

## Prevalence of Addiction to the Internet, Computer Games, DVD, and Video and Its Relationship to Anxiety and Depression in a Sample of Iranian High School Students

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(Received: 30 May 2013; Revised: 10 May 2014; Accepted: 27 Jul 2014)

**Objective:** The objective of this study was to assess the prevalence of addiction to the Internet, computer games, DVD, and video and its relationship to anxiety and depression in a sample of Iranian high school students.

**Methods:** In this cross-sectional study 1020 high school students (males and females) were selected randomly from different areas of Shiraz city in southern Iran. They were interviewed according to the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> ed (DSM-IV) criteria.

**Results:** About 50% of the students were females, 277 students (27.2%) were studying in the first year of high school, 242 (23.7%) were in the second year, and others in the third year. The prevalence of anxiety was significantly higher in females than in males ( $p < 0.05$ ). The prevalence of anxiety was lower among students of the third year ( $p < 0.05$ ). The prevalence of depression was significantly higher in students with lower economic status defined as family monthly income. Internet dependence was seen only in 5 students. The prevalence of anxiety was significantly higher in the students who used internet for chatting, amusement, and reading news ( $p < 0.05$ ). The prevalence of anxiety was significantly higher in students who were DVD or video CD dependents ( $p < 0.05$ ). The students who used especial drugs or had especial diseases had higher rates of depression and anxiety ( $p < 0.05$ ).

**Conclusion:** Internet addiction may cause depression and anxiety in high school students. It seems necessary to develop an Internet addiction prevention program for adolescents taking into account the psychological factors such as depression and Internet use habits.

**Declaration of interest:** None.

**Citation:** Ahmadi J, Amiri A, Ghanizadeh A, Khademalhosseini M, Khademalhosseini Z, Gholami Z, et al. Prevalence of addiction to the internet, computer games, DVD and video and its relationship to anxiety and depression in a sample of Iranian high school students. *Iran J Psychiatry Behav Sci* 2014; 8(2): 75-80.

**Key words:** • Addiction • Anxiety • Computer Games • Depression • High School • Internet • Student

### Introduction

The computer and the Internet have provided some wonderful opportunities for children. Although studies on the effects of children's use of

computers are still undetermined, some initial studies showed positive and negative effects in this regard. Children commonly use computers for playing games, completing school assignments, sending/receiving e-mails, and connecting to the Internet. This may sometimes interfere with other activities such as homework or normal social interchange (1).

The Internet and computer games addiction are new problems related with the computer. Studies showed that Internet addiction positively correlated with depression, novelty seeking, harm avoidance, and reward dependence. On the other hand, Internet addiction negatively correlated with persistence, self-directness, cooperativeness, and self-transcendence. In several studies it

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was demonstrated that significant factors affecting Internet addiction were depression, gender, novelty seeking, and self-transcendence (2, 3). Computer game addiction is excessive or compulsive use of the Internet, computer, and video games that may interfere with daily life. It is not clear whether Internet and video game playing meets the diagnostic criteria of Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (DSM-IV) (4).

Previous studies about Internet addiction have investigated several associated psychological variables such as shyness, loneliness, self-consciousness, anxiety, depression, and interpersonal relations (5). Some studies revealed a significant association between Internet addiction and depressive symptoms in adolescents and high school students. This association is supported by temperament profiles of the Internet addiction group. Many investigations suggest the necessity of the evaluation of the potential underlying depression in the treatment of Internet-addicted adolescents (6). Moreover, the level of Internet addiction correlated positively with the level of depression and suicidal ideation among high school students. Based upon several studies, there were significant positive correlations among Internet addiction, depression, and suicidal ideation in adolescents (7). Kim et al. showed that the levels of depression and suicide ideation were highest in the Internet-addicts group than other students. They advised future studies to investigate the direct relationship between psychological health problems and Internet dependency (8).

In this study we tried to investigate the prevalence of Internet, computer games, and DVD and video addiction among high school students in Southern Iran, Shiraz, and its relation to depression and anxiety.

### Materials and Methods

During the years 2008 and 2009 and in a cross-sectional study 1020 high school students (males and females) were selected randomly by area and cluster sampling from different areas of Shiraz in Southern Iran. An informed consent was received from each

participant and they were assured of the confidentiality of the data.

The students were given a full explanation of the reasons for the implementation of the study and were informed that their responses would be confidential. They were asked to express their personal comments and recommendations at the end of the interview. Special attention was paid to ensure that the students clearly understand the instructions of the interview. In addition, they were asked not to say their name or student number in order to encourage them to provide more open and honest answers. The students were given enough time for the interview.

Demographic data (age, sex, and economic status according to income of the family), duration of Internet usage, computer games playing, TV and satellite watching, DVD and video CD usage, and the reasons of the usages were asked at the interviews.

The students were interviewed for addiction, generalized anxiety disorder, and major depressive disorder according to the DSM-IV criteria.

### Definitions

*Mild depression:* decreased mood, presence of anxiety symptoms, and increased symptoms in the afternoon, without suicidal idea.

*Moderate depression:* decreased activity, depressed mood, agitation, decreased energy, and decreased concentration, sense of guilt, hypochondriacs, sleep disturbance, depersonalization symptoms, decreased appetite, and decreased sexual activities.

*Severe depression:* nihilistic delusions, and auditory and visual hallucinations.

*Use:* Normal use without any dysfunction.

*Dependent:* dysfunctional, and withdrawal symptoms (restlessness, anxiety, decreased concentration, insomnia, irritability, fatigue, and craving) after discontinuing.

*Abuse:* dysfunctional, but no withdrawal symptoms after discontinuing.

The obtained data were analyzed using descriptive indices and the analytic methods of the chi-squared and Pearson regression. The data were analyzed with Statistical Package for Social Sciences (SPSS) for Windows 15.0 (Chicago, IL., USA).

## Results

50% of the students were females and others were males. 277 students (27.2%) were in the first year of high school, 242 (23.7%) were students of the second year, and 501 (49.1%) were in the third year of high school. 140 students (13.7%) had low economic status (defined as family monthly income of less than 3000000 Rials income), 807 (79.1%) had moderate economic status (3000000-1000000 Rials income per month), and 62 (6.1%) had high economic status (more than 10,000,000 Rials income per month).

Table 1 shows the prevalence of depression and anxiety among students according to sex, economic state, and internet, computer, or DVD usage, and history of medical disease.

836 students did not have any sign of anxiety. Major depression was seen in 9 students. Internet abusing was seen only in 5 students (0.5%). 286 students (26.3%) mentioned that they did not play computer games. 13 students (1.3%) were computer games abusers, and 634 students (85%) reported playing computer games for amusement.

Internet dependency was seen in 19 students (1.9%). Computer games dependency was seen in 54 students (5.3%). DVD and CD dependency was seen in 39 students (3.8%). TV and satellite dependency was seen in 190 students (18.6%).

215 (21.1%) of student did not use DVD or video CD. 1 student (0.1%) was DVD or video CD abuser, and 576 students (77.7%) reported using DVD or video CD for amusement. 22 (2.2%) students did not watch TV or satellite, 4 students were abusers, and 190 (18.6%) students were dependent to TV or satellite. 455 (53.6%) students reported watching TV or satellite for film and football, and 306 (36.2%) for amusement. 94 students (9.2%) had medical problems, and 71 (7%) used some medications regularly. Prevalence of anxiety and depression were significantly higher in females ( $p < 0.05$ ). The prevalence of anxiety and depression was significantly lower in students of the third year compared to other grades ( $p < 0.05$ ). The prevalence of depression and anxiety was the same in

students in different branches. The prevalence of anxiety was significantly higher in students with lower family monthly income status ( $p < 0.05$ ). The prevalence of depression was significantly higher in students with lower economic status ( $p < 0.05$ ). The prevalence of depression was significantly higher in students who were Internet abusers or dependents ( $p < 0.05$ ), but we did not detect a significant relation between anxiety and Internet usage.

The prevalence of anxiety was significantly higher in the students who used the Internet for chatting, amusement (such as downloading music, films, and pictures), and reading the news compared to the students who used the Internet for other reasons ( $p < 0.05$ ). There was no significant correlation between depression and reason of Internet use among the students. The prevalence of anxiety and depression were significantly higher in students who were computer games abusers or dependents ( $p < 0.05$ ).

The prevalence of anxiety and depression did not show a relationship with the reason of playing computer games. The prevalence of anxiety was significantly higher in students who were DVD or video CD dependents ( $p < 0.05$ ). The prevalence of depression did not relate to the level of DVD or video CD use. Students who used DVD or video CD for resting had higher levels of anxiety and depression ( $p < 0.05$ ). The prevalence of depression and anxiety did not relate to the usage of TV or satellite ( $p < 0.05$ ). Students who watched TV or satellite for film, football, and music had lower levels of anxiety ( $p < 0.05$ ). Students who watched TV or satellite for film and football had lower levels of depression ( $p < 0.05$ ). The students who used some medications regularly or had medical problems had higher rates of depression and anxiety ( $p < 0.05$ ).

## Discussion

The problem of excessive computer and Internet usage is increasing more rapidly and it can occur together with other kinds of addiction. The causes of Internet addiction do not have only habitual bases, but also

**Table 1.** Prevalence of depression and anxiety among students according to sex, economic state, and internet, computer, or DVD usage, and history of medical disease

	(n)	Depression n (%)	P value	Anxiety n (%)	P value
<b>Sex</b>	<b>Male (510)</b>	5 (1.0)	< 0.05	7 (1.4)	< 0.05
	<b>Female (510)</b>	25 (5.0)		15 (2.9)	
<b>Grade of high school</b>	<b>1<sup>st</sup> year (277)</b>	7 (2.6)	< 0.05	5 (1.8)	< 0.05
	<b>2<sup>nd</sup> year (242)</b>	12 (5.0)		3 (1.2)	
	<b>3<sup>rd</sup> year (501)</b>	6 (1.2)		1 (0.2)	
<b>Economic state</b>	<b>Upper (62)</b>	1 (1.6)	< 0.05	2 (3.3)	< 0.05
	<b>Middle (807)</b>	2 (0.3)		12 (1.5)	
	<b>Lower (140)</b>	6 (4.3)		8 (5.7)	
<b>Internet</b>	<b>Use (590)</b>	11 (1.9)	< 0.05	25 (4.3)	> 0.05
	<b>Dependence (19)</b>	2 (11.1)		1 (5.6)	
<b>Computer games</b>	<b>Playing (634)</b>	5 (0.8)	< 0.05	12 (1.9)	< 0.05
	<b>Abuse/Dependence(30)</b>	1 (2.9)		1 (4.1)	
<b>DVD/Video CD</b>	<b>Use for entertainment (576)</b>	18 (3.2)	< 0.05	11 (1.9)	< 0.05
	<b>Abuse (1)</b>	0 (0.0)		0 (0.0)	
<b>History of disease</b>	<b>Yes (94)</b>	9 (10.0)	< 0.05	10 (11.6)	< 0.05
	<b>No (926)</b>	7 (0.8)		11 (1.2)	

demographic and socioeconomic aspects. The behaviors related to Internet addiction may be a symptom of depressive disorders in adolescents (9-11).

Batthyany et al. reported excessive computer playing and Internet usage corresponding to addictive behaviors were found in 12.3% of the adolescents in Austria (12). Vilella et al. showed the rate of Internet addiction in the high school students to be about 7% which was more prevalent among males (13).

Hur in study on Korean adolescents reported significant correlations among Internet addiction, depression, and suicidal ideation (14). Ha et al. found that almost one third of subjects in their study diagnosed as Internet addicts had a significant level of depressive symptoms that required psychiatric intervention (15). These users use the Internet to such an extent that it interferes with their academic studies and they are very much preoccupied with it. However, defining this problem as an addiction remains a controversial move. It is still very much a matter of debate whether Internet addiction is a distinct disorder or a behavioral problem secondary to another disorder.

LaRose et al. suggested that Internet communication with people can alleviate depression, at least among socially isolated and moderately depressed populations such as college students (11). They added that the behaviors related to Internet addiction may be a symptom of depressive disorders in adolescents.

Educationists and parents should try to understand the root causes of any isolation in the youth. It is alarming that excessive Internet users are more likely to report having felt sad or depressed most of the days in the past year. They opined that the possible comorbidity of major depressive disorder among Internet-dependent adolescents could be explained by the internalizing tendency of the adolescents. Internalized depressive adolescents can escape from the reality or problems of the real world by losing themselves in the cyber world.

Purposeful activities on the Internet, which are focused, for example on academics-related research or discussing a project online, can be completed in relatively shorter periods of time through good planning. However, use of the Internet for entertainment may not have a time limit and some activities like multi-player games can be highly compulsive. Parental rules in such situations can set the limit, and thereby reduce excessive use and limit negative outcomes.

The rate of internet, computer games, and DVD addiction in our study were significantly lower than reports from other parts of the world. The most important reasons of usage were amusement and research.

Students with lower economic state had higher rates of depression and anxiety. The prevalence of anxiety was significantly higher in students who did not use the Internet. These abnormal results may be due to lower economic states among the students who did not use the Internet.

The rate of depression among Internet abusers was significantly higher. The prevalence of anxiety was significantly higher in the students who used internet for chat, amusement, and news. Similar to other studies, the prevalence of anxiety and depression was significantly higher in students who were computer game abusers or dependents, although it did not have any relation with the reason of playing of the computer games.

The students studied experienced lower levels of depression and anxiety than other countries. For example, Ha et al. reported that one third of subjects in their study diagnosed as Internet addicts had a significant level of depressive symptoms that required psychiatric intervention (15).

### Conclusion

While Internet addiction is a new phenomenon, it has already become a subject of numerous studies. On the other hand, it is a very complicated problem and it is difficult to state whether it is more accurate to treat the problem totally as an addiction or not (15-17).

In summary, it can be concluded that the results presented in this study are for the most part in accordance with those of other authors and other studies on this subject. Some differences could be the result of different conditions, instruments, and differences in the number and structure of the studied group.

### Acknowledgments

We are very grateful to the Vice Chancellor for Research at Shiraz University of Medical Sciences for supporting this study financially.

### Authors' contributions

JA conceived and designed the evaluation and helped to draft the manuscript and its revision and re-evaluated the clinical data. AA participated in the evaluation and collection of the clinical data, and helped to draft the manuscript. AGh participated in conceiving and designing the evaluation and helped to draft the manuscript and re-evaluated the clinical data. MKh, ZKh, and

ZGh participated in the evaluation and collected the clinical data. MSh helped to draft the manuscript and revised the manuscript. All authors read and approved the final manuscript.

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