

# Assessing behavioral patterns of Internet addiction and drug abuse among high school students

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**Background:** Internet addiction and drug abuse isolate adolescents from their family and friends and cause damage to their health, relations, emotions, and spirit. In the society, adolescents' addiction extracts high cost on health care, educational failure and mental health services.

**Objectives:** The aim of this study was to assess the behavioral patterns of Internet and drug addiction among urban and rural students in Urmia, Iran.

**Methods:** A sectional and descriptive–analytical approach with stratified sampling method was employed to recruit 385 high school students from urban and rural areas. The Internet Addiction Test (IAT) and the Addiction Acknowledgement Scale (AAS) were used for data collection.

**Results:** The total score of Internet addiction among the students was  $41.72 \pm 17.41$ . Approximately two-third of the students were not addicted to the Internet. The mean score of the AAS was  $1.87 \pm 1.23$  among boys and  $1.75 \pm 1.31$  among girls. Moreover, 8.31% of the students were prone to abusing substances. A statistically significant relationship was found between mother's literacy level and Internet addiction behavior of students ( $p=0.009$ ).

**Conclusion:** Concentrating on adolescents' behavioral patterns and their tendency toward misusing Internet and drugs is a notable procedure. Therefore, focusing on adolescents' health and institutionalizing appropriate training programs for adolescents and their families are vital.

**Keywords:** Internet, drug abuse, adolescence, addiction, behavior

## Introduction

There are ~1.2 billion adolescents in the age group of 10–19 years in the world. Adolescence is a critical period for the formation of lifestyle-related patterns, and adolescents experience physical, mental, and social interactional changes during this period.<sup>1–3</sup> As mortality and morbidity risk factors in this age group have shifted from infectious to behavioral factors over the past years<sup>4–6</sup> and, on the other hand, many health risk behaviors in adolescence are associated with disabilities and diseases throughout their lives, focusing on the behavioral risk factors must be considered for more research.<sup>7,8</sup>

Expansion of personal computers and increase in Internet connection at home and workplace have led to the advent of a dilemma called online addiction among adolescents. Internet addiction is described as uncontrollable and damaging use of the Internet and is recognized as a compulsive Internet usage disorder.<sup>9</sup> Internet users have increased by 15% between 1992 and 2000 in the whole world. Like other types of addiction, this kind of addiction isolates adolescents from their family and friends and causes damage to their health, relations, emotions, and spirit. Based on the latest research in Iran, most of the Internet users are youth, 35% of whom are in chat rooms, 28% play Internet games, and 25% search the World Wide Web.<sup>10–12</sup> The abuse of

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alcohol and drugs during adolescence and early adulthood is another serious public health problem.<sup>13</sup> The consequences of drug abuse are acute on both individual and social circumstances. Drug abuse demoralizes motivation, interferes with cognitive processes, and contributes to debilitating mood disorders and accidental injuries. In the society, adolescents' addictions extract high cost on health care, educational failure, and mental health services.<sup>14</sup> Studies have indicated that 22.4% of Iranian adolescents smoke and also 9.6% and 10.8% use alcohol and drugs.<sup>15</sup> West Azerbaijan Province is in the northwest of the country, bordering Turkey, Iraq and Azerbaijan's Nakhchivan Autonomous Republic. Urmia, the capital, is linked to Europe through Turkey's roads and the principal exit point for drugs transiting, making accessibility to drugs easy. Moreover, unemployment and social distractions are evident in Urmia. Thus, despite the previous studies accomplished in other states of Iran, we aimed to assess the behavioral patterns of both Internet addiction and drug abuse among adolescents in Urmia.

As >90% of children and adolescents spend a considerable amount of time of the day at school, which is a great place for developing regular contact with adolescents, schools can provide an appropriate environment for training a healthy lifestyle for adolescents.<sup>16</sup> Given the serious consequences of Internet addiction and drug abuse among adolescents and their devastating impact on physical and mental health, this study was aimed to evaluate the prevalence of risky behaviors such as Internet addiction and its related factors among students and adolescents of urban–rural schools. We hope the results of this study would be useful for developing health-oriented programs in the future.

## Methods

### School setting and participants

This study was designed and implemented using a sectional and descriptive–analytical approach. According to the following equation, the sample size was calculated based on the 95% confidence interval and 50% health behavior performance.

$$n = \frac{z^2 \left[ 1 - \frac{a}{2} \right] \times pq}{d^2} = \frac{1.96^2 \times .5 \times .5}{0.05^2} = 385$$

Regarding the dispersion of students in urban and rural schools, stratified sampling method was used to recruit 26 schools (12 private schools and 14 public schools) from 6 education zones of the city. Eventually, 194 boys and 191 girls who had access to the Internet via cell phone or computers were invited to participate in the study, and participants were

ineligible if they had severe impairment or were too frail to undertake the survey.

### Ethical considerations

This study was approved by the ethical review committee of the Tabriz University of Medical Sciences (Institutional Review Board approval no: 5/4/4878-20/08/2014). The required coordination was also done with the Ministry of Education and directors of educational zones and schools. Confidentiality of the information and making students aware of optional participation in the study were also considered. The purpose of the study was explained to all students, and written informed consent was obtained.

### Output measures

Data of the study were collected through sociodemographic items, including gender, student's field of study, types of school (private or public), parents' literacy, and students' residence; Internet Addiction Test (IAT); and the Addiction Acknowledgement Scale (AAS).

The Internet addiction questionnaire includes 20 Likert-scale responses. The range of the scores is from 20 to 100, where higher scores indicate a greater level of addiction. A score of 20–49 points is categorized as average online user, 50–79 points as occasional or frequent problems because of the Internet, and 80–100 points as Internet usage is causing significant problems.<sup>17</sup>

The AAS is a subscale of the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) scale that detects alcohol/drug abuse problems in the context of a general personality assessment. The scale includes 13 questions with false or true responses. The correct response to each question earns a point.<sup>18,19</sup> Owing to certain restrictions from the education organizations, a few of the questions related to sexual behaviors, alcohol, and specific drugs were eliminated. Both scales were previously translated to Persian, and standardized versions have been used in Iran.<sup>20,21</sup>

### Procedure

The questionnaires and other documents for getting permission were sent to the head office of the ministry of education, and their verifications were obtained. Then, letters related to students' cooperation with researchers were sent to all the education zones. In addition, general information related to students' population as well as phone number and address of schools were acquired. Finally, after making the required coordination in each educational zone and with the principals and obtaining written consent from students, the questionnaires were completed by self-reporting and interviewing each student individually.

## Data analysis

The obtained data were analyzed using descriptive statistics, independent *t*-test, and analysis of variance. Additionally, multivariate logistic regression analysis was applied to find a relationship between sociodemographic variables and being prone to abusing substances. All statistical tests were two sided with a *p*-value <0.05 considered statistically significant.

## Results

A total number of 385 students, including 194 boys and 191 girls, participated in this study. Of all these students, 76.9% were from public schools and 23.1% were from private schools. Also, 83.4% were living in the city and 16.6% were from rural areas. Additionally, 19.2% were studying in the field of mathematics, 19.5% experimental sciences, 18.7% humanities, 22.3% vocational, and 20.3% technical. The sociodemographic characteristics are summarized in Table 1.

The total score of Internet addiction among the students was  $41.72 \pm 17.41$ , and the range of scores was from 20 to 100. Approximately two-third of the students had lack of Internet addiction, 25.2% had average dependency, and 3.6% had severe dependency.

Using multivariable regression analysis, a statistically significant relationship was found between mother's literacy level and Internet addiction behavior of students ( $p=0.009$ ). Based on the results of independent *t*-test, there were no significant relationships between school types, gender, fields

of study, and Internet addiction. According to the results obtained from the IAT, questions "How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?", "How often do you find yourself anticipating when you will go on-line again?", "How often do you find that you stay on-line longer than you intended?", and "How often do you try to cut down the amount of time you spend on-line and fail?" received the maximum scores and question eight "How often does working on the Internet cause a problem in your work?" obtained the minimum score. The results are compared in Tables 2 and 3.

Based on the descriptive results of the drug addiction questionnaire, the items that received higher ranking than the others were as follows: adolescents' hand vibration (46.2%), excessive criticism by the family (34.3%), and pretending to be sick (30.1%). The mean score of the AAS was  $1.87 \pm 1.23$  for boys and  $1.75 \pm 1.31$  for girls. Moreover, 8.31% of the students had a higher score of 3, which indicates being prone to abusing substances. The results are summarized in Table 4.

Higher rates of addiction potential were reported in rural areas, public schools, and in the field of arts and humanities. The specific independent *t*-test and analysis of variance showed that there was no significant relationship between sociodemographic variables and being prone to abusing substances. The results are summarized in Table 5.

## Discussion

The results indicate that students were categorized as normal online users (mean score of the IAT was  $41.72 \pm 17.41$ ). Approximately two-third of the participants were categorized in the ordinary level (lack of Internet addiction), and 25.2% had moderate dependency and 3.6% severe dependency. The mean score of the AAS was  $1.87 \pm 1.23$  for boys and  $1.75 \pm 1.31$  for girls.

In the third millennium, the Internet plays an increasingly important role in adolescents' lives. Internet attraction has caused most of the adolescents to choose computers instead of interaction with peers and parents. In the present research, gender and Internet addiction had no significant relationship, whereas one study showed that mean Internet use was higher among boys than among girls.<sup>9</sup>

The effect of mothers' literacy on Internet addiction behavior was also confirmed in this study. In other words, Internet addiction was higher among the children of mothers with higher education than those with lower education. Similar results were reported in a study in Taiwan where adolescents with a higher literacy level were more exposed to Internet difficulties.<sup>22</sup> Another study in Iran revealed that the prevalence of problematic Internet use was significantly higher among

**Table 1** Frequency of sociodemographic characteristics of participants (N=385)

Variable	n (%)
Gender	
Male	194 (50.4)
Female	191 (49.6)
Type of school	
Free public school	296 (76.9)
Private school	89 (23.1)
Fields of education	
Math and physics	74 (19.2)
Experimental sciences	75 (19.5)
Humanities and literature	72 (18.7)
Applied sciences	164 (42.6)
Family residence	
Rural	64 (16.6)
Urban	321 (83.4)
Mother's level of education	
Primary school	114 (29.6)
High school	197 (51.1)
Undergraduate	74 (19.3)
Father's level of education	
Primary school	63 (16.4)
High school	206 (53.5)
Undergraduate	116 (30.1)

**Table 2** Distribution of the IAT (N=385)

No	Question	Answer options, n (%)		
		Never and rarely	Occasionally and frequently	Often and always
1	How often do you find that you stay on-line longer than you intended?	131 (34.02)	167 (43.37)	87 (22.59)
2	How often do you neglect household chores to spend more time on-line?	171 (44.41)	138 (35.84)	76 (19.74)
3	How often do you prefer the excitement of the Internet to intimacy with your partner?	187 (48.57)	119 (30.90)	79 (20.51)
4	How often do you form new relationships with fellow on-line users?	186 (48.31)	118 (30.64)	81 (21.03)
5	How often do others in your life complain to you about the amount of time you spend on-line?	177 (45.97)	127 (32.98)	81 (21.03)
6	How often do your grades or school work suffers because of the amount of time you spend on-line?	183 (47.53)	138 (35.84)	64 (16.62)
7	How often do you check your email before something else that you need to do?	226 (58.70)	102 (26.49)	57 (14.80)
8	How often does your job performance or productivity suffer because of the Internet?	200 (51.94)	145 (37.66)	40 (10.38)
9	How often do you become defensive or secretive when anyone asks you what you do on-line?	216 (56.10)	108 (28.05)	61 (15.84)
10	How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?	136 (35.32)	151 (39.22)	98 (25.45)
11	How often do you find yourself anticipating when you will go on-line again?	155 (40.25)	149 (38.70)	81 (21.03)
12	How often do you fear that life without the Internet would be boring, empty, and joyless?	224 (58.18)	97 (25.19)	64 (16.62)
13	How often do you snap, yell, or act annoyed if someone bothers you while you are on-line?	213 (55.32)	117 (30.38)	55 (14.28)
14	How often do you lose sleep due to late-night log-ins?	191 (49.61)	105 (27.27)	89 (23.11)
15	How often do you feel preoccupied with the Internet when off-line, or fantasize about being on-line?	170 (44.15)	136 (35.32)	79 (20.51)
16	How often do you find yourself saying "just a few more minutes" when on-line?	171 (44.41)	127 (32.98)	87 (22.59)
17	How often do you try to cut down the amount of time you spend on-line and fail?	152 (39.48)	143 (37.14)	90 (23.37)
18	How often do you try to hide how long you've been on-line?	216 (56.10)	119 (30.90)	50 (12.98)
19	How often do you choose to spend more time on-line over going out with others?	219 (56.88)	107 (27.79)	59 (15.32)
20	How often do you feel depressed, moody or nervous when you are off-line, which goes away once you are back on-line?	219 (56.88)	107 (27.79)	59 (15.32)

**Abbreviation:** IAT, Internet Addiction Test.

university students who had highly educated parents.<sup>23</sup> In this study, 3.6% of the adolescents were strongly addicted to the Internet and 25.2% reported moderate dependence. In consistent with our study, in the study of Khagemogahi and Alasond,<sup>11</sup> 28% of participants were moderate Internet users and 2% had severe Internet addiction. In other studies, Internet addiction was very low, eg, 0.25% in the study of Tamanaefar et al.<sup>12</sup> Other studies revealed higher rates, for example, in the study of Masoudnia,<sup>10</sup> 21.7% of Internet addiction was reported.

Students in the major of applied sciences were reported as highly Internet addicted users. The reason can be attributed to the compulsory existence of computers for education and Internet accessibility. The majority of the students in these fields were from computer and accounting groups. The results of a similar study appealed that Internet addiction was significantly and positively correlated to owning Internet-enabled devices.<sup>23</sup> Lack of significant relationship between Internet addiction behaviors among urban city students from public and private schools can be related to Internet accessibility.

In this study, drug abuse initiated various problems, including hand vibration (46.2%), excessive criticism of the

family (34.3%), and pretending to be sick (30.1%). A similar study found that there was a significant correlation between Internet addiction and distressed behaviors. Students who terribly suffer from mental illness may not be able to deal enthusiastically with their problems and therefore go toward virtual communications.<sup>9</sup> A further study in Iran indicated that feeling lack of support and not having communications with others may lead to chronic pain. According to the interviews, these feelings increase their tendency toward drug abuse.<sup>24</sup>

In the present study, approximately one-third of the students were taking medicine or sleeping drugs without physicians' prescription, which may be because of medicine availability, lack of control by the family, society, and parents' unawareness. Moreover, 79% of the students preferred talking with others instead of using medicine for alleviating their concerns. Hence, it can be inferred that if an adolescent does not have someone to talk with, she/he may use tranquilizers and sleeping drugs. The results of a similar research project in China revealed that it is necessary to improve parents' and adolescents' awareness of the risks of non-medical use of any prescription drug.<sup>25</sup>

**Table 3** Comparing sociodemographic variables and Internet addiction (N=385)

Variable	Level of Internet addiction (%)		p-value <sup>a</sup>
	Moderate	Severe	
Gender			
Male	25.25	4.12	0.912
Female	25.13	3.14	
Family residence			
Rural	24.29	3.73	0.25
Urban	29.68	3.12	
Type of school			
Free public school	25	3.71	0.364
Private school	25.84	3.37	
Fields of education			
Math and physics	18.91	2.7	0.777
Experimental sciences	28	4	
Humanities and literature	27.77	1.38	
Vocational	29.06	4.65	
Technical	21.79	5.12	
Mother's level of education			
Primary	40.34	3.85	0.009
High school	26.08	4.34	
Undergraduate	33.78	6.75	
Father's level of education			
Primary	47.9	3.17	0.426
High school	23.68	3.5	
Undergraduate	28.44	6.89	

Note: <sup>a</sup>Multivariate logistic regression analysis.

The results of our study showed that 8.3% of the participants were at risk of drug abuse difficulties. Furthermore, ~15% of students living in rural areas and 9% of students living in urban areas were categorized as prone to abusing substances. This important issue may be due to recent cultural, economic, and social changes in the rural areas of Iran.

In the study of Bashirian et al,<sup>26</sup> 11.1% of high school students had a smoking history, 4.3% had drug abuse experience, and 12% had intention for drug abuse. Moreover, in another study, the prevalence of drug abuse among students of medical sciences was 1.3%.<sup>27</sup> Interestingly, a study among medical science students in Iran indicated that 27.6% of male students consumed alcohol and 82% used at least one kind of drugs.<sup>28</sup>

**Table 4** Distribution of the questions of AAS (N=385)

Question	Answer options	
	Correct, n (%)	False, n (%)
I have noticed that when I am busy doing something my hand shakes	178 (46.2)	207 (53.8)
I've never run afoul of the law	300 (77.9)	85 (22.1)
My parents and family members are complaining too much about me	132 (34.3)	253 (65.7)
I remember to get rid of the cobwebs, I made myself sick	116 (30.1)	269 (69.9)
Never without a prescription, I do not use drugs or sleeping pills	253 (65.7)	132 (34.3)
To reduce the problems and concerns, talking to others is more suitable than using drugs	307 (79.7)	78 (20.3)

Note: Analyzed by descriptive statistics.

Abbreviation: AAS, Addiction Acknowledgement Scale.

Peers have a significant role in developing behavioral patterns among adolescents. The most vulnerable behavioral patterns are adolescents' tendency toward substances that calm down them and are mutual among other peers. Adolescents tend to select friends who share similar activities, relationships, and culture. Thus, concentrating on peers and their interests in order to initiate healthy relationships is essential.<sup>29</sup>

## Conclusion

By taking all abovementioned arguments into consideration, the following conclusions are obtained. First, since one-third of the population were moderate and severe Internet users and considering the rapid progress of technology, it seems necessary to educate students regarding the appropriate amount of using the Internet. Also, since a positive correlation between mother's education level and Internet addiction was observed, training and increasing health literacy level of mothers can be an imperative step in promoting mental and physical health of adolescents. Second, an 8.3% prevalence of drug abuse and vulnerability of girls in comparison to boys leads us to the significance of paying more attention to adolescents' health and institutionalizing appropriate training programs on drug abuse for girls' schools.

## Limitations

Owing to certain restrictions from the Ministry of Education, a few of the questions related to sexual behaviors, alcohol, and specific drugs were eliminated. In addition, it must be indicated that Urmia is a city with a variety of religions such as Islam, Christian, and Assyria and also different races such as Turk, Kurd, and Aramean. Thus, because of certain protection measures from the Ministry of Education, we were not able to ask students' religions and races and they were not included in the questionnaire.

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**Table 5** Prone to abusing substances in terms of sociodemographic variables (N=385)

Variable	Prone to abusing substances	p-value
Gender		
Male	8.24	0.36*
Female	8.37	
Type of school		
Free public school	9.79	0.58*
Private school	3.37	
Field of education		
Math and physics	5.4	0.64#
Experimental sciences	9.33	
Humanities and literature	12.5	
Technical	7.69	
Vocational	6.97	
Family residence		
Rural	15.62	0.3*
Urban	6.85	
Mother's level of education		
Primary school	7	0.61#
High school	9.26	
Undergraduate	6.75	
Father's level of education		
Primary school	9.52	0.3#
High school	8.93	
Undergraduate	6.03	

Notes: \*p for independent t-test. #p for analysis of variance.

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## Disclosure

The authors report no conflicts of interest in this work.

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