  $P = 0.001$ ); however, the Internet addiction score had no significant association with the parents' education ( $P > 0.05$ ) (**Table.2**).

Regarding the frequency distribution of the students' Internet addiction status, 290 (69.5%) were non-addicts to the Internet, 115 (27.6%) were prone to Internet addiction, and 13 (2.9%), were severely addicted to the Internet (**Table.3**). Pearson's correlation coefficient showed that there was a direct relationship between the Internet addiction score and the depression score ( $r = 0.514$ ,  $P = <0.001$ ), anxiety score ( $r = 0.481$ ,  $P = <0.001$ ), and stress score ( $r = 0.495$ ,  $P = <0.001$ ) among the students; and as the Internet addiction score increased, depression, anxiety, and stress too increased (**Table.2**).

The independent t-test indicated that the mean score of Internet addiction among the boys was significantly higher than among the girls ( $P = 0.002$ ). Nevertheless, the mean scores of depression, anxiety, and stress had no significant difference between the boys and girls (**Table.4**).

**Table-1:** Demographic characteristics of the participant students

Variables		Number	Percent
Grade	7th	136	32.6
	8th	142	34.1
	9th	139	33.3
Purpose of Internet use	Social networking sites	171	41
	Games	129	30.1
	Scientific activity	136	32.6

	Entertainment	137	32.9
	Others	38	9.1
	All of them	39	9.3
	Unmentioned	36	8.6
Birth order	First-born	194	46.5
	Second-born	130	31.2
	Third-born	41	9.9
	Fourth-born and above	29	6.9
	Unmentioned	23	5.5

**Table-2:** Correlation coefficients between the Internet addiction score and some demographic and mental health variables

Variables	Internet addiction score	
	r	P-value
Paternal education	0.003	0.96
Maternal education	0.079	0.11
Grade	0.167	0.001
Birth order	0.071	0.16
depression	0.514	<0.001
Anxiety	0.481	<0.001
Stress	0.495	<0.001

**Table-3:** The frequency distribution of the students' Internet addiction status

Internet addiction status	Number	Percent
Non-addicted	290	69.5
Prone to addiction	115	27.6
Addicted	12	2.9
Total	417	100

**Table-4:** The mean scores of the internet addiction and mental health variables in boy and girl students

Variables	Boys		Girls		Independent t-test	
	Mean	SD	Mean	SD	t-test	P-value
Internet addiction	44.9	15.7	40.1	15.5	3.12	0.002
Depression	10.2	4.3	10.3	5.9	0.12	0.90
Anxiety	8.1	3.6	7.9	4.3	0.23	0.82
Stress	10.5	4.2	10.8	5.1	0.32	0.75

SD: Standard deviation.

#### 4- DISCUSSION

Young people, especially adolescents, use the Internet much more than any other age group for various purposes such as entertainment and communication with friends and even strangers. They are therefore more prone to Internet addiction and mental problems (21). Thus, the present study attempted to address this

issue. It explored the prevalence of Internet addiction and its association with anxiety, stress, and depression among junior high-school students in Shahr-e Kord. Its results demonstrated that 27.6% of the students had a mild addiction to the Internet and 2.9% were severely addicted to the Internet. These results are consistent with results of studies carried out by Taranto et al. (2015), and Pallanti et al. (2006), on high-school

students in Italy. According to them, the prevalence of severe Internet addiction was 4.7% and 5.4%, respectively, (7, 22). However, the results are not in line with results of a study by Shek and Yu (2012), who declared that severe Internet addiction among adolescents in Hong Kong was 26.7% (23). Nevertheless, based on recent studies, the prevalence of severe Internet addiction among adolescents from different societies and cultures varies from 1.6% to 30% and the number of Internet users is on the increase (24). In the present study, there was a significant difference between the two genders with regard to the prevalence of Internet addiction, which was higher among the boys than the girls. This is consistent with results of a study performed by Zboralski et al. on computer and Internet addiction among Polish students in 2009 (25). Nonetheless, it is inconsistent with results of a study by Ozturk et al. in 2013 (16). This discrepancy in the results might be due to the purpose of using the Internet and personality patterns because boys are usually more adventurous and look for exciting experiences more in a country like Iran (26, 27).

Furthermore, the results indicated that the students' age and grade had a significant correlation with the Internet addiction score. In fact, with an increase in grade, the Internet addiction score too increased. These are not in line with results of the study by Ozturk et al. (16), but are similar to results of a study conducted in 2009 by Bakken et al. on Internet addiction among Norwegian adults (28). Other findings of the present study showed that there was a significant difference in the scores of anxiety, depression, and stress at the different levels of Internet addiction, so that the mean of the scores of anxiety, depression, and stress among the Internet addicts was significantly higher than the normal Internet users. This is consistent with results of studies carried out by Kim et al. (2009), and Ozturk et al. (2013), on

Korean and Turkish adolescents, respectively. They showed that anxiety, stress, and depression were significantly related to Internet addiction (16, 29). However, they were not similar to results of a study by Campbell et al. (2009), who had not observed this relationship (30). Obviously, the relationship between Internet addiction and anxiety, depression, and stress is reciprocal. It is likely that people suffering from depression, anxiety, and stress turn to the virtual world and the Internet so as to escape these disorders or perhaps Internet addicts are prone to these disorders due to their dependence on the Internet (31). In consequence, it is essential to conduct an in-depth study on this issue.

#### **4-1. Limitations**

The most important limitation of the present study was its cross-sectional quality, which could have both maximized the likelihood of selection bias, because some students were not cooperative and increased the probability of unreal answers due to the application of self-report questionnaires. Owing to a limitation on this age group and side effects of the excessive use of the Internet, which is associated with students' mental health and school performance, it is recommended that further and in-depth studies be carried out using longitudinal qualitative research methods in other settings.

#### **5- CONCLUSION**

The results of the present study revealed the prevalence of Internet addiction among high-school students in ShahreKord and the significant association it had with anxiety, stress, and depression. Hence, given the increase in the number of Internet users, particularly among adolescents, deleterious side effects arising from the excessive use of the Internet, and its adverse effects on various aspects of health, especially mental health, it is essential to plan to take interventional measures for preventing injury to adolescents, increase their

awareness of Internet addiction side effects, train them to optimize their use of the Internet, and foster the culture of using the Internet efficiently.

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## 7- CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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