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Association Between Problematic Internet Use and Impulse Control Disorders Among Iranian University Students

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Abstract

Previous studies have examined the relationship between problematic Internet use (PIU) with pathological gambling and impulsivity. However, few studies have investigated the association between PIU and other impulse control disorders. This study aimed to assess whether PIU is related to compulsive buying, kleptomania, trichotillomania, intermittent explosive disorder, and pyromania, among a sample of Iranian university students. A cross-sectional study design was used among a random sample of ($n = 950$) university students. Self-reported questionnaires, including demographic, Problematic Internet Use Questionnaire (PIUQ) and Minnesota Impulse Disorders Interview were utilized. The prevalence of PIU was 21.2 percent. Students with diagnosis of either compulsive buying, or intermittent explosive disorder, or pyromania had significantly higher scores on PIUQ compared to the students without the diagnosis. Multivariate regression analyses indicated that in the male gender, the diagnosis of either compulsive buying or intermittent explosive disorder were significant predictors of the risk of the PIU. The results support the proposal that PIU should be considered as a spectrum of impulse control disorder.

Introduction

THE INTERNET HAS IMPACTED the world and presented many benefits to its users such as facilitating communication and research activities. The number of Internet users has increased over the last few years worldwide. However, Internet has had negative impacts and Internet addiction or problematic Internet use (PIU) is becoming a serious mental health problem among adolescents.

PIU is defined as: (i) preoccupation with using the Internet, (ii) increasing amounts of time spent online, (iii) feeling irritable if disturbed while online, (iv) symptoms of withdrawal when away from the Internet, (v) inability in organization of the time spent on Internet, (vi) neglecting important area of life such as sleep, education, and vocation, and (vii) resulting in social, occupational, or financial problems.[1–3]

There is increasing evidence that shows different mental and conduct problems are frequently associated with PIU. Psychiatric disorders, such as mood and anxiety disorders, substance abuse, interpersonal problems are frequent comorbid disorders among problematic Internet users.[4,5]

Impulse control disorders (ICDs) are psychological disorders characterized by: (i) the repetitive behaviors and inability to refrain from performing these behaviors that are harmful either to one or others, (ii) an increasing sense of arousal or tension before engaging in the behaviors, and (iii) experiencing either pleasure or tension release at the time of committing the behaviors. According to Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision (DSM-IV-TR), ICDs include: pathological gambling, kleptomania, intermittent explosive disorder, trichotillomania, pyromania, and impulse control disorders not otherwise specified. In addition, diagnostic criteria have been proposed for compulsive buying and compulsive sexual behavior.[6]

Some authors have proposed that PIU shares a number of key elements with ICDs, and suggested that PIU should be considered as the spectrum of ICDs.[5,7–9] In line with this view, Young, (1998) developed diagnostic criteria for PIU based on DSM-IV criteria for pathological gambling. The reason for this approach was that pathological gambling was the most similar of the DSM-IV diagnosis to the "pathological nature of Internet use".

To demonstrate that a relationship exists between PIU and ICDs, it should be evidence that PIU overrepresented in patients with ICDs or vice versa. Tsitsika et al. (2010) showed an association between PIU and pathological gambling, while Dowling and Brown, did not.[10,11] Shapira et al. (2000) reported that 100 percent subjects with PIU met DSM-IV criteria for an ICD, not otherwise specified, though this study had small sample size and used face-to-face interviews.[5] There is scarce of studies that have examined the association between PIU and ICDs using standard questionnaires. Therefore, the

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aim of this study was to examine the relationship between PIU and compulsive buying, kleptomania, trichotillomania, intermittent explosive disorder, and pyromania. It is hypothesized that young people who have an ICD would be at a higher risk of excessive Internet use.

Methods

Participants

The study was cross-sectional, conducted in Kerman University of Medical Sciences, Iran, during the academic year 2010–2011. The Kerman University of Medical Sciences is one of the higher education establishments in Iran, with seven related schools, namely: Health Sciences, Medicine, Pharmacy, Dentistry, Nursing and Midwifery, Paramedical, Management, and Health Information Sciences. The sample included 950 students, with the total student population who attended the university as the sample frame. The number of students was obtained, and the sample was generated using a stratified random sampling method, with stratification according to the proportion of students in each school. The survey was conducted in classrooms at different schools. Selected students from different school were invited to participate in the survey by a research assistant and were asked to complete self-administered questionnaires. The study protocol was approved by the Ethical committees of Kerman Universities of Medical Sciences. Informed consent was obtained from all of the study participants.

Assessment tools

Self-completed questionnaires were distributed to all of the study participants in their classrooms of the respective schools. The participants were asked to complete the questionnaire anonymously. The questionnaire included three components: (i) demographic information; (ii) Problematic Internet Use Questionnaire (PIUQ); and (iii) Minnesota Impulse Disorders Interview (MIDI). Demographic variables consisted of age, gender, and marital status. PIU was assessed by the PIUQ developed by Demetrovics et al. (2008).[12] The PIUQ is a 18-item self-reported questionnaire with three six-item factors (obsession, neglect, and control disorder). The obsession subscale represents obsessive thinking about the Internet, and mental withdrawal symptoms resulted from the lack of Internet use. The neglect subscale represents neglect of everyday activities. Lastly, the control disorder subscale consists of items reflecting difficulties in controlling Internet use. Participants use a five-point Likert scale ranging from 1 (never) to 5 (always) to estimate how much the given statement is true for them. Possible scores ranged from a minimum of 18 to a maximum of 90. Participants were then classified according to suggested cutoff score of 41, with 18–41 as "average users" and 42–90 as "problematic Internet users". A study on the psychometric properties of PIUQ suggested good reliability, with Chronbach's alpha of values ranging from 0.87 to 0.74 for various factors, and test-retest correlation of 0.90.[13]

ICDs were assessed using the MIDI, which is a screening instrument for ICDs.[14] Diagnostic criteria for ICDs are consistent with the *DSM-IV-TR*. For purposes of this study, the MIDI was used as a self-report screen for lifetime ICDs including: compulsive buying, kleptomania, trichotillomania, intermittent explosive disorder, and pyromania. Participants were classified as having a disorder if they met full criteria for an ICD. The MIDI has shown good classification accuracy compared to diagnostic instruments.[15,16]

Statistical analysis

Group differences in demographic variables were examined using the χ^2 test and independent t test. The differences in PIUQ scores between students with and without the diagnosis of ICDs were analyzed using independent t test. Stepwise multivariate logistic regression was used to find factors associated with the PIU. All analyses were carried out using the SPSS version 17.

Results

Questionnaires were completed by 925 (response rate = 97.3 percent), 32.9 percent were male (males = 302), with overall age 21.5 ($SD = 2.1$). In terms of the outcome variable of the study, a cutoff score of 41 was used to divide the participants to average Internet users and PIUs. Results showed that 78.8 percent ($n = 727$) had scores 18–41 and classified as average Internet users, and 21.2 percent ($n = 196$) had scores 42–90 and classified as PIUs. Table 1 represents the characteristics of the two groups. The two groups significantly differed on scores on PIUQ and gender distribution, while age was comparable between the two groups.

Regarding ICDs, prevalence rate was 7.6 percent for intermittent explosive disorder, 6 percent for compulsive buying, 1.6 percent for Tricotillomania, 1.1 percent for Pyromania, and 0.4 percent for Kleptomania. Table 2 shows scores on PIUQ for different ICDs. Students with diagnosis of either compulsive buying, or intermittent explosive disorder, or pyromania had significantly higher mean scores of PIUQ compared to students without diagnosis.

Results of previous section showed that the mean score of PIUQ was significantly higher in students with diagnosis of the three of the ICDs. Then we sought to examine whether having an ICD could predict PIU by performing a stepwise binary logistic regression, using all ICDs as independent variables, and group (average users, PIUs) as dependent variables. Because sex and age were predictors of PIU in some previous studies, they were also selected to enter in multiple regression model. The result showed overall fit of the model

Table 1. Demographic Characteristics and Scores on Problematic Internet Use Questionnaire (Mean ± SD) of Average Internet Users and Problematic Internet Users

	Average internet users	*Problematic internet users*	p *Value*
PIUQ score (mean ± SD)	26.92 ± 6.81	51.52 ± 8.64	0.000
Sex- N (percent male)	221 (30.5 percent)	80 (41.2 percent)	0.005[a]
Age (mean ± SD)	21.4 ± 2.01	21.7 ± 2.49	NS

[a] χ^2 test.
PIUQ, Problematic Internet Use Questionnaire; NS, not significant.

Table 2. Scores of Problematic Internet Use Questionnaire (Mean ± SD) for Each Impulse Control Disorder

Impulse control disorders	*PIUQ score (mean ± SD)*	p *Value*
Compulsive buying		
Yes (55)	36.4 ± 13.2	0.009
No (866)	31.7 ± 12.3	
Intermittent explosive disorder		
Yes (69)	36.6 ± 14.2	0.002
No (841)	31.7 ± 12.2	
Pyromania		
Yes (69)	43.2 ± 17.2	0.004
No (841)	31.9 ± 12.3	
Kleptomania		
Yes (4)	34.1 ± 19.6	NS
No (908)	32.0 ± 12.4	
Tricotillomania		
Yes (15)	33.9 ± 14.6	NS
No (896)	32.1 ± 12.4	

($\chi^2 = 18.9$, $df = 3$, $p < 0.001$). As shown in Table 3, male gender increased the risk of PIU by 1.6-fold. Among the various ICDs, compulsive buying and intermittent explosive disorder were significant predictors of the risk of the PIU.

Discussion

The present study primarily focused on examining the relationship between PIU and some ICDs including kleptomania, trichotillomania, intermittent explosive disorder, pyromania, and compulsive buying among a sample of Iranian university students. In this study the prevalence rate of PIU was 21.2 percent. Consistent with our hypothesis, the results showed that the mean score of PIUQ was significantly higher in students with diagnosis of either compulsive buying, or intermittent explosive disorder, or pyromania compared to the students without the diagnosis. Moreover, our findings indicated a significant association between PIU and the two ICDs, compulsive buying and intermittent explosive disorder. This result supports the proposal that problematic Internet use should be considered as an impulse control disorder.[5,7–9] Supporting evidence for our finding comes from other studies showing high prevalence of ICDs in people with PIU.[5,17]

The study findings also showed that the most significant factor associated with the PIU was compulsive buying (OR = 1.99, 95% CI = 1.09–3.64), which is consistent with other studies.[18,19] This result reflects some common characteristics among the two disorders including impulsive aspect that initiate the behavior, and the compulsive feature that results in the behaviors to persevere overtime. In fact, these behaviors are similar in their symptoms, such as problems in controlling impulses, dangerous for self, ritualized and repetitive nature. Moreover, our finding supports the proposal that a common underlying mechanism serves for the two disorders. For example, Billieux et al. (2010) found that both compulsive buying and excessive use of the Internet may serve as behaviors used to cope with or manage underlying negative affective states.[20]

The point estimate of PIU in this study was 21.2 percent. The prevalence rates of PIU seem to vary between different study populations. Using different measures, previous studies in Iran have shown prevalence of 3.8 percent in high school students and 22.8 percent in coffee nets members.[21,22] In addition, the prevalence rates have been reported in university students of Taiwan[23] 17.9 percent, China[24] 10.6 percent, United States[25] 8.1 percent, and Greece[26] 34.7 percent. Comparing the findings of these studies is difficult due to differences in samples, screening measurements, social and cultural context. However, after taking these differences into consideration, our results show that PIU among Iranian university students is serious. In fact, with the rapid expansion of the Internet and the substantial exposure of university students to the Internet, they are clearly at the risk. This is of importance, because problematic Internet users often spend excessive amount of time online, delaying work and losing sleep. These disrupted behaviors may lead to excessive fatigue and thus impairment of academic and occupational functioning. It should be noted that in accordance with other studies, the results indicated that male students were more likely to be problematic Internet users compared to their female counterparts.[8,23,27]

These findings advance our understanding the association between PIU and ICDs, since we examined a wide range of ICDs using a valid screening instrument. Our results have implication on clinical management of PIU. Considering the PIU as a part of the spectrum of ICDs, treatments that are suitable for ICDs could be applicable for it. Clinicians need to be aware of potential comorbidities of ICDs among problematic Internet users.

There are several limitations of this study that warrant attention. The use of self-reported questionnaires, versus clinical interviews, may limit the interpretation of the study results. Moreover, underlying or concomitant mental health problems, including depression, manic, and hypomanic symptoms were not assessed. This study used PIUQ, although the psychometric characteristics of the questionnaire shows good reliability, future studies may use other measures to assess PIU and its relationship with ICDs.

Table 3. Risk Factors of Problematic Internet Use Based on the Logistic Regression Analyses

Predictors[a]	*df*	*B*	p *Value*	*OR*	*95% CI*
Sex (male vs. female)	1	0.48	0.006	1.62	1.15–2.28
Compulsive buying (yes vs. no)	1	0.69	0.025	1.99	1.09–3.64
Intermittent explosive disorder (yes vs. no)	1	0.61	0.028	1.84	1.07–3.17
Constant	1	−1.61	0.000	0.20	

[a]The nonsignificant predictors are not shown here.
OR, odds ratios; CI, 95% confidence interval.

In conclusion, the findings of the present study show an association between PIU and some ICDs and support further research in this area.

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Disclosure Statement

No competing financial interests exist.

References

1. Kraut R, Patterson M, Lundmark V, et al. Internet paradox. A social technology that reduces social involvement and psychological well-being? American Psychologist 1998; 53:1017–1031.
2. Treuer T, Fabian Z, Furedi J. Internet addiction associated with features of impulse control disorder: is it a real psychiatric disorder? Journal of Affective Disorders 2001; 66:283.
3. Yellowlees PM, Marks S. Problematic Internet use or Internet addiction. Computers in Human Behavior 2007; 23:1447–1453.
4. Bai YM, Lin CC, Chen JY. Internet addiction disorder among clients of a virtual clinic. Psychiatric Services 2001; 52:1397.
5. Shapira NA, Goldsmith TD, Keck PE Jr., et al. Psychiatric features of individuals with problematic internet use. Journal of Affective Disorders 2000; 57:267–272.
6. American Psychiatric Association. (2000) *Diagnostic and statistical manual of mental disorders.* 4th ed. Washington, DC: American Psychiatric Association; Text Revision.
7. Beard KW, Wolf EM. Modification in the proposed diagnostic criteria for Internet addiction. CyberPsychology and Behavior 2001; 4:377–383.
8. Young KS. Internet addiction: the emergence of a new clinical disorder. CyberPsychology and Behavior 1998; 1:237–244.
9. Shapira NA, Lessig MC, Goldsmith TD, et al. Problematic Internet use: proposed classification and diagnostic criteria. Depression and Anxiety 2003; 17:207–216.
10. Tsitsika A, Critselis E, Janikian M, et al. Association between internet gambling and problematic internet use among adolescents. Journal of Gambling Studies 2010; 27:389–400.
11. Dowling NA, Brown M. Commonalities in the psychological factors associated with problem gambling and Internet dependence. Cyberpsychology, Behavior and Social Networking 2010; 13:437–441.
12. Demetrovics Z, Szeredi B, Rozsa S. The three-factor model of Internet addiction: the development of the Problematic Internet Use Questionnaire. Behavior Research Methods 2008; 40:563–574.
13. Koronczai B, Urbán R, Kökö nyei G, et al. Confirmation of the three-factor model of problematic internet use on off-line adolescent and adult samples. Cyberpsychology, Behavior, and Social Networking 2011; 14:657–664.
14. Grant JE. (2008) *Impulse Control Disorders: A Clinician's Guide to Understanding and Treating Behavioral Addictions*. New York, NY: WW Norton and Company.
15. Grant JE, Williams KA, Potenza MN. Impulse-control disorders in adolescent psychiatric inpatients: co-occurring disorders and sex differences. Journal of Clinical Psychiatry 2007; 68:1584–1592.
16. Grant JE, Levine L, Kim D, et al. Impulse control disorders in adult psychiatric inpatients. American Journal Psychiatr 2005; 162:2184–2188.
17. Cao F, Su L, Liu T, et al. The relationship between impulsivity and Internet addiction in a sample of Chinese adolescents. European Psychiatry 2007; 22:466–471.
18. Claes L, Müller A, Norré J, et al. The relationship among compulsive buying, compulsive internet use and temperament in a sample of female patients with eating disorders. European Eating Disorders Review 2011 [Epub ahead of print]; DOI: 10.1002/erv.1136.
19. Ruiz-Olivares R, Lucena V, Pino MJ, et al. Analysis of behavior related to use of the Internet, mobile telephones, compulsive shopping and gambling among university students. Addiciones 2010; 22:301–309.
20. Billieux J, Gay P, Rochat L, et al. The role of urgency and its underlying psychological mechanisms in problematic behaviours. Behaviour Research and Therapy 2010; 48:1085–1096.
21. Ghassemzadeh L, Shahraray M, Moradi A. Prevalence of internet addiction and comparison of internet addicts and non-addicts in Iranian high schools. Cyberpsychology, Behavior, and Social Networking 2008; 11:731–733.
22. Kheirkhah F, Juibary AG, Gouran A. Intenet addiction, prevalence and epidemiological features in Mazandaran province, northern Iran. 2009. Iranian Red Crescent Medical Journal 2010; 12:133–137.
23. Tsai HF, Cheng SH, Yeh TL, et al. The risk factors of Internet addiction—a survey of university freshmen. Psychiatry Research 2009; 167:294–299.
24. Wu HR, Zhu KJ. Path analysis on related factors causing Internet addiction disorder in college students. Chinese Journal of Public Health 2004; 20:1363–1364.
25. Morahan-Martin J, Schumacher P. Incidence and correlates of pathological Internet use among college students. Computers in Human Behavior 2000; 16:13–29.
26. Frangos CC, Frangos CC, Sotiropoulos I. Problematic internet use among Greek university students: an ordinal logistic regression with risk factors of negative psychological beliefs, pornographic sites, and online games. Cyberpsychology, Behavior, and Social Networking 2011; 14:51–58.
27. Greenfield DN. Psychological characteristics of compulsive internet use: a preliminary analysis. Cyberpsychology and Behavior 1999; 2:403–412.

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