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INTERNET ADDICTION INCREASES AMONG HIGH SCHOOL STUDENTS ESPECIALLY AMONG FEMALE STUDENTS IN MERSIN TURKEY

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Abstract
The present study aimed to show the change in the prevalence of internet addiction detected among high school students from data collected in 2012 to that collected in 2016. This cross-sectional study was conducted in 13 high schools in 2016. The prevalence of internet addiction in 2012 and 2016 was compared using the Z-test. The risk factors for internet addiction were determined using Binary Logistic Regression analysis. The study population consisted of 1061 students, 531 of which were female (50.1%). Of the 1061 students, 234 (22.1%) had an internet addiction (18.9% in males, 25.2% in females, $p<0.05$). In comparison with the data collected in 2012, the prevalence of internet addiction in male students had not changed in the four years, while it had changed dramatically in female students ($p<0.001$). Internet addiction was influenced 1.76 times by female students, 2.08 times by gaming, and 1.4 times by an increase in online applications. Internet addiction among high school students increased from 2012 to 2016 in the evaluated schools. The main factor for this is the increase in the internet addictionin female students.
Keywords: Adolecent, internet, internet addiction.

İNTERNET BAĞIMLILIĞI LİSE ÖĞRENCİLERİ ARASINDA ÖZELLİKLE KIZLAR ARASINDA ARTMAKTADIR.

Çalışma 2012'den 2016'ya lise öğrencileri arasında internet bağımlılığındaki değişimi araştırmayı amaçlamaktadır.Kesitsel tipte planlanan çalışma 2016 yılında 13 lisede yapıldı. 2012 ve 2016 internet bağımlılığı prevelansı Z testi kullanılarak karşılaştırıldı. İnternet bağımlılığı ile ilişkili risk faktörleri Binary Logistik Regresyon analizi ile belirlendi. Çalışma grubu 531'i (%50.1) kız olmak üzere 1061 öğrenciden oluşmaktadır. 1061 öğrencinin 234'dünün (%22.1) internet bağımlısı idi (Erkeklerde %18.9, kızlarda %25.2, p<0.05)). 2012'de toplanan very ile karşılaştırıldığında, geçen dört yılda kız öğrencilerde internet bağımlılığı prevelansı dramtik bir şekilde artarken (p<0.001), erkek öğrencilerde değişmemişti. İnternet bağımlılığı kız öğrencilerde 1.76 kat, oyun oynayanlarda 2.08 kat ve online uygulama sayısı arttıkça 1.4 kat artmaktadır.2012 yılından 2016 yılına lise öğrencileri arasında internet bağımlılığı artmıştır. Bunun başlıca nedeni internet bağımlılığının kızlarda artmasıdır.
Anahtar kelimeler: Ergen, internet, internet bağımlılığı.

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Introduction

Internet addiction has become a social health problem over recent decades due to increasing use of the internet. It was first defined by Young (1) in 1996 as: excessive use of the internet; inability to suppress the appetite to use it; desire to stay longer online, extreme nervousness, tension, and restlessness in its absence, and the emergence of psychological, mental, social, and professional problems. Internet addiction threatens all age groups, but those most at risk are teenagers. It has been reported that the prevalence of internet addiction is 1.9−26.2% (2−21) in different countries and 7.9−18.2% (22−27) in Turkey.

The prevalence and related factors of internet addiction have been investigated in a plethora of national and international studies (2−28); however, the question of whether internet addiction changes positively or negatively over time has not been efficiently examined. Furthermore, comparison of several studies conducted using different methods has suggested this to be the main reason for such a large variation in results. Thus, we suggest that repetition of data collection in the same population using the same method will better reveal this change over time.

In our previous study conducted in Mersin in 2012, which was published in the European Journal of Public Health in 2014 (27), we reported that the average prevalence of internet addiction in high school students was 15.1% (20.4% in males and 9.3% in females). The present study aimed to provide a comparison with our previous study.

Material and Method

The data were taken from a thesis in medicine with the title “Research on Quality of Sleep of High School Students in Mersin in Relation to Use of Virtual Communication Tools and Internet Addiction”. The author of the thesis is Fazıl Koças, and his supervisor was Tayyar Şaşmaz An article entitled “Internet addiction increases poor sleep quality among high school students” was taken from the thesis and published in the Turk Journal of Public Health in 2018 (29).

The study population consisted of 55043 students enrolled in Mersin high schools in 2016. The minimum sample size was calculated as 1047 students, with a 50% prevalence, +3 error margin, and 95% Confidence Interval (CI). We decided to include 1100 participants in case of drop out. A multistage stratified sampling method was used in the present study. Stratification was performed based on district and high school type. Of the 114 high schools, 13 were randomly selected, in addition to the classes to be included in the study. All students in the selected classes were included in the study. The data were collected between February 15th and April 5th, 2016.

Demographic information, family, and internet use characteristics, in addition to internet addiction data were collected. Internet addiction was used as dependent variable. The Turkish version of the scale developed by Griffiths was used to determine internet addiction. The reliability and validity of this scale was tested in 2010 by Canan et al., (30). The scores 81 and over were defined as internet addiction.

The data were interpreted using descriptive statistics. The prevalence of internet addiction in 2012 and 2016 was compared using the Z-test. The categorical variables were compared using the chi-square test, and continuous variables using the Mann−Whitney U test. Independent variables for which significant differences were detected in the risk factors affecting internet addiction were identified using Binary Logistic Regression Forward method analysis, with $p \leq 0.05$.

Results

The study population consisted of 1061 participants, of which 531 were females (50.1%). The mean age of the participants was 16.6±1.2 years old, and the mean number of siblings was 3.4±1.9. Of the 1061 participants, 961 (90.7%) lived with parents, 353 (35.0%) with a high school- or higher level-educated mother, and 453 (43.1%) with a high school- or higher level-educated father (Table 1).

Table 1: The socio-demographic characteristics of the participants.

Variables	n	%
Gender (n=1061)		
Male	530	49.9
Female	531	50.1
Age *(x̄±SD)*	1061	16.6±1.2
Number of sibling (her/himself included) *(x̄±SD)*	1061	3.4±1.9
School type (n=1061)		
General high school	516	48.6
Occupational high school	545	51.4
School type (n=1061)		
State high school	950	89.5
Private high school	111	10.5
Class (n=1061)		
Nineth	309	29.1
Tenth	271	25.5
Eleventh	291	27.5
Twelfth	190	17.9
Own room in home (n:1051)		
Yes	739	70.3
No	312	29.7
Who lives with (n=1060)		
With parents	961	90.7
With others	99	9.3
Mother education (n=1053)		
Middle school and below	700	65.0
High school and above	353	35.0
Father education (n=1052)		
Middle school and below	599	56.9
High school and above	453	43.1
Working status of parents (n=1042)		
Mother and father working	217	20.8
Only mother working	29	2.8
Only father working	713	68.4
Parents not working	83	8.0

Of the 1061 participants, 234 (22.1%) were internet addicts. The prevalence of internet addiction was 18.9% in male students and 25.2% in female students. In 2012, these rates were 20.4% in male students and 9.3% in female students (15.1% overall) (27). No significant difference was found in the overall prevalence of internet addiction of males as compared with 2012; however, internet addiction in females significantly increased by 2.7 fold (Table 2).

Table 2: The change of internet addiction prevalence from 2012 to 2016

Variables	2012 Survey			2016 Survey			p[3]
	n[1]	*n*[2]	*%*	*n*[1]	*n*[2]	*%*	
Male	609	124	20.4	530	100	18.9	>0.05
Female	547	51	9.3	531	134	25.2	**<0.001**
Total	1156	175	15.1	1061	234	22.1	**<0.001**

[1]Total number, [2]The number of internet addiction, [3]Z Score calculator for 2 population proportions

Univariate analyses showed a significant relationship between internet addiction and being female, young, having an increased use of online applications, using the internet for purposes other than academia, having a limitless internet connection at home, a personal computer, and a mobile phone, playing games, and having parents educated to at least high school level (Table 3).

Table 3: Associated factors with internet addiction

Variables	Internet addiction				p
	Yes		*No*		
	n	*%*	*n*	*%*	
Gender (n=1061)					
Male	100	18.9	430	81.1	<0.05
Female	134	25.2	397	74.8	
Age (n=1061)[4]	234	16.4±1.2	827	16.6±1.2	<0.01[3]
Number of online applications (n=1037)[4]	231	1.9±1.1	806	1.5±1.0	<0.001[3]
Aim of internet usage (n=1048);					
Academic use only	5	10.4	43	89.6	<0.001[2]
Academic and others	104	17.5	490	82.5	
Not academic use	125	30.8	281	69.2	
Internet connection in home (n=1058);					
No	44	15.6	238	84.4	<0.001[2]
Limited	25	17.5	118	82.5	
Not limited	165	26.1	468	73.9	
Own room in home (n:1051)					
Yes	178	24.1	561	75.9	<0.05
No	54	17.3	258	82.7	
Monthly family income (n=983)[1];					
<431 $	42	18.5	185	81.5	<0.05[2]
431-862 $	84	21.1	315	78.9	
863-1293 $	31	21.7	112	78.3	
>1293 $	61	28.5	153	71.5	
Own computer (n=1045);					
Yes	166	24.2	520	75.8	<0.05
No	64	17.8	295	82.2	
Own mobil phone (n=1059);					
Yes	216	23.5	705	16.5	<0.01
No	17	12.3	121	87.7	
Playing game on computer (n=1035);					
Yes	184	24.8	557	75.2	<0.01
No	50	15.6	270	84.4	

Mother education (n=1053)					
Middle school and below	141	20.1	559	79.9	<0.05
High school and above	90	25.5	263	74.5	
Father education (n=1052)					
Middle school and below	115	19.2	484	80.8	<0.01
High school and above	118	26.0	335	74.0	

[1]The minimum wage in Turkey in the period of the study is 431 $ (1300 TL), [2]Linear by linear test, [3]MannWhitney U test, [4]($\bar{x}$±SD)

Binary logistic regression analysis was used to determine the risk factors affecting internet addiction, showing that it was influenced 1.76 times by female students, 2.08 times by gaming, and 1.4 times by an increase in online applications. In the same model, an increase in age and the use of the internet for educational purposes decreased internet addiction (Table 4).

Table 4: Associated risk factors with internet addiction on Binary Logistic Regression

Variables	OR	95% CI	p
Male	1.00		
Female	1.76	1.27 – 2.44	<0.01
Age	0.83	0.73 – 0.96	<0.05
Aim of internet usage;			
Not academic use	1.00		
Academic and others	0.43	0.16 – 1.17	>0.05
Academic use only	0.43	0.32 – 0.59	<0.001
Playing game on computer;			
Yes	2.08	1.43 – 3.04	<0.001
No	1.00		
Number of online applications	1.4	1.14 – 1.54	<0.001

Discussion

The present study indicates that 22.1% of the participants were internet addicts as compared with 15.1% in our previous study conducted in 2012 in the same setting and age group (27). The prevalence of internet addiction in similar studies in different countries has been shown to be 1.9−20.9% (6,9-10,12,15,18,31−37) in 2012 and earlier, and 2.0−25.5% (2,3−5,7,8,11,13−14,16,17,19-21,38) after 2012. Studies conducted in Turkey have reported that the prevalence of internet addiction was 7.9−11.6% (25,30) in 2012 and earlier, increasing to 10.1−18.2% (22−24,26) after 2012. Considering the results of the present study, we suggest that there has been an increase in internet addiction in high school students of approximately 50% over the last four years. This increase in internet addiction may be related to the daily increase in the number of applications and activities provided via the internet both in academic and social setting.

The prevalence of internet addiction in males and females in 2012 was 20.4% and 9.3%, respectively (27), while the current study indicates 18.9% and 25.2%, respectively. There was no significant difference in the prevalence of internet addiction in males over the last four years, while there was an increase of 2.7 fold in females. A study involving five European countries, conducted with a two-year interval (10), indicated that internet addiction in 2009−2010 was 4.06% and 3.99% in males and females, respectively, and 5.69% and 6.27% in 2011−2012. This study also indicated that internet addiction increased in

females more than in males over two years.

Some studies have reported that internet addiction is not related to gender (9,11,22,25,26), but others state that being male is the main risk factor (2,3,8,10,12,13,15,17,18−21,23,24,30−32,34−40). This difference was suggested to be related to the role of men within society, based on greater access and use of the internet. For instance, men are known to spend more time online gaming, watching movies, and using the internet for purposes other than academia, and it is this type of use that leads to addiction. Similar to the above-mentioned studies, in our study conducted in 2012, we found that being male was an independent risk factor for internet addiction; however, unlike our previous study and other studies, we found out in the present study, internet addiction in females is more prevalent, and being female is an independent risk factor. There exists only one study reporting that internet addiction is higher among females. In a study conducted in Spain in 5538 individuals between the ages 12 and 20 years, internet addiction was reported as 10.6% in males and 17.0% in females (14). These results may correlate with the change in the usage area of the internet. Other uses of the internet than academic purposes by men over recent decades, such as watching online videos, playing games, and gambling may have caused internet addiction to be more prevalent in males. The use of the internet by men for purposes other than academia remains high, but social media use on smart phones, whichis more prevalent in females, may cause a change in the gender distribution regarding internet addiction (11,14).

Age is a factor that affects both the biological structure and attitudes and behaviors of humans. There exist many studies conducted in adolescents stating that internet addiction increases with age (4,14,17,19); however, many studies also suggest that there is no relationship between age and internet addiction (8,9,15,26). A study conducted in Hong Kong reported that as adolescents get older, their internet addiction decreases (2). In the present study, we show that an increase in age is an independent factor decreasing internet addiction. Although our study shows that an increase in age reduces internet addiction, other studies conducted in similar age groups in different countries, even different studies in the same country have reported that the relationship between age and internet addiction remains undetermined. This may depend on sociocultural and economic differences between countries. For instance, students in Turkey spend more time studying and preparing for university entrance exams close to this time. Older adolescents naturally stay away from the internet and applications during this process, reducing internet addiction over time.

The aim of using internet determines its usage type. Studies show that using the internet for purposes other than academia (playing games, watching movies, shopping, connecting to social media) increases internet addiction (7,9,11,12,14,16,20−22), which is in accordance with the present study. This is an expected result and using the internet for purposes other than academia may increase addiction risk in adolescents.

In conclusion, over the last four years, the prevalence of internet addiction in high school students has increased from 15.1% to 22.1%; in particular, a dramatic increase to 25.2% was seen in females, while no significant change was observed in males. Thus, we suggest that the internet should be used more for academic purposes among teenagers, and more activities should be organized independent of virtual environments.

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