Evaluation of Psychiatric Comorbidity in Adolescence with Excessive Computer Game Players

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ABSTRACT

Despite of the increasing use of games, yet assessment of causes and consequences of these games were less considered. The purpose of this study was to determine the psychiatric disorders in comparison with usual game users. Firstly PVGT questionnaire was given to 1056 male students at ages 12-18. Students who had score 70 or higher had eligible criteria for excessive or problematic or addictive game user. In the second stage of study, the addicted user group was interviewed by clinical psychologist (M.S) with use of K-SADS. In people that had early symptoms of disorders, questionnaires attachment of K-SADS were used, finally the interview based on DSMIV criteria was performed for confirmation of diagnose of psychiatric disorders. In this study of 1000 male, 46 male equivalents to 4.3 percent were excessive or addictive game users. Prevalence of MDD, types of phobias, TSD, SAD, panic disorder, ADHD and OCD although were predominantly higher percent in addictive game users, difference was not significant based on(P< 0.05). The overall prevalence of anxiety disorders and psychiatric problems was significantly higher in this group. In this study a large range of disorders were found. The excessive users of video game were associated with an increased presence of psychiatric disorders specially anxiety disorders. In the future studies, the causal role of excessive game abuse and side effects of this game on mental health should be considered.

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INTRODUCTION

Nowadays industries and companies manufacturing computer and its equipment have extended their penetration rate and application among families annually by newer and cheaper products. Meanwhile, computer and video games have become one of the alternatives for traditional activities in free times like interactive and social games [1], and probability of excessive use of these games is increasing over the time by increasing variety and access to them. On the other hand, cyber space games provide opportunities for creating online social communications and new identities within them game, so that in 2008 it was stated that there are 174 million excessive game players with averagely 4 hours excessive playing per week, while it was increased by 4 percent in another study in 2010 as 2 days of perfect playing per week [2].

In other words, 21th century's adolescents are generation of gaming, and absence of computer and internet games for them is impossible. To this end, one of the research tasks in the current century understands effects and consequences and perhaps advantages of these games [2].

Addiction to Computer Games
In various studies it has been shown that almost 70 percent of 10 -15 years old children sometimes use computer games and 40 percent of adolescents are users of online games. Online games have been more time-consuming and

addictive and they have been substitute for such important activities as sports and social relationships in real world [2]. In some studies like Daniel, 6 percent of game users are regarded as excessive or addicted users of games [3]. Scholars strongly attempt to confirm problematic use of games as a kind of addiction and develop fixed diagnosis criteria for it, and they recognize it as a kid of behavioral addiction.

Addiction means behaviors producing short term rewards which include brain's rewarding system and thus cause instability of the behavior despite of awareness about its negative outcomes including reduced behavior control. In other words, reduced control is one of the main symptoms of dependency and addiction [4].

Behavioral addiction is not dependent on drug abuse, but it has characteristics similar to drug dependency. With insistence on repeating the behavior it is clear that often outcome of tension for the behavior is raised, and there would be quick stop in the behavior but it is temporary. Recently video and computer games are also referred to as behavioral addiction and technologic addiction [7].

In confirming theory of inclusion of addiction to computer games in behavioral addiction there are etiologic similarities and even similarities in medical reactions. In terms of genetic, drug addiction is higher in relatives around the people with internet addiction [2]. In brain imaging, long-term changes in brain rewarding system, which occurs in drug abusers and reduction of Dopamine receptor up to 10% after computer and video games are observed [8]. In terms of medical similarities, positive effect of 12-step training, which is used for drug abusers, and effectiveness of cognitive behavior therapy have been confirmed in improving symptoms of users [9].

In other studies, treatment with Naltrexone, which is Opioid receptor antagonist, has been effective in improvement of behavioral addictions including obsessive purchase and internet addiction. In other words, Opioid receptors may have considerable role in behavioral addiction [2]. Naltrexone is one of the main drugs for Opioid withdrawal. Also, drugs affecting Glutamate activity are effective in the field of behavioral addiction, and Topiramate, that blocks one types of Glutamate receptors, can reduce impulsive behaviors [2]. Behavioral addiction and substance addiction have common cognitive manifestations in neurological tests (Neuro Cognitive) such as problems with inhibition, planning, flexibility, that are observed in both cases [10].

As mentioned earlier, various studies emphasize on inclusion of computer games as a kind of behavioral addiction. These games especially online games act like gambling. They lead to increased excitation, stimulation of reward system, drawing attention and seeking more rewards. Since there are five main items for behavioral addiction and they are present in excessive computer game players, thus it can be considered as behavioral addiction. These five items include loss of control, high preoccupation, and withdrawal of mood facilitation after usage, or using the games as a way to mitigate the negative mood and increased conflicts [2].

Considering above mentioned facts, recent focus of authors is on investigation of negative consequences of these games, so that many research works have been conducted focused on addictive role of games during 2006 – 2010 by Van Rooij et al. [11]. In their studies it was observed that the games especially online games create false interactive space for individual and often symptoms of social anxiety are higher in excessive game players compared to general population, while there is strong relationship between social communication in real world and increased self-confidence and reduced anxiety.

In studies it is observed that excessive use of games is associated with negative outcomes in terms of mental health, and linear increase in time of these games is associated with increased negative consequences and outcomes like increasing depression and anxiety [12]. In people in higher ages, lower self-esteem and life satisfaction causes more addiction to internet, and often higher levels of social anxiety are observed. Also there is relationship between continuous use of game and such symptoms as reduced attention and social compatibility level. These individuals often experience higher levels of aggression and narcissism and reduced degree of control [14].

There are various studies on disorders with game addiction which are mostly based on self-reports. For example, increased ADHD is observed in excessive computer users. In this studies, completion and validation of symptoms mentioned on self-reports by clinical interviews have been less taken into account. Limited number of studies has been conducted on prevalence of this disorder and comorbid disorders in Iran. In the study by …prevalence of this phenomenon among high school students was reported as 8 percent, and average score of anxiety and depression was reported as higher in this group. In other studies higher scores of neuroticism, psychological pressure, anxiety

and social phobia, all of which were based on self-reporting surveys. Presence of disorder has not been examined based on psychiatric examination criteria [15].

Considering increasing role of these games in Iranian children life and rare studies regarding prevalence and consequences of these games, current studies investigates prevalence of psychiatric comorbidity in this group. In this study, individuals with symptoms of disorder were precisely interviewed and eligible people were precisely specified.

MATERIALS AND METHODS

This study was conducted as case –study research in male secondary and high schools in District 2 of education organization in Arak in 2012. Boys at ages 12 to 18 years were selected based on cluster sampling. Clusters were specified proportionate to the school population. Sample size was specified as 1,000. Following taking approval of Arak University of Medical Sciences, authors referred to selected centers for sampling, and after describing research goals and taking written consent, research sample was taken. Research population included 12 – 18 years old boys who gained scores $\geq$ 70 after completing PVGT questionnaire. Thus group was eligible of criterion for excessive computer game user. They were firstly interviewed using semi-structured K-SADS test for evaluating early symptoms of psychiatric disorders in this work. In the next stage, Appendix K-SADS tests were performed for presence of psychiatric disorder among eligible individuals. In the last stage, eligible individuals were clinically interviewed based on K-SADS questionnaire and DSM- IV by psychiatric.

Inclusion criteria for respective group were PVGT questionnaire score above or equal to 70, lack of evident neurologic and physical problems. Control group was randomly selected among participants who completed PVGT questionnaire and gained scores below 70. Replication was done based on age and gender.
Inclusion criteria for control group included PVGT score below 70 and lack of evident neurological and physical problems.

Statistical Population: Male 12 -18 years old adolescents who gained score above or equal to 70 in PVGT questionnaire.

Data Collection Tool and Characteristics in Demographic Questionnaire
K-SADS: it is a semi-structured interview containing multiple choices for generalization of symptoms to information related to current diagnosis and previous year symptoms. It has been prepared based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, and reliability of Persian questionnaire are confirmed. Its steps include preliminary interviews, expert interview and / complementary checklist.
PVGT questionnaire: It is an adapted questionnaire from internet addiction test including 20 items. Each item includes 5-ponit scale ranging from often to never (1-5).

-100 Total scor20
Average user: 20-39
Frequent problems associated with using the play: 40-69
Significant problem >70
Psychometric characteristics based on studies are as follows.
High face validity for measuring aspects of game ($\alpha = 93$).
Average correlation among items (<.54)
There is evident relationship between scores and significant relationship with DSM IV criteria (p<0.01).

Research Variables
Excessive use of computer games, major depressive disorder, conduct disorder, dysthymia disorder, Generalized Anxiety Disorder, phobias, obsessive compulsive disorder, attention deficit hyperactivity disorder, Tic disorder.

Data Analysis
Following collection of data, the questionnaire was coded and data were entered into computer. After ensuring accuracy of data, descriptive and inferential methods were used. In order to examine homogeneity of groups, independent t-test was used for quantitative variables, and chi-square test was used for qualitative variables. Overall, for investigating quantitative variables with normal distribution, t-student test, one-way variance analysis

was used. For quantitative variables with abnormal distribution, non-parametric tests (chi square and Wilcoxon) were used. In order to determine effect of confounding variables on dependent variable in two groups, one-way variance analysis was used. Confidence coefficient in test was considered as 95 percent.

RESULTS

Number of statistical samples was estimated as 1000 for this study. In the current study, questionnaire was given to 1,200 students and 1,058 ones completed PVGT questionnaire. 46 subjects (4.3%) gained PVGT score above 70 for internet addiction criterion out of 1,058.

Table 1. Game addiction prevalence based on PVGT >> 70 in total population

Frequency		percent
Game addiction	46	4.3
Total	1058	100

Table 2. Demographic characteristics of subjects in terms of PVGT score (n = 1,058)

Eligible for computer game addiction score (PVGT70)		Problematic PVGT: 40 - 69		No problem GT40	
Percent	frequency	Percent	frequency	Percent	frequency
4.3	46	43.4	459	52.2	553

553 subjects had non-problematic use of computer games. 459 ones (43.4%) had problematic use of internet. 46 (4.3%) ones had criteria of internet addiction.

Table 3. Demographic characteristics of parents in total subjects (n = 1,058)

	Mother education			Father education		
	Valid percent	**Percent**	**Frequency**	**Valid percent**	**Percent**	**Frequency**
Illiterate	36	3.4	3.8	39	3.7	4.1
Below fifth grade	133	12.6	14	80	7.6	8.5
Secondary school	33	3.1	3.5	25	2.4	2.6
Secondary school degree	203	19.2	21	2.8	19.5	21.8
High school degree	447	42.2	47.1	4.4	38.2	42.7
Associate degree	28	2.6	2.9	51	5.4	12.3
BA	62	5.9	6.5	116	12.3	2.6
MA	8	0.8	0.8	25	2.6	5.4
Total (informed individuals)	950	89.8	100	946	100	100
No information	108	10.2		112		
Total	1058	100				

Among 1,058 subjects, 946 ones completed information related to father education and 950 ones completed information related to mother education.

Table 3. Total educational level of subjects participating in plan

	Frequency	Percent	Valid percent
first year of high school	374	35.3	37.4
Second year of High school	316	29.9	31.6
third year of High school	227	21.5	22.7
Fourth year of high school	82	7.8	8.2
Total (informed individuals)	999	94.4	100
no information	59	5.6	
Total	1058	100	

999 ones out of total subjects (1058) completed information related to educational level.

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Table 4. Psychiatric disorders in patient and control group (n = 30)

| Disorder type | control | | | | percent | Patient | | | | Percent | Significance level |
| | Frequency | | | | | Frequency | | | | | P-value |
	past	present	Past and present	total		Past	present	Past and present	total		
Mood disorder	-	1	2	3	10		4	1	5	33.3	727.0
MDD		1	2	3	10		4	1	5	33.3	727.0
Dysthymia	-	-	-	-	0	-	-	-	-		-
Bipolar disorder	--	--	-	-	0	-	-	-	-		-
Cyclothimia					0	-	-	1	1	3.3	Incomputable
Conduct disorder	-	-	--	-	0	-	-	-	-		-
ODD	1	-	-	1	3.3	-	-	2	2	6.6	1
GAD	-	-	3	3	10	-	2	5	7	23.3	344.0
Phobia social	-	-	2	2	6.6	-	-	6	6	20	289.0
simple phobia	-	-	2	2	6.6	-	-	5	5	6/16	453.0
PTSD	-	-	-	-	0	-	-	1	1	3.3	Incomputable
separation anxiety	1	-	-	1	3.3	1	-	-	1	3.3	1
Panic disorder	1	-	-	1	3.3			2	2	6.6	1
Performance anxiety	-	-	2	2	6..6	-	3	1	4	13.3	687.0
Anxiety Disorder				11	36.2				26	86.6	014.0
ADHD	3	-	-	3	10	-	---	8	8	26.6	227.0
Tic	1	-	-	1	3.3	2	-	-	2	6.6	1
OCD	1	-	1	2	6.6		3	1	4	13.3	687.0
Enuresis	2	-	-	2	6.6	2	-	-	2	6.6	1
Without disorder				24	80				7	23.3	002.0
Total				30					30		1

- -Chi-Square test
- -Binomial non-parametric test

Considering low volume of sample in some cases, Binomial non-parametric test was used, and chi-square test was used in samples with higher sample volume. Significance level is at least 05.0.

Table 4. Presence of symptoms of psychiatric disorders in patient and control group (n = 30)

| Disorder type | Control | | | | percent | Patient | | | | percent | Significance level | |
| | Frequency | | | | | Frequency | | | | | | |
	past	present	Past and present	total		Past	present	Past and present	total			
Mood disorder	---	-	-4	4	13.3		4	1	5	16.6	1	
MDD	2	2	-	4	13.3	1	3	8	12	40	046.0	
Dysthimia	-	-	-	-		-	-	-	-		-	
Mania	-	--	-	-		-	1	-	1	3.3	Incomputable	
cyclothimia	-	-	-	-		-	-	1	1	3.3	Incomputable	
Conduct disorder	-	-	--	-		-	-	-	-			
ODD	1	-	-	-	303	-	-	3	3	10	523.0	
GAD	2	2	-	4	16.6	-	2	9	11	36.6	071.0	
Phobia social	2	-	2	4	16.6	2	-	6	8	26.6	248.0	
simple phobia	2	1	-	3	10	-	-	5	5	16.6	727.0	
PTSD	-	-		-		-	-	1	1	3.3	Incomputable	

eparation anxiety	1	-	-	1	2.2	1	-		1	2.2	1
Panic disorder	1	--	-	-	3.3	1		2	3	10	523.0
Performance anxiety	2	-	2	4	13.3	2	3	1	6	20	480.0
OCD	2	-	1	3	10	1	3	1	5	16.6	727.0
Anxiety symptom				19					40		006.0
ADHD	3	-	1	4	13.3	2	-	8	10	33.3	109.0
Tic	1	-	-	1	3.3	2	-	-	2	6.6	1
Enuresis	2	-	-	2	6.6	2	-	-	2	6.6	1
BMD	-	-	-	-	0	1	-	-	-	3.3	Incomputable
Without disorder				20	66.6				5	1606	003.0
Total				30					30		

Table 5. Comparison of mother educational level in case and control group (n = 35)

	Control Group (n=35)			Game addictiongroup (n=35)			Difference level		
	frequency	percent	Valid percent	Frequency	percent	Valid percent			
Literate	15	1.87		0	0				
Elementary school	83	10.37		7	20				
Secondary school	141	17		6	17				
High school degree	348	43.5		15	42.8				
Associate degree	33	4.12		3	8.5				
BA	65	8.12		3	8.57				
MA	15	1.87		1	2.85				
Total	800	100		35	100				

Using chi-square test for distribution of mother educational level in case group (group with computer addiction) and control group, it was observed that there is no significant difference (P = 0.6191) based on p = 0.05 in terms of total distribution of mother educational level.

Table 6. Comparison of father educational level in case and control group (n = 35)

	Control Group (n=35)			Game addiction group (n=35)			Difference level		
	frequency	percent	Valid percent	frequency	percent	Valid percent			
Literate	45	5.6		0	0				
Elementary school	34	4.25		4	11.4				
Secondary school	180	22.5		9	25.71				
High school degree	372	46.5		10	28.57				
Associate degree	33	4.12		4	11.42				
BA	61	7.62		6	17.4				
MA	93	11.62		1	2.85				
Total	800			35					

Father Educational Level

800 subjects completed information related to father educational level. Out of 46 subjects with internet addiction, 35 ones completed this section. Using chi-square test for distribution of father educational level, significant difference was observed between father educational level in case and control group (P = 004) based on p = 0.05.

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DISCUSSION AND CONCLUSION

In this study, which was conducted among 12-18 years old students, 1,200 ones received PVGT questionnaire and 1,058 questionnaires were returned. To this end, people with score below 40 were non-problematic (2.52%), people with score 40 – 69 (43%) were people at risk, people addicted to computer games were with scores 70 or higher (3.4%). Out of total participants, 946 ones completed information related to father education and 950 ones completed information related to mother education. Highest level of educational level among parents was high school degree (1.42% = mothers, and 7.42% = fathers). Highest level of educational level for participants was first year of high school (4.37%). One of the problems of current study was lack of accurate attention by subjects in completing demographic questionnaire. Although 1,200 questionnaires were received, 800 ones completely filled demographic information. Out of 46 students addicted to computer games, 30 ones participated in final plan which included K-SAD evaluation and DSM-IV interview. Based on the main methodology, screening interview was conducted based on KSAD. Individuals, who were eligible of respective disorder symptoms criteria in initial screening interview based on K-SAD semi-structured questionnaire, were included in second stage. In second stage, Appendix K-SADS tests were performed for presence of psychiatric disorder among eligible individuals. In the last stage, eligible individuals were clinically interviewed based on K-SADS questionnaire and DSM- IV by psychiatric. Major Depressive Disorder: there were symptoms of Major Depressive Disorder in 4 ones (3.31%) control during one past year, and continuing currently. In case group, 4 ones had these symptoms currently, one subject had them currently and during at least one past year (6.16%). Considering low sample size (below 10), binominal non parametric test was used and significance level was about 1, which is not significant based on p = 0.05. After final interview in control group, finally 3 ones had currently Major Depressive Disorder and one subjects had it during last year. In case group, four subjects had it currently and one subject had it during last year. Overall, 5 subjects (3.33%) had Major Depressive Disorder, and the relationship was not significant (727.0). considering prevalence of disorder in depression among adolescents is about 15-24 percent and it is 1.4 and 4.8 percent in Iranian studies, it is stated that depression in control group is relatively closer to findings in previous works. However, depression is specifically high in case group (3.33%) and lack of significance relationship can be due to small sample size in the study.

Dysthymia Disorder: This disorder symptoms was observed in none group. Prevalence of this disorder is reported as 5.0 percent and it is reported as 3.2 percent in Iranian studies, and lack of observing this disorder may be due to small size.

Bipolar Disorder: Primary symptoms of mania were observed in one subject (3.3%) in case group and it was zero in control group. It cannot be computed according to BIO non parametric test. In second screening, one subject had bipolar disorder and mania prevalence symptoms in both groups in this study. According to figures, prevalence of bipolar disorder in adolescents is one per 100, and no case of it was observed in this study due to small sample size. Findings regarding higher prevalence of depression in children addicted to computer games are rare and limited to studies based on questionnaires. Of course, regarding internet addiction, this dependency has been observed in several studies, but it is not clear if it is causal relationship. On the other hand, depressed people use game as a means for coping with unresolved stress and temporary mood regulation. Individuals with game addiction suffer from depression due to losing self-efficiency, control and reduced performed in various areas. In current study, depression disorder was clearly observed more in game addicted individuals. Unlike previous studies, clinical interview was also conducted in this study in addition to questionnaire [29]. It is recommended that future studies are done using larger sample size in longitudinal studies with emphasis on causal role of two variables and severity of relationship between depression and addiction to computer games.

Cyclothymia Symptoms: It was not observed in none group. Due to low prevalent of this disorder in adolescence (0.06%), it was not observed in the current study due to small sample size.

Generalized Anxiety Disorder: symptoms of disorder were observed in 2 subjects currently and two ones in the past one year in control group. It is overall 6.16 percent. 9 subjects in one past year and currently and 2 ones currently had these symptoms in case group, overall for 6.36 percent. According to chi-square test, difference is 071.0 percent which is close to significance level, but it is not significant. Presence of anxiety in control group was 10 percent which is similar to figure mentioned in Iranian studies (5.10%), but it is 3.23 percent in case group, and it is not significant with difference 344.0. although difference in disorder percent in two groups is more than twice.

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Panic Disorder: Presence of these symptoms was 3.3 percent in control group and 10 percent in case group. Using binomial non parametric test, 523.0 differences is not significant. In addition, presence of panic disorder in control group was 3.3 percent which is compatible to findings in Iranian studies (about 3%). It was 6.6 percent in case group, which is twice control group. But difference is not significant due to small size of sample size.

Obsessive-Compulsive Disorder: Presence of these symptoms was 10 percent in control group and 6.16 percent in case group. Using binomial non parametric test, 272.0 difference is not significant. In addition, presence of obsessive-compulsive disorder in control group was 6.6 percent which is compatible to findings in Iranian studies (about 4%). It was 3.13 percent in case group, which is twice control group. But difference is not significant due to small size of sample.

Posttraumatic Stress Disorder: Presence of these symptoms was 0 percent in control group and 3.3 percent in case group. Using binomial non parametric test, the difference cannot be computed. In addition, presence of this disorder in control group was 0 percent which is and it was 3.3 percent in case group. But difference cannot be computed due to small size of sample.

Simple Phobia Disorder: Presence of these symptoms was 10 percent in control group and 6.16 percent in case group. Using binomial non parametric test, 727.0 difference is not significant. In addition, presence of this disorder in control group was 6.6 percent which is compatible to findings in Iranian studies (about 2%). It was 3.16 percent in case group, which is twice control group. But difference (453.0) is not significant due to small size of sample.

Social Phobia Disorder: Presence of these symptoms was 6.16 percent in control group and 6.26 percent in case group. Using binomial non parametric test, 248.0 difference is not significant. In addition, presence of this disorder in control group was 6.6 percent which is compatible to findings in Iranian studies (about 3.4%). It was 20 percent in case group, which is twice control group. But difference (289.0) is not significant due to small size of sample. Among anxiety disorders, this type of disorder has been discussed in several studies in internet addicted people and in limited way in computer game addicted people. It seems that communication is easier and safer in cyber space, and it can be easily cut. Thus, it is seemingly a safe way for communication in isolated people and people with social anxiety and it is a non-healthy way to solve this problem. It is worth noting that the relationship communication in natural and non-virtual environments increases self-confidence and reduces the stress, while increased communication in cyberspace reduces self-confidence to communicate in the natural space [29].

Performance Anxiety Disorder: Presence of the symptoms was 3.13 percent in control group and 20 percent in case group. 480.0 difference is not significant. In addition, presence of this disorder in control group was 6.6 and it was 3.13 percent in case group, which is about twice control group. But difference (687.0) is not significant due to small of sample size.

Separation Anxiety Disorder: Presence of the symptoms was 3.3 percent in control group and 6.6 percent in case group. Using binomial non parametric test, 1 difference is not significant. In addition, presence of this disorder in control group was 2.2 percent which is compatible to findings in Iranian studies (about 2.1%). It was 2.2 percent in case group. The difference (1) is not significant.

Anxiety Disorders: Anxiety symptoms were observed in 19 cases in control group and 40 cases in case group, which it is significant using chi-square (0.006%). Presence of anxiety disorder in control group was 11 cases, and it was 26 cases in case group, which is significant (014.0). In this study it was observed that despite of higher prevalence of anxiety disorders in computer gaming addicted group, though in non-significant level, general prevalence of anxiety disorders is considerably higher in gaming addicted group.

Attention Deficit Hyperactivity Disorder: Symptoms of this disorder were observed in 3.13 percent of control group and 3.13 percent in case group. It is not significant with 109.0 percent using chi-square test. Presence of this disorder in control group is 10 percent and it is 6.26 percent in case group, and it is significant with 227.0 difference. Attention deficit hyperactivity disorder is discussed more than other disorders in previous studies. It seems that reward seeking is one of the factors affecting emergence of any kind of addiction including game addiction, and people who do not receive reward from natural environment for different reasons, seek it by using drug consumption and behavioral addiction. Hyperactive people have problem in impulse control, highly demand for simulation, and have lack of management over their time and monitoring. Cyberspace gaming environment is a space for receiving

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immediate rewards and demanding incentives. Role of co-morbidity of these disorder have been mentioned in several studies.

Tic Disorder: Presence of the symptoms was 3.3 percent in control group and 6.6 percent in case group. Using binomial non parametric test, 1 difference is not significant. In addition, presence of this disorder in control group was 3.3 percent and it was 6.6 percent in case group. The difference (1) is not significant.

Nocturnal Enuresis Disorder: Presence of the symptoms was 6.6 percent in control group and 6.6 percent in case group. Using binomial non parametric test, 1 difference is not significant. In addition, presence of this disorder in control group was 6.6 percent and it was 6.6 percent in case group. The difference (1) is not significant.

Lack of Psychiatric Disorder: Lack of psychiatric disorder symptoms was 6.66 in control group and 6.16 percent in case group. 0.003 difference was significant using chi-square test. Lack of psychiatric disorder was 80 percent in control group and it was 3.23 percent in case group, and the difference was significant (002.2%). It is concluded that psychiatric comorbidity is higher in addicted group compared to non-addicted group. This finding is in favor of primary theory of the study. Like previous studies, causal role is yet unspecified in this study. In addition, sometimes role of a common etiology can be referred in creating addiction to gaming and mentioned disorders, especially considering the fact that psychopathology mechanism of this addiction is coping with stress, reaction to excitement, and eliminating sensitivity and reward demanding. Also it should be noted that comorbid disorders in any psychiatric disorders worsens prognosis, and this issue must be considered in designing diagnosis measures and treatment.

As mentioned earlier, one of the strength of this study is investigating various psychiatric disorders in individual addicted to gaming. Investigation was done using questionnaire and clinical interview which increases diagnostic value. No study has been done with these advantages up to now. On the other hand, sample size should be larger in future studies. In addition, role of severity of gaming addiction and comorbidity can be studied.

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