Evaluation of Internet Addiction in a Group of High School Students:

A Cross-sectional Study

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ABSTRACT
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Objective: In this study, we aimed to investigate internet addiction and the effects of some variables like age, gender, parental age and education, number of siblings, existence of internet connection at home, existence of computer in the adolescent's room, time spent on internet, adolescent's cigarette use, depression inventory score on internet addiction inventory scores in a group of high school students.
Method: The study group consisted of students of a high school in Ankara city center who volenteered to participate in the study. Data was collected by a socio-demographic information form, Beck Depression Inventory (BDI) and Internet Addiction Inventory (IAI). A probability level of p<0.05 was used to indicate statistical significance.
Results: The study group consisted of 211 students of whom 54% (n=114) were female. Time spent on internet and depression scores were positively correlated with IAI scores and IAI scores of males were significantly higher than IAI scores of females. No significant correlation was found between the IAI scores and other variables. The following items were found to be statistically significant in differentiating the 'addicted group' from the 'non-addicted group, respectively: to be male, a high depression score and long time spent on internet.
Conclusion: According to our study results, among high school students, the likelihood of internet addiction is higher in males. Level of depression and the time spent on internet were found to be possible risk factors that effect internet addiction. The results of our study will be helpful for future protective studies about internet addiction.
Key words: Internet addiction, risk factors, adolescent

ÖZET
Bir grup lise öğrencisinde internet bağımlılığı değerlendirmesi: Kesitsel bir çalışma
Amaç: Bu çalışmada, liseye devam eden bir grup ergende internet bağımlılığı ile yaş, cinsiyet, anne-baba yaşı, anne-baba eğitim düzeyi, kardeş sayısı, evde internet erişiminin mevcudiyeti, ergenin internet başında geçirdiği süre, ergenin odasında bilgisayar bulunup bulunmaması, ergenin sigara kullanıp kullanmaması ve depresyon ölçek puanı gibi değişkenlerin internet bağımlılığı ölçek puanına etkisinin incelenmesi amaçlanmıştır.
Yöntem: Çalışma örneklemi, Ankara il merkezinde bir liseye devam eden ve çalışmaya katılmaya gönüllü olan öğrencilerden oluşmaktadır. Çalışma verileri; sosyodemografik bilgi formu, Beck Depresyon Ölçeği ve İnternet Bağımlılığı Ölçeği ile toplanmıştır. Tüm istatistiksel değerlendirmelerde, anlamlılık düzeyi p<0.05 olarak kabul edilmiştir.
Bulgular: Örneklem, %54'ü (n=114) kız, 211 öğrenciden oluşmaktadır. İnternet Bağımlılığı Ölçek puanı ile değişkenlerin ilişkisi incelendiğinde, internette kalma süresi ve depresyon skoru arttıkça bağımlılık ölçek puanının da arttığı, erkeklerin kızlara göre bağımlılık ölçek puanlarının istatistiksel olarak anlamlı derecede yüksek olduğu, diğer değişkenlerle bağımlılık ölçek puanı arasında istatistiksel olarak anlamlı ilişki olmadığı saptanmıştır. Ayrıca, bağımlı grubu bağımlı olmayan gruptan ayırt etmede, sırasıyla, erkek olmanın, depresyon skorunun yüksek olmasının ve internette uzun süre kalmanın istatistiksel olarak anlamlı etkisinin olduğu görülmüştür.
Sonuç: Çalışma sonuçlarımıza göre, lise öğrencilerinde internet bağımlılığı olasılığı erkek cinsiyette daha fazladır. İnternet bağımlılığını etkileyen olası risk etkenleri olarak gencin depresyon düzeyi ve internette geçirdiği süre belirlenmiştir. Çalışma bulgularının internet bağımlılığı ile ilgili yapılacak koruyucu çalışmalar açısından yararlı olacağı düşünülmüştür.
Anahtar kelimeler: İnternet bağımlılığı, risk etkenleri, ergen

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INTRODUCTION

Internet is an important communication and information sharing tool being used frequently in school, business and social life. Effect of internet on life has been examined in detail in recent years and it was reported that, despite providing convenience to maintain home, school and business lives, internet may cause negative consequences as well (1). Internet addiction term was first described by Goldberg in 1996 (2). Internet addiction concept was enormously debated in the literature and except internet addiction several terms such as computer addiction, cyber-addiction, pathological internet utilization, problematic internet utilization and compulsive internet utilization were also suggested (3). Internet addiction term will be used to define the pathology in this paper. In Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), internet addiction is not defined as a disease but evaluated among Impulse Control Disorders Not Otherwise Specified (4). However, it was stated that internet addiction will be evaluated as a separate entity in DSM-V (5). The term "addiction" was classically used related with using chemicals such as alcohol and heroine. However, behaviors such as gambling, sex, shopping and exercise may also cause addiction (6). Diagnostic criteria established in relation to non-chemical behavioral addiction are similar to clinical criteria established for substance addiction (7). In this context, internet addiction can be described as combination of negative reflections consisting of excessive internet use causing loss of time perception or neglecting basic responsibilities, hostility, deprivation symptoms including tension, tolerance development and lying and social withdrawal (8). It was reported in the literature that internet addiction may lead to substantial negative impact and consequences in individual's life and physiological problems may occur due to excessive internet use (9,10). Adolescents are evaluated as a potential risk group for developing internet addiction due to incomplete psychological maturity. There are studies reported that excessive internet use in adolescents may lead to impairment of relations within families and between friends and may

have negative impact on social life of adolescents (11,12). Consistent with the literature, according to results of Household Computational Technologies Utilization Research completed in April 2010, 16-24 age group was found to have highest computer and internet utilization (13). It was thought that knowing the effect of demographic characteristics on internet addiction may benefit to show precautions by determining individuals under risk and a research about internet addiction in high school students which has the highest rate of internet use was planned.

Aim of this descriptive and cross-sectional study is to examine the severity of internet addiction in a group of high school students by using internet addiction scale and examine the effect of variables such as age, gender, parental age, educational level of parents, number of siblings, presence of internet access at home, duration of internet use of the adolescent, presence of computer in adolescent's room, smoking status of adolescent and depression scale score on internet addiction scale score.

METHODS

Sample

Study sample composed of 211 high school students. Study was conducted in a high school in Ankara city center volunteered to participate in the study and a sample selection was not aimed due to targeting all 298 students at that school. All students were informed about the study and study was conducted with 211 students who gave their consents. Socio-demographic information form and scales were given to students in their classrooms and completion of forms and scales took approximately 20-25 minutes.

Data Collection Tools

Study data were collected by socio-demographic information form, Beck Depression Scale and Internet Addiction Scale.

Socio-demographic Information Form: The form which was prepared by authors consists of

Table 1: Sociodemographic Data and Scale Scores

	Mean	Standard Deviation	Minimum Value	Maximum Value
Age	15.77	1.06	13	18
Mother's age	42.09	4.27	32	57
Father's age	46.04	4.79	38	63
Number of siblings	2	0.71	1	4
Internet Addiction Scale Score	68.86	21.00	35	168
Depression Scale Score	9.11	7.50	0	46

questions regarding age, gender, grade, parental age and educational level, working status, number of siblings of students and presence of internet connection at home, duration of internet use , presence of computer at his/her room and smoking status.

Beck Depression Scale: It is a self-rating scale consisting of 21 symptom category. This scale is used to determine risk of depression and assess changes in level and severity of depressive symptoms. Scores are between 0 and 63. The highest the score the more severe is depression. Validity and reliability study was done for Turkish population (14).

Internet Addiction Scale: This scale was developed by Günüç in Turkish in 2009 (15) and consist of 35 items. When scale was being developed, a pool of items was developed to determine factors responsible for addiction and a trial scale was developed from this pool by receiving expert opinion. This scale was evaluated by a pilot trial and its validity was tested. Afterwards, validity and reliability study was done with 754 high school students in 7 provinces which participated in the scale development study. Attitude levels were assessed by Likert five-level scale. Likert type grading was as follows: "Fully agree", "Agree", "Neutral", "Not agree", "Definitely not agree". Scale items were scored from 5 to 1. Five points corresponded to "Fully agree" level and 1 point corresponded to "Definitely not agree" level. Scale scores are between 35 and 175. Validity and reliability of the scale was found to be high (Cronbach alpha inner consistency coefficient =0.94) (15).

Data Assessment

SPSS software was used for statistical analyses of study data. Consistency of data from measurements to

normal distribution was assessed and comparisons were done by Student's t-test when analyzing data consistent with normal distribution and Mann-Whitney U-test was used when analyzing data not mormally distributed. Pearson and Spearman methods were used in correlation analyses. Level of significance was taken $p<0.05$ at all statistical analyses.

RESULTS

Fifty-four percent (n=114) of the study sample consisted of female students. Mean age of the sample was 15.77 (SD=1.06; 13-18). Mean age of parents were 42.09 (SD=4.27; 32-57) and 46.04 (SD=4.79; 38-63) for mothers and fathers, consecutively (Table 1).

When impact of variables on addiction scores were evaluated, it was found that level of addiction increase by increasing internet use duration and depression score (r=0.25; p<0.001 and r=0.18; p<0.01) (Table 2).

Boys were found to have a statistically significantly higher level of addiction than girls (p<0.001) and working and educational status of both parents, number of siblings, smoking status of adolescent, presence of computer at his/her room, presence of internet access at

Table 2: Effect of Variables on Addiction Scores

	Internet Addiction Scale Score	
	r*	p
Age	0.01	0.86
Mother's age	-0.09	0.19
Educational level of mother	-0.04	0.59
Father's age	-0.05	0.47
Educational level of father	-0.03	0.69
Number of siblings	0.02	0.77
Duration of internet use	0.25	<0.001
Depression Scale Score	0.18	<0.01

*Spearman's rho

home were all found to have no statistically significant effect on scale addiction score (p>0.05) (Table 3).

When sample was examined by dividing to 4 groups according to internet addiction scale scores, subjects scored over 81 were classified in the first group (addictive group), between 67 and 81 in the second group (addiction risk group), between 53 and 66 in the third group (threshold group) and under 53 were in the fourth group (non-addictive group). There was no statistically significant difference (p>0.05) between groups for mean student ages, parental mean ages and educational levels, number of siblings, smoking status of the adolescent, presence of internet access at home and presence of computer at adolescent's room; however, there were statistically significant differences (p<0.05) between groups in gender, working status of mother, duration of internet use of adolescent and depression scores (Table 4).

Table 3: Effect of Variables on Addiction Level

	Internet Addiciton Scale Score		
	Mean	Standard Deviation	Statistical Test and p value
Gender			
Girls	65.50	20.26	MW-U= 4062.0 p<0.001
Boys	73.00	21.31	
Total	68.99	20.98	
Educational level of mother			
Primary school	73.95	21.29	χ^2 = 2.459 p= 0.48
Secondary school	64.92	21.05	
High school	68.29	21.51	
University	68.66	20.73	
Total	68.88	21.06	
Educational level of father			
Primary school	73.38	33.63	χ^2 = 0.317 p= 0.96
Secondary school	68.55	11.38	
High school	49.98	25.26	
University	68.35	19.28	
Total	68.86	20.73	
Mother			
Working	67.79	20.87	MW-U= 4835.0 p= 0.14
Not working	70.12	20.13	
Total	68.88	21.04	
Number of siblings			
Single	69.09	20.77	χ^2 = 0.707 p= 0.87
Two	68.48	21.90	
Three	70.72	18.58	
Four and over	67.13	18.77	
Total	68.86	21.01	
Smoking status			
Smoking	64.36	16.39	MW-U= 2029.0 p= 0.30
Not smoking	69.47	21.52	
Total	68.86	21.01	
Internet access at home			
Yes	69.10	21.14	MW-U= 1088,0 p= 0.61
No	65.00	19.04	
Total	68.86	21.01	
Computer at room			
Yes	69.28	21.51	MW-U= 3668.0 p= 0.73
No	67.37	19.25	
Total	68.86	21.01	

MW-U: Mann Whitney U, χ^2: Chi-square test

Table 4: Effect of Variables on Groups

	First Group (n=51)	Second Group (n=53)	Third Group (n=54)	Fourth Group (n=53)	Statistical test and p value
Age of student	15.80±1.06	15.80±1.10	15.80±1.06	15.80±0.98	F= 0.270 p=0.88
Gender					
Girl	19	28	31	36	$\chi^2 = 10.898$
Boy	32	25	23	16	p< 0.01
Age of mother	41.70±4.20	41.60±4.00	42.20±4.10	42.90±4.80	F= 1.044 p=0.37
Age of father	46.10±4.70	45.80±4.70	45.30±4.70	47.00±5.10	F= 1.169 p=0.32
Educational level of mother					
Primary school	4	11	3	4	
Secondary school	2	4	2	5	$\chi^2 = 13.787$
High school	20	14	15	20	p= 0.17
University	25	24	34	24	
Educational level of father					
Primary school	2	1	2	3	
Secondary school	1	6	2	2	$\chi^2 = 7.203$
High school	12	14	11	12	p= 0.67
University	36	32	38	36	
Working status of mother					
Working	24	22	37	29	$\chi^2 = 9.607$
Not-working	27	31	16	24	p=0.02
Number of siblings					
Single	12	6	18	8	
Two	30	7	28	35	$\chi^2 = 10.139$
Three	7	8	7	7	p=0.34
Four and over	2	2	1	3	
Smoking	6	4	8	7	$\chi^2 = 1.488$
Not smoking	45	49	46	46	p=0.69
Internet at home					
Yes	47	52	50	50	$\chi^2 = 2.167$
No	4	1	4	3	p=0.46
Computer at room					
Yes	42	39	44	40	$\chi^2 = 1.751$
No	9	14	10	13	p=0.63
Internet use					
1-3 hours/day	34	45	47	50	
4-6 hours/day	12	8	5	3	$\chi^2 = 15.596$
7-9 hours/day	2	0	1	0	p= 0.047
10 hours/day and over	1	0	1	0	

F: One-Way Analysis of Variance, χ^2: Chi-square test

When analyses with single variables which showed that mother's working status, duration of internet use of adolescent and depression scores which were found to be significantly different between groups and mother's educational level which can be effective in analyses with multiple variables were analyzed together by "Multiple Logistic Regression Analysis", none of the factors mentioned above were found to be statistically significant to differentiate between non-dependent 4th group and 2nd and 3rd groups, consecutively, i.e., threshold and risk groups (p>0.05). However, being male (p<0.01), having a higher depression score (p=0.03) and higher duration of internet use (p=0.02) were found to have a statistically significantly effect on differentiating addicted group from the non-addicted.

DISCUSSION

In the previous validity and reliability study of the scale, 10.1% of subjects were in the internet addicted

group (15); however, in this study it was found that 24.2% of subjects were in the internet addicted group according to scale scores. In epidemiological studies about internet addiction, general prevalence of internet addiction was reported the range of 6-14% (16). However, different results were reported about addiction rates in studies about internet addiction in young people and this situation was related to sample characteristics, characteristics of assessment tools utilized and unclear diagnostic criteria about internet addiction (17,18). High internet addiction rate found in our study can be explained by composition of our sample from subjects living in urban areas with higher internet access, and diagnosis of internet addiction done by only addiction scale assessment without clinical evaluation.

In our study, when internet addiction scale score was assessed according to gender, scale scores of boys were found higher than girls. In several studies including validity and reliability study of the scale, addiction levels of boys were found higher than girls (15,19-21). However, there are studies reporting no difference between genders for internet addiction (22). Our findings support previous studies reported male gender as a risk factor for internet addiction.

In a study which adolescents with internet addiction and adolescents with substance abuse, both conditions were found to be related with similar emotional and behavioral problems and it was proposed that internet addiction may be based on organizing and correcting problematic behaviors like in other addictive behaviors (17). However, no statistically significant correlation was found between smoking and internet addiction in our study. This may be due to non-smoking status of majority (88.2%) of the sample.

Internet addiction may lead to problems such as health, school and family life and time management in young people (23,24). In a study by Yen et al. done with 2114 adolescents (25), internet addiction and depressive disorder and symptoms of attention deficit/hyperactivity disorder was found to be correlated. When the related literature is reviewed, it can be observed that several studies found a significant correlation between internet addiction and depression (26-30). Significant difference between the addicted group and other groups in terms

of depression scores in our results support the findings of these studies. Our findings do not allow us to determine the direction of correlation between variables due to the design of our study. No definite opinion was reported whether internet addiction started first or internet addiction developed over depression about the relationship between internet addiction and depression when the literature is reviewed. In a recent case-control study done in Greece by 129 adolescents, depression was reported to be one of the factors that may increase the chance of internet addiction, symptoms such as low self-esteem, low motivation, fear of rejection and need for approval which are frequently seen in depression may lead people to frequent internet use and interactive functions of internet may lead to addiction in these people (26). In other studies, depression related with social isolation in internet addiction was reported (31). There is a need for detailed studies to show cause-consequence relationship in this field.

Children and adolescents carry a much higher risk for negative effects of internet than adults due to incomplete developmental processes. This risk was reported to increase by excessive internet and computer use (23,32). Our finding of increased addiction by increased duration of internet use is consistent with these previous findings.

Not utilizing clinical interview to assess internet addiction, not collecting data from sources other than the adolescent such as family and teachers and using a sample consisting of mainly people from urban areas and higher socio-economic status were among limitations of our study.

CONCLUSION

We think that findings of our study will be useful to understand characteristics about internet addiction among high school students living in a big urban center in Turkey, to determine precautionary measures in this field and to increase awareness about internet addiction. The most important study findings from clinicians' point of view will be questioning symptoms of internet addiction in male adolescents having depressive symptoms. It will be beneficial to conduct new

longitudinal studies with a wider sample covering all of Turkey and without the limitations of our study in

order to collect national data about internet addiction in adolescents.

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