Brief Report / Kısa Araştırma

Internet Addiction and Depression Levels in Erciyes University Students

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ABSTRACT

Internet addiction and depression levels in Erciyes University students

Objective: The study was carried out to determine Internet addiction and depression levels among university students, the effects of some socio-demographic factors on these levels, and association between Internet addiction and depressive symptom levels.

Method: This descriptive study was performed in Schools of Medicine, Engineering, and Economics and Administrative Sciences Erciyes University in 2015. A total of 1288 students were included in the study. Data were collected via socio-demographic questionnaire of 27 questions, Internet Addiction Scale (IAS), and Beck Depression Inventory (BDI). The students were visited in their classrooms and informed about the study by the researchers. The questionnaires and scales were collected after being filled in by the students, under the supervision of the researchers.

Results: Mean IAS and BDI scores were calculated as 12.1±9.1 and 27.7±14.7, respectively. Depressive symptoms were found in 26.4% of the students whereas, Internet addiction in 0.2% and limited symptoms of Internet addiction in 7.5%. Mean IAS score was found higher among men, whereas mean BDI score was higher among women. A significant correlation was found between IAS and BDI scores (r=0.325, p<0.001).

Conclusion: Approximately 8% of the students are under the risk of Internet addiction. There is a significant association between Internet addiction and depression scores. But, it is not clear which of these two factors affects the other.

Keywords: Depression, Internet addiction, student

ÖZ

Erciyes Üniversitesi öğrencilerinde İnternet bağımlılığı ve depresyon düzeyleri

Amaç: Bu araştırma, üniversite öğrencilerinde İnternet bağımlılığı ve depresif belirti düzeylerini, çeşitli sosyo-demografik faktörlerin bu düzeylere etkisini ve İnternet bağımlılığı ile depresif belirti düzeyleri arasındaki ilişkiyi incelemek amacıyla yapılmıştır.

Yöntem: Araştırma, Erciyes Üniversitesi'ne bağlı Tıp, Mühendislik ve İktisadi ve İdari Bilimler Fakültelerinde, 2015 yılında yapıldı. Toplam 1288 öğrenci araştırma kapsamına alındı. Araştırma verileri, 27 sorudan oluşan sosyo-demografik anket formu, İnternet Bağımlılık Ölçeği (İBÖ) ve Beck Depresyon Ölçeği (BDÖ) yardımıyla toplandı. Öğrenciler, araştırmacılar tarafından sınıflarında ziyaret edilerek araştırma hakkında bilgilendirildi. Anketler ve ölçekler, araştırmacıların gözetimi altında öğrenciler tarafından doldurulduktan sonra toplanmıştır.

Bulgular: Araştırma grubunda, ortalama BDÖ puanı 12.1±9.1, ortalama İBÖ puanı 27.7±14.7 bulunmuştur. Öğrencilerin %26.4'ünde depresif belirti, %0.2'sinde İnternet bağımlılığı, %7.5'inde ise sınırlı İnternet bağımlılığı belirtileri belirlenmiştir. İBÖ puanları erkeklerde, BDÖ puanları ise kadınlarda daha yüksek bulunmuştur. İBÖ ve BDÖ puanları arasında pozitif yönde ilişki bulunmuştur (r=0.325, p<0.001).

Sonuç: Öğrencilerin yaklaşık %8'i İnternet bağımlılığı riski altındadır. İnternet bağımlılığı puanları ile depresyon puanları arasında anlamlı bir ilişki vardır. Ancak bu faktörlerden hangisinin diğerini etkilediği tam olarak belli değildir.

Anahtar kelimeler: Depresyon, İnternet bağımlılığı, öğrenci

INTRODUCTION

The ever-expanding uses of Internet cause people to spend more time on the Internet, and this overuse can sometimes lead to a level of addiction. Internet addiction is defined by Young (1) as 'inability to avoid the desire for excessive use of the Internet, losing the importance of the time passed without being connected to the Internet, being extremely irritable and aggressive when deprived, and increasingly jeopardizing work, social and family life of the person.'

The term of Internet addiction has been adopted since the mid 1990s and various scales have been developed to determine Internet addiction (2-4). In studies conducted in diverse societies using different scales, greatly differing Internet addiction ratios have been reported (5-7).

Internet addiction, which has been named as 'pathological Internet use, excessive Internet use, or inappropriate Internet use', is yet to be defined as a disorder. It has been suggested in the studies conducted in recent years that, it is a candidate to enter Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5) diagnostic lists as a mental disorder (8). However, it was not included in the DSM-5 classification published in 2013, but for the first time it was included in Section III as "Internet gaming disorder" among "Conditions for Further Study" (9).

There are studies showing that social, behavioral and psychological disorders can occur following the increasing amount of time of Internet use and the development of addiction (10). It is reported that there is a relationship between Internet addiction and mental and behavioral disorders such as substance abuse, attention-deficit/hyperactivity disorder, social phobia, anxiety, and depression. For example, in a systematic review of 20 articles published up to 2013, 75% of studies reported a significant association between Internet addiction and depression (11). Although pathological Internet use and depression are reported to be together, it is not clear whether there is a causal relationship between them.

Given the widespread use of Internet in young people, it can be said that university students are one of the important risk groups in terms of both Internet addiction and associated disorders such as depression. For this reason, it is important to verify the extent of the problem, to identify risky groups and to determine the measures to be taken via studies to be done especially in these groups.

This study was conducted to investigate Internet addiction and depressive symptom rates, the effects of various socio-demographic factors on these rates, and the relationship between Internet addiction and depressive symptom levels in students attending various faculties of Erciyes University.

METHOD

This descriptive study was carried out in 2015 at School of Medicine, School of Engineering, and School of Economics and Administrative Sciences (SEAS) affiliated to Erciyes University. Administrative consent and Ethical approval was obtained from the Dean's Office of each school and from the Ethics committee of Clinical Investigations of Erciyes University School of Medicine, respectively.

It has been considered that the depressive symptom rate in university students may be about 25% (12). Minimum sample size was calculated as 1190 by taking Confidence level as 0.95 and tolerance value as 0.025. At least 1200 students were planned to be included in the study.

The School of Engineering and the SEAS have four year curriculum, whereas the School of Medicine is six years. To make it more suitable for comparison, it was decided to perform the study on the first four grade students of each school. It was planned to include similar number of students from each of the three schools. Since the number of students at the School of Medicine was fewer, it was decided to include all the students in the first four grades of the School of Medicine, three departments of the School of Engineering, and one department of SEAS. Departments of Environmental Engineering, Industrial Engineering, and Food Engineering at School of Engineering and Department of Business Administration at SEAS were randomly selected. The total number of students in these programs was 3382 and it was thought that the

planned sample size can be reached if 50% of these students are reached. It was aimed to reach all students in the selected department and classes.

Measures

Data were collected using socio-demographic questionnaire, Internet Addiction Scale (IAS), and Beck Depression Inventory (BDI).

Socio-demographic questionnaire: In the questionnaire prepared by the researchers, there are 18 questions about participants' socio-demographic characteristics and computer and Internet use characteristics.

Internet Addiction Scale (IAS): It was developed by Young (13) in 1998 and adapted to Turkish in 2001 by Bayraktar (14). There are 20 Likert type questions with six choices on the scale and they are scored as never (0) through always (5). The scores of all the items are summed, yielding total scores between 0-100. Patients with a total IAS score of 80 or higher are considered 'pathological Internet users', those between 50 and 79 are considered as 'having limited symptoms', and those below 50 points are considered 'non-symptomatic'.

Beck Depression Inventory (BDI): This scale was developed by Beck et al. (15) to measure somatic, emotional, cognitive and motivational symptoms of depression. Turkish adaptation study was performed by Hisli (16). The BDI is a self-report scale consisting of 21 questions. The score for each question ranges from 0 to 3, and the total score can range from 0 to 63. BDI scores were classified as normal (1–10), mild depression (11–16), borderline clinical depression (17–20), moderate depression (21–30), severe depression (31–40), and very severe depression (above 40). Clinical assistance is recommended for those with scores of 17 and above (16).

Data Collection

The students were visited in their classes by the researchers, they were informed about the research and verbal consents were received. Socio-demographic questionnaires and scales were distributed to the students who agreed to participate in the study. The questionnaires and scales were collected after being filled in by the students, under the supervision of the researchers. Students were asked not to name the questionnaires and scales. Of the 1342 students in the selected classes, 54 did not agree to participate in the study. Thus, a total of 1288 students were included in the study.

Statistical Analysis

The answers to the questions on the Internet Addiction Scale were evaluated and an IAS score between 0-100 was calculated. Internet addiction scores below 50 points were considered normal, scores of 50-79 points were considered as having "limited symptoms", and scores of 80 points and over were considered as "pathological Internet use". In further analyzes, pathologic Internet users and those with limited symptoms were evaluated altogether and expressed as having 'risk of Internet addiction'.

The answers to the questions in the Beck Depression Scale were evaluated and BDI scores between 0-63 points were obtained. A BDI score of 17 and above was considered as having 'depressive symptom'.

The obtained data were analyzed on SPSS 15.0 software package. In the statistical analysis of the data; Pearson Chi square test was used for categorical data, unpaired t test and one-way ANOVA test (post hoc Scheffe test) were used for quantitative data. Pearson simple correlation analysis was performed to analyze the relationship between quantitative variables. Logistic regression analysis was applied to assess the effect of various socio-demographic factors on Internet addiction and depressive symptom probabilities. Variables determined to affect depression or Internet addiction in the literature were included in the logistic analysis, as well as variables that were found to significantly affect the BDI or IAS score in univariate analyzes. Considering that the relationship between depression and Internet addiction is related to mutual interaction, both variables were taken as independent variable of each other.

When factors affecting the likelihood of depressive symptom were assessed; age, gender, economic status of the family, place of residence, presence of chronic illness, continuous drug use and Internet addiction status were taken as independent variables. When factors affecting Internet addiction were evaluated; age, gender, economic status of the family, depressive symptom status, having a personal computer, having Internet access, Internet access on cell phone, years of Internet use, and daily Internet use were taken as independent variables. In all statistical analyzes, p<0.05 values were considered significant.

RESULTS

Of the 1288 students included in the study, 42.8% were men, 57.2% were women with a mean age of 20.7±2.0 years. The number of the students studying at the School of Medicine was 405, whereas 471 were studying at the School of Engineering and 412 at SEAS.

Table 1: Internet use characteristics of the study group

Internet Use Characteristics (n=1288)	n	%
Owns a Personal Computer (PC)		
Yes	979	76.0
No	309	24.0
Internet Access on PC		
Yes	1124	87.3
No	164	12.7
Internet Access on Mobile Phone		
Yes	1212	94.1
No	76	5.9
Internet Access Means		
PC	835	64.8
Mobile phone	1154	89.6
School computer	135	10.5
Internet cafe	85	6.6
Other	43	3.3
Internet Activity		
Communication – chat	1105	85.8
Fun–music–film	973	75.5
Actuality	960	74.5
Access to teaching material	856	66.5
Shopping	452	35.1
Other	64	5.0
	Mean	**SD**
Years of Internet Use (year)	7.2	73.1
Daily Internet Use (hours)	4.2	3.3

SD: Standard deviation

In the study group, the mean BDI score was 12.1±9.1, the mean Internet addiction score was 27.7±14.7. Of the patients 26.4% were evaluated as having depressive symptoms, 0.2% as pathological Internet users and 7.5% as Internet users with limited symptoms.

As seen in Table 1, the majority of the students in the study group go online on their PC and /or on their mobile phone. Students spend for an average of 4.2±3.3 hours per day on the Internet.

As shown in Table 2, the average IAS score was found to be higher in men and the BDI score was higher in women. The mean IAS score was higher for students under 20 years of age, wheras BDI score was higher in students aged 20 and over. For those who reported a poor economic status, both the IAS score and the BDI score were higher.

A significant positive correlation was found between the years of Internet use and the IAS score (r=0.063, p=0.024); daily Internet use and IAS score (r=0.283, p<0.001); and the IAS score and BDI score (r=0.325, p<0.001).

As seen in Tables 3 and 4, having controlled the other independent variables, the risk of Internet addiction was found to be 2.56 times higher in students with depressive symptoms than those without depressive symptom; the risk of depressive symptoms was 2.60 times higher in students who had Internet addiction or limited symptoms than those who did not have.

DISCUSSION

The mean Internet addiction score in the entire study group was 27.7±14.7; pathological Internet users were 0.2% of the students and 7.5% were evaluated as 'having limited symptoms'. Studies have found quite diverse rates regarding Internet addiction. Some studies have reported rates as low as 1% (17), while others have reported rates as high as 80% (18). In a study conducted on university students by Gunuc and Kayri (4), it was determined that 12.6% of the students were at risk of getting Internet addiction and 12.3% had Internet addiction. In a study conducted by Mayda et al. (7),

Table 2: Comparison of BDI and IAS scores according to various characteristics of the research group

Characteristics	n	IAS Score				BDI Score			
		Mean	SD	t	p	Mean	SD	t	p
Gender									
Men	551	29.5	15.9[a]	3.80	<0.001	11.4	9.3[a]	2.42	0.016
Women	737	26.3	13.5[b]			12.6	9.0[b]		
Age									
17–19	404	29.9	15.1[a]	3.68	<0.001	11.2	8.6[a]	2.44	0.015
≥20	884	26.7	14.4[b]			12.5	9.3[b]		
		Mean	SD	F	p	Mean	SD	F	p
Economic Status									
Good	481	28.6	14.1[a,b]			11.5	9.0[a]		
Medium	742	26.7	14.5[a]	5.28	0.005	12.0	9.0[a]	13.52	<0.001
Poor	65	32.0	18.5[b]			17.7	9.4[b]		
School									
Medicine	405	28.3	14.8			12.0	9.1		
SEAS	412	27.1	15.0	0.71	0.490	12.1	9.3	0.05	0.948
Engineering	471	27.7	14.0			12.0	8.9		
Residence									
With family	535	27.2	14.4			11.8	9.0[a]		
Hostel	438	28.5	15.1	0.78	0.505	12.9	9.3[a]	3.69	0.012
Student home	274	27.3	14.4			10.9	8.6[a]		
Other (with relatives etc)	21	27.2	13.8			14.8	11.8[b]		
		Mean	SD	t	p	Mean	SD	t	p
Presence of a Chronic Disease									
No	1168	27.6	14.6	0.37	0.710	11.9	8.9	2.62	0.009
Yes	119	28.2	15.6			14.2	11.0		
Need for Continuous Drug Use									
No	1234	27.7	14.6	0.19	0.847	11.9	9.0	2.58	0.012
Yes	54	27.3	15.8			16.0	11.3		
Owns Personal Computer (PC)									
No	309	26.6	14.4	1.44	0.140	12.5	9.3	0.88	0.382
Yes	979	28.0	14.7			11.9	9.1		
Internet Access on PC									
No	164	25.0	14.6	1.71	0.088	13.3	9.8	1.73	0.086
Yes	1124	27.9	14.6			11.9	9.0		
Internet Access on Mobile Phone									
No	76	25.4	14.9	1.62	0.156	13.4	10.1	1.22	0.225
Yes	1212	27.8	14.9			12.0	9.1		

BDI: Beck Depression Inventory, IAS: Internet Addiction Scale, SAES: School of Economics and Administrative Sciences, SD: Standard deviation, a,b: For each varible, the groups not having the same letter were significantly different (p<0.05)

those with Internet addiction were found as high as 56.9%. These different results may be due to differences in the scales used in the definition of addiction, differences in the groups studied, and the fact that the studies were conducted at different times. In the studies using Young's IAS, which is also used in this study, usually lower rates of Internet addiction are found. In another study using the same scale which was performed on Kahramanmaras Sutcu Imam University Faculty of Education students, found a

mean IAS score of 26.7±18.4. Pathological Internet users were 1.2% and students with limited symptoms were 10.1% (19).

The relationship between age and IAS scores was statistically significant in the study group; the risk of Internet addiction was found to be higher among students under 20 years of age (Tables 2 and 3). In the study conducted by Ni et al. (20) in China, the IAS scores of students over 21 years old were higher than those of younger students. In the study performed by

Table 3: Effect of various factors on the probability of Internet addiction (Logistic Analysis Results)

Independent Variables	n	Internet Addiction Risk		OR (95CI%)
		Number	%	
Gender				
Male	551	65	11.8	3.30 (2.06–5.18)
Female (ref)	737	35	4.7	1.00
Age				
17–19	404	36	8.9	1.77 (1.11–2.82)
≥20 (ref)	884	64	7.2	1.00
Economic status				
Good (ref)	481	37	7.7	1.00
Medium	742	53	7.1	1.01 (0.64–1.61)
Poor	65	10	15.4	1.91 (0.82–4.43)
Owns Personal Computer				
No (ref)	309	21	6.8	1.00
Yes	979	79	8.1	1.32 (0.74–2.35)
Internet Access on Personal Computer				
No (ref)	164	10	6.1	1.00
Yes	1124	90	8.0	1.44 (0.67–3.10)
Internet Access on Mobile Phone				
No (ref)	76	7	9.2	1.00
Yes	1212	93	7.7	0.65 (0.27–1.55)
Years of Internet Use (year) (numerical)				1.01 (0.94–1.08)
Daily Internet Use (hours) (numerical)				1.12 (1.07–1.18)
Depressive Symptom				
No (ref)	948	55	5.8	1.00
Yes	340	45	13.2	2.56 (1.65–3.98)

OR: Odds ratio, CI: Confidence interval, Ref: Reference category

Table 4: Effect of various factors on the probability of Internet addiction (Logistic Analysis Results)

Independent Variables	n	Depressive Symptom		OR (95CI%)
		Number	%	
Gender				
Male	551	139	25.2	1.00
Female	737	201	27.3	1.24 (0.94–1.63)
Age				
17–19	404	94	23.3	1.00
≥20	884	246	27.8	1.30 (0.98–1.73)
Economic status				
Good	481	114	23.7	1.00
Medium	742	191	25.7	1.14 (0.87–1.50)
Poor	65	35	53.8	3.80 (2.18–6.62)
Residence				
With family	535	141	26.4	1.00
Hostel	438	129	28.2	0.95 (0.71–1.28)
Student home	274	60	21.9	0.75 (0.52–1.08)
Other	21	10	47.6	2.43 (0.98–6.03)
Presence of a chronic disease				
No	1168	299	25.6	1.00
Yes	119	41	34.5	1.23 (0.76–2.02)
Need for continuous drug treatment				
No	1234	317	25.7	1.00
Yes	54	23	42.6	1.86 (0.94–3.69)
Internet Addiction Scale score				
0–49	1188	295	24.8	1.00
50–100	100	45	45.0	2.60 (1.68–4.01)

OR: Odds ratio, CI: Confidence Interval, Ref: Reference category

Tel and Koksalan (21) with academic staff serving at various colleges in Turkey, the Internet use rate have been found higher in academicians below 30 years of age than those aged 30 and above. On the other hand, the relationship between age and Internet addiction was not statistically significant in the study of Ju-Yu et al. (22) on 3662 adolescents in Taiwan. The conflicting age-related research findings may be due to the differences between the societies where the research is conducted, the age distribution of the research groups, and the time of the conducted research. The finding of a higher risk for Internet addiction among students under 20 may be due to the fact that younger generations start using the Internet at an earlier age, this reality may cause an increase in Internet addiction levels in the coming years.

The average IAS score of male students was significantly higher than that of female students (Table 2). The risk of Internet addiction in men is about three times higher than in women (Table 3). In the initial years of when the Internet was becoming common, it is known that the proportion of men using the Internet is higher than that of women (23). However, with the widespread use of the Internet, this gap is expected to decrease. Reduction in differences in the Internet use of men and women can also lead to a reduction of differences in Internet addiction. The mean IAS score in males was found to be higher compared to females in the studies performed by Balta and Horzum (24), Fidancioglu et al. (25), Kelleci et al. (26) as well. In a study with university students in Lebanon, the risk of Internet addiction in male students was about twice as high as in female students (27). However, the relationship between Internet addiction and gender was not found statistically significant in the studies by Usta et al. (28) and Lam et al. (29).

As shown in Table 2, the mean IAS score of students who reported their socioeconomic status as poor was found to be higher than those of the students with good and medium socioeconomic status. However, according to the results of logistic regression analysis, the effect of socioeconomic status on Internet addiction risk was not significant (Table 3). There is

conflicting information about the relationship between socio-economic status and Internet addiction in the literature. Jackson et al. (30) point out that the level of income and education used to be associated with Internet use in the past, but this link has disappeared in years. In our country, Internet access is getting easier and socioeconomic status differences perish. Over time, the change in factors that affect Internet use may as well cause factors that affect Internet addiction to change.

There was a significant positive correlation between the IAS score and years of Internet use and amount of daily Internet use. However, the correlation coefficient between the IAS score and the years of Internet use is very low. Indeed, in the logistic analysis, the effect of years of Internet use on Internet addiction risk was not significant. On the other hand, the correlation coefficient between the amount of daily Internet use and the IAS score is higher, and according to the results of logistic regression analysis, it is determined that the one hour increase in daily Internet use increases the Internet addiction risk by about 10%. In a study on medical school students in Thailand, the risk of Internet addiction was found to be about 2.2 times higher in students with more than 5 hours daily Internet use than in those with less than two hours daily Internet use (31).

There was a significant positive correlation between BDI scores and IAS scores of the students in the study group (r=0.325, p<0.001). As shown in Table 3, the risk of Internet addiction was found to be about 2.5 times higher in the students with depressive symptoms than those without depressive symptoms. Similarly, the risk of depression in students with Internet addiction was 2.6 times higher than those without Internet addiction (Table 4). This relationship between Internet addiction and depression is independent of the students' characteristics such as age, gender, and economic status. In most of the studies on Internet addiction, there is a relation between Internet addiction and various psychological problems. In a study conducted on Eskisehir Osmangazi University first year students in 2012, a strong correlation (r=0.804) was found between the IAS and the BDI scores of the students (r=0.804). A study conducted by Yen et al. (33) on 2114 adolescents

found that Internet addiction, depressive disorder, and attention-deficit hyperactivity/disorder symptoms were related. In another study; general health problems, depression, and emotional and behavioral disorders such as loneliness, social isolation, and aggression, have been shown to increase as duration of Internet use increased (34).

Internet addiction is associated with lack of social skills, shyness, loneliness and social support variables (35). It has been determined that Internet addiction is frequent in people with low social support who perceives the Internet as an environment in which they can establish social relations (36). The fact that virtual social support provided via the Internet is not transformed to permanent relations in real life, leads to social problems; while the dissatisfaction and unhappiness in social relations direct to the virtual world creating a vicious circle (37).

The data obtained from our studies and from previous studies show that there is a significant relationship between Internet addiction and depression. However, whether this relationship is a causal relationship is not clear, nor the direction of a possible causal relationship. Internet addiction may trigger depressive symptoms, and Internet addiction may as well arise when depressive people diverge from real social relationships and converge to Internet. It is also possible that Internet addiction and depression can affect each other and develop a vicious circle.

This study has three important limitations. First, the data about Internet use is self-report, and in particular, the data about the duration of Internet use may not reflect the actuality. Second, because of the cross-sectional nature of the study, it was not possible to determine whether the relationship between depression and Internet addiction had a causal relationship or which one affected the other. Third, since the study was conducted on university students, the results cannot be generalized to the entire society.

In conclusion, it was determined that approximately one fourth of the students in the study group had depressive symptoms, 7.8% had Internet addiction or limited symptoms in terms of Internet addiction. A positive correlation was found between the BDI and the IAS scores. The risk of Internet addiction was found to be three times higher in males than in females, two times higher in students aged below 20 than in those over 20. Depression risk was higher in students with poor economic status.

In order to better explain the relationship between Internet addiction and depression, more comprehensive and prospective studies should be conducted. By early intervention, students who are at risk of Internet addiction and depression should be prevented from entering the vicious circle.

Contributions category	Authors name
Development of study idea	O.G.
Methodological design of the study	O.G., A.O.
Data acquisition and process	E.E.A., N.S.
Data analysis and interpretation	O.G.
Literature review	E.E.A., N.S.
Manuscript writing	O.G., A.O., E.E.A., N.S.
Manuscript review and revision	O.G., A.O.

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