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# Gaming disorder among students of Tabriz University of Medical Sciences: The frequency and related factors

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## Abstract

**Background:** Gaming disorder has been identified as a health problem. Disorders in emerging adulthood might negatively affect individuals' attitude toward the world, their communication with others, and formation of their personal identity. Thus, the present study was performed to identify the frequency of gaming disorder and its related factors among students of Tabriz University of Medical Sciences.

**Methods:** A total of 813 undergraduate students of Tabriz University of Medical Sciences participated in this descriptive correlational study in 2018. All students filled the personal-social information form and Social Readjustment Rating Scale, and gamers filled gaming behaviors form and Internet gaming disorder-20 test (IGD). Data were analyzed using descriptive statistics and Pearson correlation coefficient, t- test, ANOVA, chi-square, and multiple linear regression.

**Results:** A total of 394 (48.5%) students were currently playing games. The mean of IGD scores among the gamers was 45.47 ±13.93, and 17 (4.3%) of them were recognized as having gaming disorder. The frequency of the disorder among all students was 17 (2.1%). Being male, playing online games, and having access to all 3 gaming devices (computer, smart phone, and tablet) were recognized as determining factors of gaming disorder.

**Conclusion:** This study revealed that almost half of the university students were playing video and or on line games; however, a low percentage of the gamers had addictive gaming behaviors. The results indicated the necessity of applying modifications to individuals' gaming methods as well as implementing the individual and family-centered interventions to prevent and manage gaming disorder.

**Keywords:** Video Games, Internet, Behavior, Addictive, University students

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## Introduction

In recent years, it has been admitted that addiction is not restricted to the behaviors induced from uncontrolled usage of substance, yet there are some so-called harmless behaviors that might be addictive in distinct occasions and violate individuals' life seriously. In the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM5), a new diagnostic category has been added called substance-related and addictive disorders. In this category,

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***↑What is "already known" in this topic:***
Use of digital devices and the Internet is prevalent among university students. One of the motivations for students to use them is to provide entertainment such as games. Gaming disorder has been identified as a health problem.

***→What this article adds:***
This study revealed almost half of the university students were playing video and /or on line games; however, a low percentage of the gamers had addictive gaming behaviors. Moreover, being male, playing online games, and accessing all 3 gaming devices (computer, smart phone, and tablet) were determining factors of this disorder.

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there is also a section on disorders not related to substance. Although this section includes only gambling disorders, in section III, internet gaming disorder (IGD) has been added (1). Section III includes the disorders that require more studies to be considered as an independent disorder (2).

Moreover, gaming disorder has been included in the WHO International Classification of Diseases 11th revision. In this edition, gaming disorder has been defined as a constant or frequent gaming behavior (digital or video games) that encompass both online and offline games. This disorder is displayed as (1) disturbed control over gaming (such as starting the game, frequency, severity, duration, stopping, and background), (2) too much prioritizing the game as it results in exclusion of other life interests and daily activities, and (3) continuing or intensifying the gaming behavior despite unfavorable and negative consequences. To be diagnosed, the disorder is required to be severe enough to cause a notable disturbance concerning personal, family, social, educational, occupational, or other important performance matters. In addition, to diagnose the disorder, gaming behaviors, and other features need to be apparent for 12 months. However, the duration could be shorter in case all diagnostic requirements are met and severe symptoms exist (3).

The results of the study by Wang in school students showed that one-sixth of them had video or internet gaming dependency (4). Other studies have reported the prevalence of Internet gaming disorder to be noticeably different between 1.3% and 17.7% (5-10).

The results of some other studies show that gaming disorders are associated with sleeping disturbance, school drop-out, low academic performance (11), depression symptoms (12), aggressive behaviors (13), attention disorders (14), low self-esteem, low life satisfaction (15), anxiety (16, 17), imbalanced family (4), suicide thoughts and plans, increased daily life problems, tension and neuroticism personality traits, high extroversion, and low conscientiousness (18).

The target population in most of the studies was the individuals younger than 18 years. However, in some studies, it has been stated that the stereotype of a male teenager as a classic gaming addict is no longer dealt with, as most of the gamers are young men (2). Arnett has considered the age between 18 to 29 years as emerging adulthood. Instability and numerous changes are the features of this period, which include changes in academic status and living place (leaving parental home to study or get married) and entering the business world. Disorders in this period might have a negative effect on individuals' attitude toward the world, their relationships, and forming their personal identity (19, 20). The most undergraduate students are in this age range. Use of digital devices and the Internet is prevalent among this age group.

A study in Iran showed that 98% of students are Internet users and 21% of them are problematic users (21). One of the motivations for students to use the Internet is to provide entertainment, such as online games. According to a qualitative study, students reported problems with their health and education due to the use of online games and some of them had bad relationships with friends and family (22).

Considering that gaming disorder has been identified as a health problem, it is necessary to enhance our knowledge about its prevalence and its related factors in different groups, as APA has suggested that more investigative studies should be done on this issue. On the other hand, in Iran, gaming disorder and its effects has not drawn the sociologists' attention yet, which results from the novelty of the issue. Therefore, awareness of the students' gaming behaviors and its related factors could help health policymakers to for plan appropriate educational or preventive programs.

## Methods

This was a descriptive correlational study performed in 2018 in Tabriz University of Medical Sciences. The study population consisted of undergraduate students of nursing and midwifery, health, nutrition and food sciences, paramedicine, rehabilitation, and management and medical informatics faculties. Inclusion criteria were as follows: being an undergraduate student; having access to smartphone, tablet, or computer; and willingness to participate in the study.

The sample size was calculated as 994 using the results of the study by Potenz et al (23), in which amount of error was 0.01, P = .053 and N = 2018. Type 1 error was supposed to be .05. The proportional random sampling method was used.

$$\varepsilon = z\sqrt{\frac{p(1-p)}{n}}\sqrt{\frac{N-n}{N-1}}$$

$$n_0 = \frac{z^2 p(1-p)}{\varepsilon^2}$$

$$n = \frac{n_0 N}{n_0 + (N-1)}$$

To collect the data, personal-social information form, gaming behaviors form, and IGD test questionnaire were used. Personal-social questionnaire included gender, age, marital status, field of study (major), semester, residency (dorm or others), number of close friends, perceived stress level, and perceived loneliness, parents' educational level, economical status of the family, students' grade point average (GPA) in previous semester (the score between 0-20), students' academic self-assessment, and relationship quality with classmates and professors. Perceived stress level, perceived loneliness, and relationship quality with classmates and professors were assessed by 4 questions, including "How much stress have you experienced in the past year," "How much loneliness have you experienced in the past year," "How is your relationship with your classmates," and "How is your relationship with your professors," respectively. The rate of stress was measured using the Social Readjustment Rating Scale. Gaming behaviors form included type of game (online, offline, indi-



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vidual, group) and gaming device.

The IGD test includes 20 items that reflects 9 IGD criteria in DSM-5. Additionally, this instrument includes the elements of theoretical framework of addiction model (salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse). IGD-20 test investigates both online and offline gaming behaviors during last 12 months. The items of IGD were rated in the 5-point Likert scale including completely disagree, disagree, neutral, agree, completely disagree, with the lowest and the highest points of 1 and 5, respectively. The score range of IGD items is between 20 and 100. The cutting point of the instrument is 71, out of which the higher points are considered as the cases having diagnostic criteria for Internet gaming disorder (23). After obtaining the permission for using the instrument, the original version was translated from English into Persian. To achieve content validity, the questionnaire was reviewed by 10 faculty members of Tabriz University of Medical Sciences and their corrective opinions were applied. To identify the instrument's internal consistency, the questionnaire was completed by 20 students and Cronbach alpha was achieved as 0.91.

Stress Scale (Social Readjustment Rating Scale) was developed by Holmes and Rihe in 1967. The Scale is a list including 43 stressful life events such as spouse's death, divorce, fire at workplace, sexual problems, et cetera. For each event, a score has been assigned considering its severity. Stressful life events have been defined as the occurrences causing readjustment changes in an individual's normal performance. The sum of points is considered as the index of an individual' s experienced stress in a distinct period of time (24). In this study, the most recent year was considered as the distinct period of time. In Iran, the reliability of the scale was evaluated by Manouchehri et al among university students and it was determined by Cronbach alpha coefficient as 0.75 (25).

The study was approved by the regional ethics committee in Tabriz University of Medical Sciences (IR.TBZMED.REC.1395.771). First, the total number of students of each major was obtained. Afterward, samples were proportionately and randomly selected from among majors based on the calculated sample size. Participants were selected through preparing the list of students' names and assigning a number to each one at random using a random number generator. Then, the researcher referred to the classes or the clinical training units at the end of class time to not interfere with the student learning process. After obtaining permission from the professor, explaining the study purpose, and obtaining informed consent from the eligible students, students were requested to complete the questioners. They were asked to complete IGD-20 if they were currently playing games. Participants were assured about their voluntary nature of their participation and confidentiality of their information.

Data were analyzed using SPSS version13 (SPSS Corp). First, the normality of the data distribution was approved using the Kolmogorov-Smirnov test. Afterward, data were analyzed using descriptive statistics (mean, standard deviation, frequency, and percentage) and inferential statistics (Pearson correlation coefficient, t-test, ANOVA, chi-square, and multiple linear regression) considering .05 as significant.

## Results

A total of 813 undergraduate students of Tabriz University of Medical Sciences participated in this study. Of them, 170 participants were excluded from the study due to their unwillingness to complete the questionnaire. In addition, 11 incomplete questionnaires were excluded. The mean age of participants was 21.48 (2.51) and the mean of their GPA was 16.79 (1.60). The majority of the participants were girls (n = 530 [65.3%]), single (n = 697 [85.7%]), and stayed in dorms (n = 470 [57.8%]). The number of students from the faculties of nursing and midwifery, paramedicine, health, nutrition and food sciences, rehabilitation and management, and medical informatics was 367 (45.1%), 163(20.0%), 72(8.9%), 33(4.0%), 109(13.4%), and 69(8.5%), respectively. Table 1 demonstrates the personal-social information among gamers and nongamers.

*Table 1.* The Personal-Social Information Among Gamers and Nongamers[a]

| Variable | | Gamers f(%) (N = 394) | Non gamers f(%) (N = 416) |
|---|---|---|---|
| Gender | Male | 200(38) | 327(62) |
| | Female | 194(68.8) | 88(31.2) |
| Marital status | Single | 351(50.5) | 344(49.5) |
| | Married | 37(34.9) | 69(65.1) |
| | Divorced | 2(100) | 0(0) |
| Residence status | Living with family | 228(48.7) | 240(51.3) |
| | Living in dormitory | 163(48.7) | 172(51.3) |
| Economic status of the family | Income equal with living expenses | 213(48.6) | 225(51.4) |
| | Income greater than living expenses | 118(48.8) | 125(51.2) |
| | Income less than living expenses | 47(49.5) | 48(50.5) |
| Number of close friends | ≤ 2 | 140(44.3) | 176(55.7) |
| | 3-6 | 184(49.2) | 190(50.8) |
| | ≥7 | 70(58.8) | 49(41.2) |
| Perceived stress level | High | 244(51.3) | 232(48.7) |
| | Low | 130(46.6) | 149(53.4) |
| | Without feeling of stress | 19(35.2) | 35(64.8) |
| Perceived loneliness | High | 168(53) | 149(47) |
| | Low | 188(48.3) | 201(51.7) |
| | Without feeling of loneliness | 38(36.9) | 65(63.1) |

[a]GPA, grade point average.



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*Table 1.* Ctd

| Variable | | Gamers f(%) (N = 394) | Non gamers f(%) (N = 416) |
|---|---|---|---|
| Perceived harmony in family | Very good | 87(44.4) | 109(55.6) |
| | Good | 148(47.3) | 165(52.7) |
| | Normal | 121(52.2) | 111(47.8) |
| | Bad | 30(58.8) | 21(41.2) |
| | Very bad | 6(46.3) | 7(53.8) |
| Students' academic self-assessment | Very good | 20(38.2) | 51(71.8) |
| | Good | 143(52.4) | 130(47.6) |
| | Normal | 155(49.8) | 156(50.2) |
| | Bad | 52(47.3) | 58(52.7) |
| | Very bad | 19(51.4) | 19(51.4) |
| Relationship with classmates | Very good | 65(44.5) | 81(55.5) |
| | Good | 198(48.9) | 207(51.1) |
| | Normal | 111(49.3) | 114(50.7) |
| | Bad | 14(60.9) | 9(39.1) |
| | Very bad | 6(54.4) | 5(45.5) |
| Relationship with professors | Very good | 60(43.8) | 77(56.2) |
| | Good | 185(48.3) | 198(51.7) |
| | Normal | 128(51) | 123(49) |
| | Bad | 14(66.7) | 7(33.3) |
| | Very bad | 9(60) | 6(40) |
| Gaming device | computer | 22(5.6) | 30(7.3) |
| | Tablet | 3(0.8) | 4(1.0) |
| | Smartphone | 134(34.1) | 172(41.7) |
| | Smartphone/ computer | 162(41.2) | 144(35.0) |
| | Smartphone/Tablet | 11(2.8) | 16(3.9 |
| | All devices | 61(15.5) | 46(11.2) |
| GPA of previous semester | | 16.56±1.71 | 17.03±1.45 |
| Age | | 21.39±2.24 | 21.54±2.66 |
| Score of Holmes and Rahe Stress Scale | | 101.16±78.55 | 82.76±62.12 |

A total of 394 students (48.5%) of 813 participants were playing games. Among them, 27.8% played online games, 58.6% played offline games, and 13.6% played both. Moreover, 60.9% played individual games, 23.7% played group games, and 15.4% played both.

The mean of IGD score among gamers was 45.47±13.93. Considering the cut point of the instrument, from among all 394 users, 4.3% (n = 17 participants) were recognized as having IGD disorder and the frequency of the disorder in the study population was 2.1%.

The results of the data analysis showed a statistically significant correlation between the IGD score with social readjustment rating scale score (P =0.006; R = 0.160) and GPA (P =0.016, R = -0.136). However, there was no statistically significant correlation between age and IGD score (P = 0.315; R = 0.052). Table 2 shows the comparison of IGD score with personal-social information and gaming behaviors of the students.

*Table 2.* Comparing the IGD Score With Demographic Features and Gaming Behaviors of Students[a]

| Variables | | Mean ± SD | P Value | Variables | | Mean ± SD | p |
|---|---|---|---|---|---|---|---|
| Gender | Male | 50.20±14.43 | <0.001 | Type of the game | Online | 50.02±14.01 | <0.001 |
| | Female | 41.51±12.05 | | | Offline | 43.32±13.04 | |
| Marital status | Single | 45.73±13.98 | 0.338 | Number of close friends | ≤ 2 | 47.33±15.18 | 0.261 |
| | Married | 45.13±11.48 | | | 3-6 | 44.97±13.85 | |
| | Divorced | 31.50±0.70 | | | ≥7 | 44.78±11.33 | |
| Residence status | Living with family | 46.16±13.65 | 0.473 | Type of the game | Individual | 43.03±12.73 | 0.003 |
| | Living in dormitory | 45.13±14.46 | | | group | 48.31±13.05 | |
| Father education | No formal education | 37.00±0.00 | 0.339 | Relationship with classmates | Very good | 44.73±15.32 | <0.001 |
| | Elementary | 45.64±11.75 | | | Good | 43.12±11.74 | |
| | Secondary | 47.27±13.91 | | | Normal | 49.54±14.4 | |
| | High school | 47.58±13.70 | | | Bad | 51.71±18.21 | |
| | University | 44.32±14.81 | | | Very bad | 60.00±21.34 | |
| Mather education | No formal education | 37.00±0.00 | 0.670 | Relationship with professors | Very good | 42.85±14.02 | <0.001 |
| | Elementary | 46.43±13.29 | | | Good | 43.40±12.01 | |
| | Secondary | 46.66±14.88 | | | Normal | 48.39±14.05 | |
| | High school | 46.46±14.00 | | | Bad | 58.07±17.26 | |
| | University | 44.24±14.02 | | | Very bad | 65.83±20.82 | |
| Economic status of the family | Income equal with living expenses | 46.01±13.91 | 0.677 | Students' academic self-assessment | Very good | 41.70±12.55 | <0.001 |
| | | | | | Good | 41.68±10.75 | |
| | Income greater than living expenses | 45.33±14.60 | | | Normal | 48.01±14.51 | |
| | | 47.48±13.76 | | | Bad | 48.51±16.28 | |
| | Income less than living expenses | | | | Very bad | 55.21±17.17 | |

[a]IGD, Internet gaming disorder.



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*Table 2.* Ctd

| Variables | | Mean ± SD | P Value | Variables | | Mean ± SD | p |
|---|---|---|---|---|---|---|---|
| Gaming device | Computer | 51.81±14.35 | 0.014 | Perceived harmony in family | Very good | 43.05±13.73 | 0.006 |
| | Tablet | 43.33±12.22 | | | Good | 44.08±12.22 | |
| | Smartphone | 46.80±13.66 | | | Normal | 49.10±13.68 | |
| | Smartphone/ computer | 43.32±13.13 | | | Bad | 47.23±16.49 | |
| | Smartphone/Tablet | 54.27±8.50 | | | Very bad | 53.33±29.98 | |
| | All devices | 45.91±15.71 | | | | | |
| perceived stress level | High | 46.14±14.38 | 0.068 | Perceived loneliness | High | 47.00±14.43 | 0.034 |
| | Low | 44.26±13.28 | | | Low | 43.96±13.26 | |
| | Without feeling of stress | 51.94±11.29 | | | Without feeling of loneliness | 49.21±14.18 | |

*Table 3.* Predictors of the IGD Scores in Multiple Linear Regression[a]

| Variables | B | SE | B | T | P |
|---|---|---|---|---|---|
| Constant | 31.345 | 10.455 | | 2.998 | 0.003 |
| Being male | 7.585 | 1.918 | .276 | 3.955 | <0.001 |
| Gaming online | 4.999 | 2.018 | .155 | 2.477 | 0.014 |
| Having all gaming devices | 13.040 | 5.832 | .148 | 2.236 | 0.026 |

[a]IGD, Internet gaming disorder.

The results of regression test showed that being male, playing online games, and accessing all 3 gaming devices (computer, smart phone, and tablet) were determining factors of the IGD score (Table 3).

## Discussion

Results of this study showed that half of the students were playing on line and video games. Therefore, such gaming was a relatively common and prevalent phenomenon among students. However, a small percentage of gamers had gaming disorder behaviors, as 4.3% were classified as having addictive gaming behaviors. Consequently, it seems that playing games was a harmless entertainment for most of the participants. Some studies reported positive effects of playing game, such as a boost in their visual short-term memory and an improvement in the quality of their friendship (13). Similarly, previous studies reported the 1.3% to 17.7% of its prevalence. In a study in Turkey, the prevalence of the disorder was reported to be 1.3% after 455 individuals aged 10 to 29 years were investigated using a short form of the instrument (5). In Spain, a study conducted in 1074 individuals aged 12 to 58 revealed the prevalence of the disorder as 2.6% using the same instrument (6). In the study by Wang in school students of Hong Kong, it was reported that 15.6% of the participants were addicted to the internet or video games (7). In a study in Germany, the prevalence of the disorder was 5.7% among individuals aged 12 to 29 years (8). In another study conducted in Slovenia on teenager students with the age mean of 13.5 years, the disorder prevalence was reported to be 2.5% to 4.7% (9). In another study on 1251 participants aged 13 to 40 years, using the 9-item instrument, the prevalence of the disorder was 17.7% (10). The difference between the percentages could be related to diversity of the study population, instrument, and culture.

The results of the present study showed that being male was one of the determining factors of gaming disorder. This result was in agreement with previous studies (4, 26, 27). It could be because of different usages of online activities by girls and boys. Boys are usually interested in Internet gaming; however, girls utilize the Internet to use social media (28).

The results indicated that gaming behaviors, including playing online games and accessing all 3 gaming devices (computer, lap top, and smart phone) were determining factors of gaming disorder. Similarly, in the study by Wang, playing online games was identified as one of the factors associated with gaming disorder (4). It seems that individuals play games to evade the actual life problems. Online games interest such people greatly since they can regularly be updated and can provide communication opportunities; as a result, they are encouraged to stay in the virtual world. As the results of the univariable tests, family and personal problems, such as high level of perceived loneliness, low level of perceived balance in the family, low level of perceived academic performance, and high scores of Rahe Stress Scale were associated with the higher scores of gaming disorder. The literature shows that individuals turn to emotion- or problem-focused coping mechanisms when encountering stressful events and upsetting occasions. In problem-focused mechanism, the individual tries to solve the problem. However, in emotion-focused mechanism, the aim is not solving the problem but doing some activities to decrease the emotions such as anxiety, sorrow, rage, fear, and guilt. Playing games and doing recreational activities are types of application of the recent mechanism (29). This result shows the necessity of individual and family- centered interventions in order to prevent and treatment gaming disorder.

Moreover, accessing various devices for playing the games causes the individuals to be able to play the game at any time in various ways at home, at work, at study place, and outdoors, and it increases their preoccupation with virtual world and takes them away from an actual communication. The results of the study by Starvropoulos alike indicated that vast social withdrawal was associated with internet gaming disorder (30). It seems that in addition to individual and family psychological interventions for alleviating the individual and family conflicts, modifications should to be applied to individuals' gaming habits to prevent them from social life withdrawal. Providing educational courses for students concerning the games, gaming methods, and the side effects could be helpful in



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managing the use of games. Installing the games on the computer instead of the smartphone may be helpful in limiting the gaming time only to home.

In this study, the questionnaires were self-reported, which might have created the possibility of bias or giving incorrect information. Therefore, it is suggested that further studies use clinical diagnostic interviews to confirm the disorder cases. In addition, this study population were the students of Tabriz University of Medical Sciences, which limits the generalization of the findings to other populations. Previous studies have shown that culture influences the individuals' gaming behaviors. Consequently, it is recommended that more studies be conducted in different cultures to identify the factors related to gaming disorder.

## Conclusion

The results of the present study revealed that almost half of the university students were playing video and internet games; however, a low percentage of the gamers had addictive gaming behaviors. Moreover, being male, playing online games, and accessing all 3 gaming devices (computer, smart phone, and tablet) were determining factors of the IGD score. The study results indicated the necessity of applying modifications on individuals' gaming habits as well as implementing individual and family-centered interventions in order to prevent and manage gaming disorder. Providing educational courses for students about games, their side effects, and playing methods could help manage the use of the games.

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### *Conflict of Interests*

The authors declare that they have no competing interests.

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