Epidemiology and Related Factors of Internet Addiction with Emphasizing the Role of Feeling Loneliness and Interpersonal Problems in University Students

Hadis Nazari [1], Zeinab Raiesifar [2], Pouriya Darabiyan [1], Kourosh Zarea [3, *], Saeed Ghanbari [4] and Sally Wai Chi Chan [5]

[1]Department of Nursing, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[2]Abadan University of Medical Sciences, Abadan, Iran
[3]Department of Nursing, Nursing Care Research Center in Chronic Diseases, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[4]Department of Biostatistics and Epidemiology, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[5]President Office, Tung Wah College, Hong Kong, China

Corresponding author: Department of Nursing, Nursing Care Research Center in Chronic Diseases, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Email: zarea_k@ajums.ac.ir

Abstract

Background: Internet addiction is recognized as a global public health issue, with high prevalence among medical students. The identification of risk factors related to Internet addiction is crucial for reducing its prevalence and severity.

Objectives: This study aimed to assess the epidemiology and related factors to Internet addiction, emphasizing the role of feeling loneliness and interpersonal problems.

Methods: A cross-sectional correlational study was conducted in 2022, involving 414 students from the Nursing and Midwifery Faculty, Jundishapur University of Medical Sciences, Ahvaz, Iran. Young's Internet addiction questionnaire, along with the assessments of interpersonal problems and loneliness, was used. Descriptive and inferential statistics (including correlation coefficients and hierarchical regression) were applied using SPSS software (version 22), with a significance level set at $P < 0.05$.

Results: All students had internet addiction; nevertheless, the majority (82.4%) of them were in the range of mild addiction, and none of them had severe Internet addiction. The average score of Internet addiction was 51.59 (4.77), which shows moderate Internet addiction among students. Internet addiction had a positive and significant relationship with students' lodging (dormitory), feelings of loneliness, and interpersonal problems; however, there was no correlation with age, gender, marital status, major, and academic year.

Conclusions: The prevalence of Internet addiction was significantly higher in the present study than in previous studies, serving as a critical warning for health practitioners and planners. Notably, the highest level of addiction observed was at a mild level, necessitating early intervention to prevent further escalation. Considering the correlation between Internet addiction and students' lodging (dormitory), feelings of loneliness, and interpersonal problems, it is imperative to explore alternative activities within dormitories and provide regular psychological counseling for the early detection of these issues.

Keywords: Internet Addiction Disorder, Feeling of Loneliness, Interpersonal Problems, Risk Factors, Students

1. Background

As the Internet is very widespread and easily accessible today, it easily affects our daily lives to a great extent (1, 2). Internet addiction is known as a pathological use of the Internet or its problematic use, which leads to a person's inability to control the Intense use and the occurrence of negative consequences in daily life. In recent decades, Internet addiction has emerged as a new problem worldwide (3). Apart from the fact that Internet addiction is a mental illness or injury, it is a chronic and recurring phenomenon that is often associated with physical, mental, family, social, and psychological injuries (4). The prevalence of Internet addiction varies in different countries. The data collected from 11 countries in the United States, Europe, and Asia show that the prevalence of Internet addiction among teenagers, graduate students, and the general population has ranged from 0.7% to 25%

(5). In the same way, the rate of prevalence among medical students was higher than in the general population, the reason for which is mentioned in some sources, the free access of medical students for educational and recreational purposes (6).

The results of studies related to the amount of Internet addiction among medical students were reported as 5.2 - 28.7% in Iran, 46.8 - 58.9% in India,11.5% in Chile, 21% in Nepal, and 24.4% in Thailand (7-11). Internet addiction among medical students is associated with complications that lead to poor academic performance and psychological and social problems (12), and among the mental health problems of this group, the most common problem is depression (7). Other psychological factors studied for Internet addiction include interpersonal relationships (13-15), interpersonal problems (16), and loneliness (17-19). Loneliness is a state of mental distress that occurs between reality and feeling relationships (20).

Loneliness is very common in every person's life, especially among students (21, 22). Studies have shown that loneliness is related to interpersonal problems, mental health problems, and Internet addiction; therefore, the more a person's tendency toward the Internet increases in the long term, the more mental problems he/she has and the less his/her connection with the outside society. As a result, the individual feels lonely, which in turn causes personal problems in his/her daily life (17, 21, 23, 24). Interpersonal problems are problems that arise in relation to others; however, there is little knowledge about the relationship between these factors among medical students, and the necessary studies have not been performed (20). In a study conducted by Simcharoen et al., the results showed that loneliness and interpersonal problems are both strong predictors of Internet addiction in students (25).

Despite the high prevalence of Internet addiction among medical students in Iran and recognizing the critical role this segment of society plays in human health, there has been a notable absence of comprehensive studies investigating the predictors of Internet addiction within this context. To date, no such study has been conducted in this regard in Iran. Consequently, the researchers embarked on a study with the primary objective of exploring the relationship between Internet addiction, loneliness, and interpersonal problems among university students.

2. Objectives

This study aimed to determine the epidemiology of Internet addiction, loneliness, and interpersonal problems in the students of the Nursing and Midwifery Faculty, Jundishapur University of Medical Sciences, Ahvaz, Iran, in 2022.

3. Methods

3.1. Study Design and Setting

This cross-sectional correlational study was conducted among students at the Nursing and Midwifery Faculty, Jundishapur University of Medical Sciences, Ahvaz, Iran, in 2022.

3.2. Population and Sampling

The study included undergraduate students majoring in nursing, midwifery, or operating room. The participants provided consent to inclusion in the study, and the exclusion criteria involved incomplete questionnaires.

3.3. Procedure and Measurements

After obtaining ethical approval from the Research Ethics Committee of Jundishapur University of Medical Sciences (code of ethics: IR.AJUMS.REC.1399.114, project number: U-99045), the researcher implemented the study. The research population comprised all undergraduate students at the Nursing and Midwifery Faculty in Ahvaz in 2022. Sampling was performed using convenience methods that included 414 students.

After explaining the research objectives to the students and ensuring their freedom to participate or decline, written consent was obtained from willing participants. The study subjects were assured that their information would remain confidential, and they were asked to complete the questionnaires anonymously. The tools utilized in this study include the following questionnaires:

3.3.1. Demographic Questionnaire

This questionnaire included 8 items related to age, gender, marital status, year of education, grade point average, field of study, place of residence, and father's occupation. One of the main items included a direct question (Are you addicted to the Internet?) and how respondents consider their Internet use status; the answers included never, maybe, and yes. This questionnaire has been used and confirmed in the study of Lai et al. (26).

3.3.2. Internet Addiction Test Questionnaire

The Internet addiction test (IAT) is one of the most reliable tests related to measuring Internet addiction, which was invented by Young (cited in (2)). This questionnaire has 20 items, and its purpose is to measure the level of Internet addiction in different individuals. Its response range is Likert and has five degrees from 1 (rarely) to 5 (always). The total score of Internet addiction is obtained from the sum of the scores of each item, and, therefore, the score of the questionnaire will be between 20 and 100. The higher the score, the more the person is addicted to the Internet, and according to the conducted studies, the level of Internet addiction is considered mild (20 - 49), moderate (50 - 79), and severe (80 - 100) based on the score of the questionnaire (26). Alavi investigated the psychometric characteristics of Young's IAT in their study. In this study, the best clinical cut-off point of this questionnaire was reported to be 46 (27).

3.3.3. Loneliness Questionnaire (UCLA Loneliness Scale)

The loneliness questionnaire was created by (Russell, Pilva, and Cortona) in 1980 and was later improved by Russell himself. It consists of 20 items, 10 negative and 10 positive. The scoring method in this questionnaire is the Likert form with 4 options from never (1), rarely (2), sometimes (3) to always (4); however, the scores of items 1, 5, 6, 9, 10, 15, 16, 19, and 20 are the opposite. It means never (4), rarely (3), sometimes (2), and always (1). The range of scores is between 20 (minimum) and 80 (maximum). Therefore, the average score is 50. If the score is higher than the average, it indicates a greater intensity of loneliness (28).

3.3.4. Inventory of Interpersonal Problems

The 32-item (IIP-32) form of the Inventory of Interpersonal Problems (IIP) serves as a self-reporting tool, focusing on the challenges individuals commonly encounter in their interpersonal relationships. Originally designed by Barkham, this shorter version (derived from the original 127-question form) was intended for clinical use. The 32-item form was developed through exploratory factor analysis, emphasizing the four items with the highest factor load within each subscale. The scale comprises eight subscales, each shedding light on different aspects of interpersonal functioning: People-orientedness, boldness, participation with others, support of others, aggressiveness, openness, consideration of others, and dependence on others. Participants rate these items on a 5-point Likert scale, ranging from 0 (not at all) to 5 (extremely). Barkham's prepared form demonstrates high validity and reliability (29). In the context of Iran, after standardization, the initial 32 items were refined. Specifically, items 6, 19, and 31 were removed due to weak factor loading and their simultaneous placement across multiple factors (with closely aligned factor loadings). Consequently, the scale has been streamlined to 29 items. On this scale, a higher score means more interpersonal problems. To check the validity of the form and content, the questionnaires were given to 10 nursing and psychology professors of Jundishapur and Shahid Chamran universities, and minor corrections were made. In the internal consistency reliability check, Cronbach's alpha coefficients for Internet addiction, loneliness, and interpersonal problems questionnaires were 0.87, 0.79, and 0.82, respectively (30).

3.4. Statistical Analysis

Descriptive statistics (i.e., prevalence, frequency percentage, mean, and standard deviation) were used to analyze the data, and Pearson or Spearman correlation test was employed to check the relationship between variables according to the type of variables. Moreover, hierarchical regression was utilized to determine the predictors of Internet addiction using SPSS software (version 22). In all analyses, $P < 0.05$ was considered a significant level.

4. Results

The Kolmogorov-Smirnov test confirmed the normal distribution of data. Based on the results of the study, the majority of the samples were female (85%) and single (87.9%) and lived in a dormitory (84.1%). The average age of the samples (1.75) was 21.23 years. Half of the subjects were studying nursing and were in the second year (44.2%) of their studies. According to the question "Are you addicted to the Internet?", the majority of the samples expressed that they are addicted to the Internet (68.4%). Other demographic information and additional information can be found in Table 1.

Based on Young's IAT, the Internet addiction score ranged from 41 to 66. This finding means that according to the cut-off points of the questionnaire, all students had Internet addiction; however, 82.4% of the students had mild addiction, and only 7.5% had moderate addiction. The average score of Internet addiction was 51.59 (4.77), which shows mild Internet addiction among students.

Table 2 shows the correlation coefficients between the study variables. As you can see, Internet addiction has a significant relationship with the place of residence ($r = 0.125$, $P < 0.05$), academic year ($r = 0.053$, $P < 0.05$), interpersonal problems ($r = 0.20$, $P < 0.01$), and loneliness ($r = 0.505$, $P < 0.01$). In addition, there is a

Table 1. Demographic Variables of Study Participants (N = 414)

Variables	No. (%)
Gender	
Male	62 (15.0)
Female	352 (85.0)
Academic year	
First	6 (1.4)
Second	183 (44.2)
Third	154 (37.2)
Fourth	71 (17.1)
Internet addiction	
Never	131 (31.64)
Maybe	0 (0.0)
Yes	283 (68.35)
Residence	
Dormitory	348 (84.1)
Private house	66 (15.9)
Grade point average	
Less than 14	52 (12.6)
Between 14 and 15.99	126 (30.4)
Between 16 and 17	169 (40.8)
More than 17	67 (16.2)
Field under study	
Operation room	91 (22)
Nursing	207 (50)
Midwifery	116 (28)
Marital status	
Single	364 (87.9)
Married	50 (12.1)

positive and significant relationship between loneliness and interpersonal problems (r = 0.151, P < 0.01). It should be noted that no relationship was observed between Internet addiction with age, gender, and marital status.

Hierarchical regression was used to evaluate the impact of interpersonal problems, loneliness, and other independent variables on the dependent variable (i.e., Internet addiction) and which group of variables predicts Internet addiction the most. Accordingly, five models were designed, and in each model, some new variables were added to the variables of the previous model. As Table 3 shows, from the first to the fifth model, the amount of predicting the score of Internet addiction is added respectively, and the last model, the fifth model, has the largest contribution in describing Internet addiction.

Almost 40% of the changes in Internet addiction are made by the model. Therefore, place of residence, feelings of loneliness, and interpersonal problems are predictor variables of Internet addiction.

5. Discussion

In this study, all students had Internet addiction because the lowest score obtained from the questionnaire was 41; however, over 80% of the students had a mild addiction, and none of them had a severe addiction to the Internet. This result is surprising compared to the results of other studies. In the study of Simcharoen et al., which was conducted on 330 medical students in 2018, only 36.73% of them had Internet addiction, of whom 30.9%, 5.2%, and 0.6% had mild, moderate, and severe addiction, respectively (25). This difference might indicate that Internet addiction is increasing among students, especially in Iran, because in a systematic review by Salarvand et al. in 2018, the prevalence of Internet addiction among Iranian students was reported as 31.51% (31). This is a worrying issue.

This difference in prevalence in previous studies and between different countries might be due to the influence of factors that have not yet been investigated. It might also be due to the use of different Internet addiction assessment tools with different cut-off points. On the other hand, in the present study, the majority of students lived in the dormitory, who might turn to the Internet and virtual space due to being away from their families and the lack of extracurricular activities. It is also interesting to note that about 32% of students did not consider themselves addicted to the Internet (according to the question are you addicted to the Internet?). This finding shows that their awareness of Internet addiction is insufficient, and they consider their use of the Internet to be normal. This result is contrary to Simcharoen et al.'s study, which showed that students' Internet use status was worse than what their IAT scores showed (25). Therefore, it seems useful to hold educational workshops on Internet addiction, its complications, and ways to reduce it.

The results of the present study showed that age, gender, marital status, major, and academic year have no relationship with Internet addiction, which is in line with the results of several studies in this field (25, 32). Simcharoen et al. explain the reason for this issue: Both males and females are addicted to using the Internet; nevertheless, they differ in the type of activities that contribute to Internet addiction. In Simcharoen et al.'s study, females were more involved in entertainment activities, and males were more involved in online games, both of which were identified as causes related to Internet

Table 2. Correlations Between Demographic Variables and Internet Addiction, Interpersonal Problems, and Loneliness (N = 414)

Variables	1	2	3	4	5	6	7	8	9
Age									
Gender	0.026								
Field under study	0.041	0.213[a]							
Academic year	0.033	0.001	0.014						
Residence	0.050	0.016	0.018	0.021					
Grade point average	0.048	0.103[b]	0.074	0.054	0.016				
Marital status	0.077	0.049	0.035	0.081	0.035	0.212[a]			
Internet addiction	0.003	0.005	0.015	0.053	0.125[b]	-0.130[a]	0.086		
Interpersonal problems	0.051	0.077	0.016	0.028	0.072	-0.194[a]	-0.023	-0.20[a]	
Loneliness	-0.009	0.025	0.030	0.056	0.087	0.214[a]	-0.153[a]	0.505[a]	0.151[a]

[a] $P < 0.01$.
[b] $P < 0.05$.

Table 3. Hierarchical Regression to Determine Predictor Variables of Internet Addiction (N = 414) [a]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	51.398 ± 5.363	14.099 ± 11.231	-5.490 ± 12.42	-17.049 [b] ± 11.734	14.182 [b] ± -26.74
Age	-0.23 ± 0.241	2.145 ± 1.840	0.944 ± 1.32	0.898 ± 1.890	1.233 ± 1.117
Gender	0.543 ± 0.773	-0.414 ± 0.35	-0.1.44 ± 0.332	-007 ± 0.566	0.414 ± 0.087
Field under study		1.833 ± 0.266	0.745 ± 0.231	0.773 ± 0.341	0.314 ± 0.423
Academic year		1.741 ± 0.255	-0.332 ± 1.52	-0.495 ± 1.48	1.489 ± -0.219
Grade point average		1.347 ± 0.34	1.456 ± 0.289	1.245 ± 0.344	0.285 ± 0.344
Residence			0.894 [b] ± 0.265	0.640 [b] ± 0.30 [c]	0.356 [b] ± 0.810
Marital status			1.652 ± 0.662	1.046 ± 0.344	0.455 ± 0.642
Internet addiction				0.954 [b] ± 0.442 [b]	0.802 ± 0.304 [b]
Interpersonal problems					0.084 ± 0.194 [b]
R^2	0.007	0.067	0.281	0.326	0.408
$\triangle R^2$	0.007	0.050	0.231	0.050	0.085
df	2132	2128	3042	5021	1244

Abbreviations: B, unstandardized coefficient; SE, standard error; df, degree of freedom.
[a] Values are presented as B ± SE.
[b] $P < 0.001$.
[c] $P < 0.05$.

addiction (25). Therefore, there was no difference between both genders in the level of Internet addiction. In the present study, the type of activities and purposes of using the Internet by the participants were not investigated.

In a recent study, a correlation was observed between students' place of residence and Internet addiction. Specifically, students residing in dormitories exhibited a higher level of Internet addiction than their local counterparts. This finding aligns with expectations, as dormitory students often experience physical distance from their families. Consequently, they rely on online communication with family and friends through the Internet and virtual spaces. Additionally, the lack of extracurricular programs might contribute to increased Internet usage during leisure time. Loneliness and interpersonal problems were both strong predictors of Internet addiction, as reported in other studies (25, 33).

It is reasonable to expect that individuals experiencing heightened loneliness might turn to the Internet and virtual spaces as a coping mechanism due to their availability and the attractive and fun properties they offer. Additionally, individuals who encounter frequent interpersonal problems, struggling to compromise and communicate effectively, often find solace online due to the lack of effective communication in their offline interactions. In any case, medical science students represent the future workforce in health-related professions, which directly impact individuals' well-being. Therefore, it is essential to address factors that pose a threat to their physical and mental health.

5.1. Limitations

The use of the convenience sampling method in this study, along with the focus on a local population, might restrict the generalizability of the results to all students.

5.2. Conclusions

The prevalence of Internet addiction in this study was remarkably high compared to other studies, with all students exhibiting mild to moderate Internet addiction, a concerning trend. However, none of them displayed a strong addiction to the Internet. Notably, factors such as age, gender, marital status, field of study, and grade point average did not correlate with Internet addiction. On the other hand, residence, loneliness, and interpersonal problems showed a positive and significant association with Internet addiction. Based on the study's findings, several recommendations are proposed as follows:

- Dormitory residents: For students residing in dormitories, proactive measures are essential. Regular counseling sessions should be conducted to identify and address issues such as loneliness and interpersonal challenges.

- Extracurricular activities: Encouraging participation in extracurricular activities, such as sports and entertainment programs, can foster social connections and mitigate Internet addiction.

- Early assessment: Upon entering university, students should undergo an initial examination to identify potential problems. Subsequent periodic assessments during their academic journey can help prevent the development of other disorders, such as depression. Remember that addressing Internet addiction requires a holistic approach involving both individual efforts and institutional

References

1. Walsh JL, Fielder RL, Carey KB, Carey MP. Female college students' media use and academic outcomes: Results from a longitudinal cohort study. *Emerg Adulthood*. 2013;**1**(3):219–32. [PubMed ID: 24505554]. [PubMed Central ID: PMC3911790]. https://doi.org/10.1177/2167696813479780.

2. Mythily S, Qiu S, Winslow M. Prevalence and correlates of excessive internet use among youth in Singapore. *Annals Acad Med Singap*. 2008;**37**(1):9–14. https://doi.org/10.47102/annals-acadmedsg.V37N1p9.

3. Young KS. Internet addiction: The emergence of a new clinical disorder. *Cyberpsychol Behav*. 2009;**1**(3). https://doi.org/10.1089/cpb.1998.1.237.

4. Hajizadeh Meymandi M, Vakili Ghasemabad S, Mirmongereh A. A survey of the relationship between socio-psychological factors and internet addiction (Case study: Girl students of Yazd University). *J Woman Culture Art*. 2016;**8**(4):473–92. https://doi.org/10.22059/jwica.2016.61790.

5. Mihajlov M, Vejmelka L. Internet addiction: A review of the first twenty years. *Psychiatr Danub*. 2017;**29**(3):260–72. [PubMed ID: 28949307]. https://doi.org/10.24869/psyd.2017.260.

6. Mahdi A, Zayer A, Mahmood H, AL-Zwaini I. Prevalence of Internet addiction and its associated factors among AL-Kindy medical students/University of Baghdad 2019. *J Addict Res Ther*. 2020;**11**(7).

7. Berner JE, Santander J, Contreras AM, Gomez T. Description of internet addiction among Chilean medical students: a cross-sectional study. *Acad Psychiatry*. 2014;**38**(1):11–4. [PubMed ID: 24430588]. https://doi.org/10.1007/s40596-013-0022-6.

8. Boonvisudhi T, Kuladee S. Association between Internet addiction and depression in Thai medical students at Faculty of Medicine, Ramathibodi Hospital. *PLoS One*. 2017;**12**(3). e0174209.

[PubMed ID: 28319167]. [PubMed Central ID: PMC5358859]. https://doi.org/10.1371/journal.pone.0174209.

9. Nath K, Naskar S, Victor R. A cross-sectional study on the prevalence, risk factors, and ill effects of internet addiction among medical students in northeastern India. *Prim Care Companion CNS Disord*. 2016;**18**(2). [PubMed ID: 27486546]. [PubMed Central ID: PMC4956431]. https://doi.org/10.4088/PCC.15m01909.

10. Salehi M, Norozi Khalili M, Hojjat SK, Salehi M, Danesh A. Prevalence of internet addiction and associated factors among medical students from Mashhad, Iran in 2013. *Iran Red Crescent Med J*. 2014;**16**(5). https://doi.org/10.5812/ircmj.17256.

11. Upadhayay N, Guragain S. Internet use and its addiction level in medical students. *Adv Med Educ Pract*. 2017;**8**:641–7. [PubMed ID: 28989293]. [PubMed Central ID: PMC5624599]. https://doi.org/10.2147/AMEP.S142199.

12. Usman NH, Alavi M, Shafeq SM. Relationship between internet addiction and academic performance among foreign undergraduate students. *Procedia Soc Behav Sci*. 2014;**114**:845–51. https://doi.org/10.1016/j.sbspro.2013.12.795.

13. Weinstein A, Abu HB, Timor A, Mama Y. Delay discounting, risk-taking, and rejection sensitivity among individuals with Internet and Video Gaming Disorders. *J Behav Addict*. 2016;**5**(4):674–82. [PubMed ID: 27958761]. [PubMed Central ID: PMC5370373]. https://doi.org/10.1556/2006.5.2016.081.

14. Dowling NA, Brown M. Commonalities in the psychological factors associated with problem gambling and Internet dependence. *Cyberpsychol Behav Soc Netw*. 2010;**13**(4):437–41. [PubMed ID: 20575708]. https://doi.org/10.1089/cyber.2009.0317.

15. Eichenberg C, Schott M, Decker O, Sindelar B. Attachment style and internet addiction: An online survey. *J Med Internet Res*. 2017;**19**(5). e170. [PubMed ID: 28526662]. [PubMed Central ID: PMC5451635]. https://doi.org/10.2196/jmir.6694.

16. Seo M, Kang HS, Yom YH. Internet addiction and interpersonal problems in korean adolescents. *Comput Inform Nurs*. 2009;**27**(4):226–33. [PubMed ID: 19574748]. https://doi.org/10.1097/NCN.0b013e3181a91b3f.

17. Fioravanti G, Dettore D, Casale S. Adolescent Internet addiction: Testing the association between self-esteem, the perception of Internet attributes, and preference for online social interactions. *Cyberpsychol Behav Soc Netw*. 2012;**15**(6):318–23. [PubMed ID: 22703038]. https://doi.org/10.1089/cyber.2011.0358.

18. He F, Zhou Q, Li J, Cao R, Guan H. Effect of social support on depression of internet addicts and the mediating role of loneliness. *Int J Ment Health Syst*. 2014;**8**:34. [PubMed ID: 25147581]. [PubMed Central ID: PMC4139580]. https://doi.org/10.1186/1752-4458-8-34.

19. Shettar M, Karkal R, Kakunje A, Mendonsa RD, Chandran VM. Facebook addiction and loneliness in the post-graduate students of a university in southern India. *Int J Soc Psychiatry*. 2017;**63**(4):325–9. [PubMed ID: 28504040]. https://doi.org/10.1177/0020764017705895.

20. Peplau LA, Perlman D. Loneliness: A sourcebook of current theory, research, and therapy. *Theoretical Approaches to Loneliness*. John Wiley & Sons; 1982.

21. Heinrich LM, Gullone E. The clinical significance of loneliness: a literature review. *Clin Psychol Rev*. 2006;**26**(6):695–718.

22. Ozdemir U, Tuncay T. Correlates of loneliness among university students. *Child Adolesc Psychiatry Ment Health*. 2008;**2**(1):29. [PubMed ID: 18851744]. [PubMed Central ID: PMC2572161]. https://doi.org/10.1186/1753-2000-2-29.

23. Weeks DG, Michela JL, Peplau LA, Bragg ME. Relation between loneliness and depression: a structural equation analysis. *J Pers Soc Psychol*. 1980;**39**(6):1238–44. [PubMed ID: 7205551]. https://doi.org/10.1037/h0077709.

24. Li W, Zhang W, Xiao L, Nie J. The association of Internet addiction symptoms with impulsiveness, loneliness, novelty seeking and behavioral inhibition system among adults with attention-deficit/hyperactivity disorder (ADHD). *Psychiatry Res*. 2016;**243**:357–64. [PubMed ID: 27449004]. https://doi.org/10.1016/j.psychres.2016.02.020.

25. Simcharoen S, Pinyopornpanish M, Haoprom P, Kuntawong P, Wongpakaran N, Wongpakaran T. Prevalence, associated factors and impact of loneliness and interpersonal problems on internet addiction: A study in Chiang Mai medical students. *Asian J Psychiatr*. 2018;**31**:2–7. [PubMed ID: 29306727]. https://doi.org/10.1016/j.ajp.2017.12.017.

26. Lai CM, Mak KK, Watanabe H, Ang RP, Pang JS, Ho RC. Psychometric properties of the internet addiction test in Chinese adolescents. *J Pediatr Psychol*. 2013;**38**(7):794–807. [PubMed ID: 23671059]. https://doi.org/10.1093/jpepsy/jst022.

27. Alavi SS, Eslami M, Maracy MR, Najafi M, Jannatifard F, Rezapour H. Psychometric properties of Young Internet Addiction test. *J Behav Sci*. 2010;**4**:183–9.

28. Russell DW. UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *J Pers Assess*. 1996;**66**(1):20–40. [PubMed ID: 8576833]. https://doi.org/10.1207/s15327752jpa6601_2.

29. Barkham M, Hardy GE, Startup M. The IIP-32: A short version of the Inventory of Interpersonal Problems. *Br J Clin Psychol*. 1996;**35**(1):21–35. [PubMed ID: 8673033]. https://doi.org/10.1111/j.2044-8260.1996.tb01159.x.

30. Fath N, Azad Fallah P, Rasool-zadeh Tabatabaei SK, Rahimi C. Validity and reliability of the inventory of interpersonal problems (IIP-32). *J Clin Psychol*. 2013;**5**(3):69–80. Persian. https://doi.org/10.22075/jcp.2017.2137.

31. Salarvand S, N. Albatineh A, Dalvand S, Baghban Karimi E, Ghanei Gheshlagh R. Prevalence of internet addiction among iranian university students: A systematic review and meta-analysis. *Cyberpsychol Behav Soc Netw*. 2022;**25**(4):213–22. [PubMed ID: 35085012]. https://doi.org/10.1089/cyber.2021.0120.

32. Feizy F, Sadeghian E, Shamsaei F, Tapak L. The relationship between internet addiction and psychosomatic disorders in Iranian undergraduate nursing students: a cross-sectional study. *J Addict Dis*. 2020;**38**(2):164–9. [PubMed ID: 32469289]. https://doi.org/10.1080/10550887.2020.1732180.

33. Alinejad V, Parizad N, Yarmohammadi M, Radfar M. Loneliness and academic performance mediates the relationship between fear of missing out and smartphone addiction among Iranian university students. *BMC Psychiatry*. 2022;**22**(1):550. [PubMed ID: 35962328]. [PubMed Central ID: PMC9372955]. https://doi.org/10.1186/s12888-022-04186-6.