Possible internet addiction in high school students in the city center of Isparta and associated factors: a cross-sectional study

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The aim of the present study was to detect both sociodemographic factors related to possible Internet addiction and the prevalence of this addiction, as well as to determine the relationship between possible Internet addiction and self-injurious behavior, life satisfaction, and the level of loneliness in adolescents attending high school in the city center of Isparta. A cross-sectional analytic study was planned for high school adolescents. An information form concerning Internet usage and related sociodemographic factors, Internet Addiction Scale, Satisfaction with Life Scale, and a UCLA Loneliness Scale-Short Form were applied to the students. The prevalence of possible Internet addiction was found to be 14.4%. Adolescents with possible Internet addiction were found to have low levels of loneliness and high levels of life satisfaction. The results are then discussed in light of the related literature.

Key words: adolescents, possible internet addiction, self-injurious, loneliness.

The Internet is a communication medium that provides significant contributions to human life by enabling people to quickly access a vast array of information as well as to communicate with each other[1]. Adolescents have started to become the most frequent users of the Internet. The developmental needs of adolescents constitute the most important factor in pathological Internet use[1]. Features specific to adolescents, such as their lack of psychological maturity, excitement-seeking characteristics, and the intensity of peer influence, make them more vulnerable to possible Internet addiction (PIA)[1,2].

The literature to date has presented two primary definitions of Internet-related disorders. These definitions were derived by adapting the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV diagnostic criteria for substance addiction and pathological gambling[3]. It has been suggested by Goldberg that the Internet is an addictive medium[4]. Goldberg defined Internet addiction as a behavioral addiction functioning as a coping mechanism, basing his criteria on the DSM-IV substance addiction criteria. Young made a second definition of Internet addiction by adapting the DSM-IV pathological gambling diagnosis criteria to Internet use. This definition requires the fulfillment of five of eight criteria for the identification of an individual as addicted, as follows: 1. Excessive mental exertion with the internet, 2. The need for longer amounts of time online, 3. Repeated attempts to reduce internet use, 4. Withdrawal symptoms when reducing internet use, 5. Time management issues, 6. Environmental distress (family, friends, school, work), 7. Lying about time spent online, and 8. Mood modification through internet use[3]. Griffiths[5] argued that six characteristic symptoms must be present in order for a behavior to be identified as addiction: mood modification, salience, relapse, tolerance, withdrawal, and conflict.

Most addicted people have been found to have social relations in the foreground, choosing services that contain interaction, and the variable of loneliness has been examined frequently. Some studies of Internet use found that those who use the Internet at a pathological

level are lonelier[6]. Other studies, however, found no such difference[7].

Although some studies have suggested that Internet addiction contributes to a reduction in social well-being and life satisfaction, it has also been found, on the contrary, that an increase in Internet usage can lead to an increase in psychological well-being[8,9].

In the literature, self-injurious behavior (SIB) is defined as a conscious harmful behavior of any kind that is aimed directly towards one's own body without the intention of death[10]. An association between SIB and borderline personality disorder has been found. According to another view, the repetitive committing of self-injury should be considered a behavior with addictive features. Theoretically, it has been reported that individuals with Internet addiction have higher risks of self-injury. However, the number of studies on this issue is limited[11].

The goals of the present study were to:

1. Identify sociodemographic factors related to PIA in adolescents attending high school in the Isparta city center and the prevalence of this addiction;

2. Determine the relationships between PIA and SIB, life satisfaction, levels of loneliness, and sleep problems; and

3. Identify the Internet usage characteristics of high school students.

Material and Methods

A community-based cross-sectional analytical study was planned to multi-dimensionally research PIA in adolescents attending high school. Permission for the study was obtained from the Süleyman Demirel University School of Medicine Scientific Research Projects Advisory Board, Isparta Bureau of National Education, and Isparta Governorship. The study population was the total population of 12,179 students registered at high schools in the city center of

Table I. Comparison of Adolescents With and Without Possible Internet Addiction in Terms of Their Purposes to Use the Internet

The purpose of internet use	Adolescents with possible internet addiction (n=237)		Adolescents without possible internet addiction (n=1408)		χ^2	p
	n	%[§]	n	%[§]		
To get information	174	73.4	1217	86.4	26325	<0.001
Yes	63	26.6	191	13.6		
No						
To communicate	195	82.3	1032	73.3	8637	0.003
Yes	42	17.7	376	26.7		
No						
To chat	130	54.9	477	33.9	38328	<0.001
Yes	107	45.1	931	66.1		
No						
To play games	143	60.3	582	41.3	29717	<0.001
Yes	94	39.7	826	58.7		
No						
To listen to music	185	78.1	878	62.4	21874	<0.001
Yes	52	21.9	530	37.6		
No						
To earn money	25	10.5	59	4.2	16924	<0.001
Yes	212	89.5	1349	95.8		
No						
To obtain new friends	91	38.4	262	18.6	47132	<0.001
Yes	146	61.6	1146	81.4		
No						
To relax	155	65.4	671	47.7	25550	<0.001
Yes	82	34.6	737	52.3		
No						

[§]Percentage of column.

Table II. Comparison of Adolescents With and Without Possible Internet Addiction in Terms of Their Internet Usage Characteristics and Other Related Factors

Internet usage characteristics and other related factors	Adolescents with possible internet addiction		Adolescents without possible internet addiction		χ2	p
	n	%$	n	%$		
Weekly internet usage time	5	2.0	243	98.0	157746	<0.001*
<1 hour	97	9.9	885	90.1		
1-8 hours	135	32.5	280	67.5		
≥9 hours						
The weekly frequency of going to	61	12.7	419	87.3	43176	<0.001*
internet cafes	149	13.5	953	86.5		
Never	27	42.9	36	57.1		
1-6 days						
Everyday						
Smoking	162	13.3	1059	86.7	9427	0.005*
Never	29	14.0	178	86.0		
Sometimes	46	21.2	171	78.8		
Often						
Self-injurious behavior	127	21.1	475	78.9	34450	<0.001
Yes	110	10.5	933	89.5		
No						
Insomnia	95	18.7	412	81.3	11145	0.001
Yes	142	12.5	996	87.5		
No						
Sleep duration	59	27.1	159	72.9	32646	<0.001
<6 hours	178	12.5	1249	87.5		
≥6 hours						

$ Percentage of row, * Chi-square for trend.

Isparta. Prevalence was accepted as 25% and deviation as 2% (precision 23%-27%), while a sample size with 95% confidence level was calculated to be 1,569 students. In order to include students of different socioeconomic levels in the study group, school administration and guidance counselors were consulted. When schools were stratified according to their socioeconomic levels in line with the information received, the weights were similar. Thus, a school from each level was chosen randomly via cluster sampling. The total student population in the schools covered by the study was identified as 1,992. After the exclusion of students who were absent or out sick on the day of the study, the remaining 1,897 students were included in the study. Two hundred and fifty-two students who filled in the forms incorrectly or insufficiently were not included in the study. Ultimately, 1,645 high school students completed the study. The access rate was found to be 82.5%. Before applying the form and scales, the students were told about the study, and they gave their consent.

Measures

Firstly, the students were given a survey form concerning internet usage and related sociodemographic factors. This form, created by the present study's authors, asked students about: the age at which they began using the internet (onset of Internet usage); their age, gender, purposes of internet usage, and total hours per week spent on the internet; making new friends through online chatting and then meeting these friends in person; playing online games; where they use the internet; going to internet cafes; cigarette usage; family structure; their parents' education levels; the presence and frequency of SIB, and if present, the type of SIB; the use of headache medication; the presence of sleep problems; and the total duration of sleep per night.

in the study, SIB was considered a voluntary and deliberate attempt towards one's body (without the intention of death) within the last six months that could result in tissue injury. Types of SIB were self-cutting or scraping, burning, biting, hitting, inserting a pointed object, plucking hair, preventing wounds from

Table III. Comparison of Adolescents With and Without Possible Internet Addiction in Terms of the Mean Age of Onset of Internet Use and Point Averages Received from Satisfaction with Life Scale and UCLA Loneliness Scale-Short Form

The age to start using internet, SWLS, ULS-SF	Adolescents with possible internet addiction (n=237)	Adolescents without possible internet addiction (n= 1408)	p[§]
	Mean ± Standard Deviation	Mean±Standard Deviation	
The age to start using internet	10.02±2.57	10.83±2.33	<0.001
ULS-SF	20.25±7.65	22.29±7.31	<0.001
SWLS	7.56±2.72	7.09±2.45	0.012

[§] Independent samples t test.
SWLS: Satisfaction with Life Scale.
ULS-SF: UCLA Loneliness Scale-Short Form.

healing, and hitting a hard object with the head or another part of the body. Participants responded to each item by indicating whether or not they had engaged in the specified behavior. For example, it asked: Have you cut any region of your body in order to physically harm (but not kill) yourself within the last six months? Respondents were provided the options of yes or no. Questions about insomnia during the previous month included: (i) "Do you have any difficulty falling asleep at night?" (difficulty in initiating sleep); (ii) "Do you wake up during the night after you have gone to sleep and have difficulty getting back to sleep?" (difficulty in maintaining sleep); and (iii) "Do you wake up too early in the morning?" (early morning awakening). The presence of difficulty in initiating or maintaining sleep or early morning awakening was defined as occurrence ≥3 times a week. The presence of insomnia was defined as the occurrence of insomnia subtypes. The arrangement concerning sleep problems and insomnia was based on an article by Choi et al.[12] evaluating excessive use of the Internet and sleep problems. Students were also asked whether they had taken painkillers for headaches during the last month. If painkillers had been taken one or more times, the subject was regarded as taking headache medicine.

Secondly, an Internet Addiction Scale was applied to the students[13]. This scale used was created on the basis of DSM-IV substance addiction criteria as well as two criteria (salience, mood modification) suggested by Griffiths[14]. A validity and reliability study was carried out in Turkey by Canan et al.[14] on 14-19-year-old Turkish adolescents, and with the removal of 4 items, usability was reported (Cronbach α= 0.94). The scale consists of 27 items. Scale items were rated on a 5-point Likert scale (1: never, 2: rarely, 3: sometimes, 4: frequently, 5: always). In the validity and reliability study conducted by Canan et al.[14], the cut-off point of the scale was identified as 81. Also, in our study, adolescents who scored 81 points or higher in the Internet Addiction Scale were considered to be possibly internet-addicted.

Thirdly, the Satisfaction with Life Scale (SWLS) was applied to the students. The scale consists of 5 items and 7 points (1=completely false, 7=completely true)[15]. Scoring lower on the scale is recognized as indicating low life satisfaction. The adaptation of SWLS into Turkish and its validity and reliability tests were carried out by Köker[16] (Cronbach α=0.79).

Finally, the UCLA Loneliness Scale-Short Form (ULS-SF) was applied to the students. It consists of 4 items, divided into 2 positive and 2 negative[17]. The students answered the 4 items on a point scale of 4 as follows: (1) never, (2) rarely, (3) sometimes, and (4) often. High points on the scale indicated that the level of loneliness is high. A test concerning the validity and reliability of this scale for high school students in our country was carried out by Eskin18 (Cronbach α= 0.58).

Statistical Analysis

The data were analyzed using the software Statistical Package for the Social Sciences (SPSS) 15.0. The data are presented in numbers, percentages, averages, and standard deviation values as defining statistics. In comparisons of individuals with and without PIA, chi-square test and independent samples t test were used as univariate analysis, while logistic regression analysis using the enter method was used as multivariate analysis. Variables found to be

significant in univariate analyses were added to the model created for the logistic regression analysis. When the correlations among variables were evaluated, it was observed that there was no strong correlation between the variables. The limit value for significance was taken to be p<0.05.

Results

Characteristics of Internet Usage in the General Population

The average age of the participants was 16.32±1.08 (14-19 years); 42.6% (n=700) were females and 57.4% (n=945) were males. The average age of the start of Internet usage was 10.7±2.4 (3-17 years). Adolescents were found to most frequently use the Internet to gather information (n=1363, 82.8%). In addition, it was found that 59.7% of the adolescents (n=982) use the Internet for 1-8 hours a week, and that 41.2% of them (n=678) play online games. It was found that nearly two-thirds of respondents spent most of their time on the Internet at home (n=1178, 71.6%), and most (n=1102, 67%) rarely went to Internet cafes. 36.6% of the adolescents (n=602) were identified as committing SIB within the last six months, as follows: 34.1% (n=561) committed SIB 1-5 times, while 2.5% of them (n=41) did so 6 or more times.

Comparison of Adolescents with and without PIA in Terms of Internet Usage Characteristics and Other Related Factors

The PIA prevalence of our study was found to be 14.4% (n=237). PIA prevalence was identified to be 13.1% (n=92) and 15.3% (n=145) in females and males, respectively, with no significant difference observed (p=0.209). No correlation was found between the prevalence of PIA and schools of low (n=71, 14.7%), middle (n=83, 14.2%), or high (n=83, 14.4%) socioeconomic levels ($\chi2$ = 0.055, p=0.973). A comparison of adolescents with and without PIA in terms of their purposes for Internet usage is provided in Table I. Adolescents with PIA were found to engage significantly more in making new friends online (n=171, 72.2%), meeting these online friends in person (n=107, 45.1%) and playing online games (n=152, 64.1%) as compared to adolescents without PIA (respectively, p<0.001, p<0.001, p<0.001). PIA prevalence was observed to be significantly higher in adolescents who commit SIB than in

those who do not (p<0.001).

No significant difference was found between adolescents with and without PIA in terms of using headache medicine, their parents' education level, or parental divorce rates (respectively, p=0.064, p=0.223, p=0.511, p=0.847). Comparisons of adolescents with and without PIA in terms of their Internet usage characteristics and other related factors are provided in Table II. According to these data, as weekly internet usage time, weekly frequency of visits to internet cafes, and the amount of smoking increased, PIA rates increased significantly. PIA prevalence was found to be higher in adolescents who commit self-injury, have insomnia, and sleep less than 6 hours a night. When the relation between weekly internet usage time and sleep duration in adolescents with PIA was examined, it emerged that getting less than 6 hours of sleep a night significantly increases as internet usage time increases ($\chi2$ for trend = 45062, p<0.001). The rate of sleeping less than 6 hours is 8.1% in adolescents using the Internet for <1 hour, 10% in those who use the Internet for 1-8 hours, and 24% in those who use it for 9 hours or more.

Comparisons of adolescents with and without PIA in terms of the mean age of onset of Internet use and in terms of point averages received from SWLS and ULS-SF are provided in Table III.

Comparison of Girls and Boys with PIA in Terms of Internet Usage Characteristics

The study found that using the Internet for 9 hours or more per week is significantly higher in boys with PIA (n=92, 63.4%) than in girls with PIA (n=43, 46.7%) (p=0.038). The rates of meeting people they got to know online in person (n=77, 53.1%) and playing online games (n=105, 72.4%) were also significantly higher in boys with PIA than in girls with PIA (respectively, p=0.002, p=0.001). No significant difference was found between boys and girls with PIA in terms of making new friends online (p=0.058).

Multivariate Analysis Test Results

A logistic regression model was created using variables observed to differ significantly between the groups with and without PIA in univariate analyses (Table IV).

In both the univariate and multivariate analyses,

Table IV. Comparison of Adolescents With and Without Possible Internet Addiction According to the Logistic Regression Analysis§

Features	ß	p	Odds ratio	95% Confidence interval
Weekly internet usage time				
1-8 hours	1.631	0.001	5.11	2.04-12.79
9 hours or more	3.012	<0.001	20.33	8.07-51.24
Smoking				
Sometimes	-0.252	0.295	0.78	0.49-1.25
Often	-0.323	0.150	0.72	0.47-1.12
SIB				
Yes	0.574	<0.001	1.78	1.30-2.43
Insomnia				
Yes	0.078	0.637	1.08	0.78-1.49
Sleep duration				
<6 hours	0.445	0.025	1.56	1.06-2.30
The weekly frequency of going to internet cafes				
1-6 days	0.115	0.517	1.12	0.79-1.59
7 days	1.104	0.001	3.02	1.60-5.69
SWLS	0.075	0.014	1.08	1.02-1.14
ULS-SF	-0.028	0.007	0.97	0.95-0.99
Age to start using internet	-0.081	0.010	0.92	0.87-0.98

§SWLS points, ULS-SF points, and the onset age of Internet usage are included in the model as numeric data. Weekly Internet usage time, smoking, presence of SIB, presence of insomnia, sleep duration, and weekly frequency of going to Internet cafes are included in the model as categorical variables. The reference group for the time variable is using the Internet less than 1 hour per week, for the smoking variable is non-smokers, for the SIB presence variable is none, for the insomnia variable is none, for the sleep duration variable is 6 or more hours, and for the weekly frequency of going to Internet cafes variable is never.
SWLS: Satisfaction with Life Scale. ULS-SF: UCLA Loneliness Scale-Short Form. SIB: Self-injurious behavior.

the age of first Internet usage was observed to be significantly lower in adolescents with PIA. The points received from SWLS in both univariate and multivariate analyses were significantly higher in adolescents with PIA, and their ULS-SF points were found to be significantly lower.

Discussion

In studies conducted outside Turkey, the PIA prevalence ranges between 18.4–53.7 %[12,19,20] compared with 11.6-28.4% in Turkey[14,21,22]. In our study, this rate was observed as 14.4%. There may be various reasons for this difference, e.g. differences in the definition of possible addiction in the studies in question, differences in the scales used in the evaluation, and differing sociocultural conditions in different countries.

While no significant gender difference was observed in some studies of PIA[12,19,23,24], other studies suggest that PIA is significantly higher in males[22,25]. Though internet use has

traditionally been found to be higher in males, recent studies have found this difference rapidly diminishing[26]. In societies such as Turkey where individuality is less prominent and girls and boys are subjected to different culturizations, the Internet can be a medium for girls to freely express themselves[27]. This may be the reason why no significant gender difference was found in terms of PIA frequency. However, while in our study, no significant difference was observed between boys and girls with PIA in terms of making new friends online, meeting these online friends in person was found to be significantly higher in boys. It may be argued that while girls' tendency to use the Internet leads them to make new friends online, they cannot meet those people in person because of the cultural restriction on communicating with the people they would like to.

Excessive Internet usage has been found to be the chief symptom and factor defining such usage as addiction. Another important factor is the purpose for spending that time on

the Internet[28]. In the studies to date, it was found that addicted people use the internet predominantly for communication and that they spend more time on websites with musical, gaming, and chatting content[28-30]. Online activities and practices have also been found to be important factors in detecting internet addiction[22]. In our study, playing online games, playing games, listening to music, making new friends, and online chatting were found to be significantly higher in possibly addicted adolescents. In our study, adolescents with PIA have characteristics similar to the addicted group in terms of their internet usage purposes.

Talking to strangers in the virtual environment and meeting with these people in person are generally considered risky Internet behaviors, as such behavior leaves individuals vulnerable to sexual solicitation and/or cybervictimization[31]. Virtual friends may hide their real identities and behave dishonestly, and they generally are not made to take responsibility for their behaviors. Virtual friendship is also thought to constitute a risk to healthy social development[32]. Our study found that the possibly addicted group meets more often in person with people they came to know via the Internet and also more often established friendships via online chatting. When these characteristics are taken into account, it seems that adolescents with possible addiction are at risk of unhealthy social development and cybervictimization.

Loneliness is closely related to communication skills as well as friendship and family relationships in adolescents. Adolescents who lack these skills and values have been found to experience loneliness[33]. One study found that individuals consider the internet a tool to help relieve loneliness, but it is also a tool that can gradually lead to addiction[34]. Problematic internet usage has been found to be more likely in adolescents who use the internet to alleviate their loneliness[35]. Loneliness is an important variable that negatively affects the life satisfaction of the adolescent[36]. Life satisfaction refers to the state of well-being expressed by various positive emotions such as happiness and morale as well as feeling positive about everyday relationships[37]. In the limited number of studies carried out in Turkey and abroad, the life satisfaction levels of problematic Internet users have been found to be low[8,35,37]. In our study, on the contrary, the possibly addicted group was found to have high levels

of life satisfaction and low levels of loneliness. Moreover, possibly addicted adolescents have been found to use the internet mostly for communication, for instance to chat online and make new friends. Social support-oriented internet usage in the possibly addicted group may be thought to lower loneliness levels, thereby positively affecting life satisfaction. When the similarities between possibly addicted adolescents and addicted individuals in terms of internet usage purposes and the way they constitute a risk group for addiction are taken into account, we could say that these seemingly positive functions may over time serve to accelerate the transition from possible addiction to addiction. There are also studies that suggest that the internet does not negatively affect the social environment of individuals and that it lowers loneliness levels by increasing the social support[38,39]. However, over time, virtual relationships can decrease the need for and efforts to establish real social relations. The temporary social support obtained via the internet may not continue in real life[40]. The lack of strong, quality relationships in online relationships may cause social isolation[41]. Thus, it would be appropriate to increase the communication and social skills of the possibly addicted group in order to avoid the internet's negative effects on social relationships. If adolescents can obtain the social support that they need from their friends and family, they will not need to communicate in the virtual environment of the internet.

Individuals with addictive characteristics have been found to have higher risks of committing self-injury. The most significant of all the causes and functions of SIB in adolescents has been found to be the reduction of tension or impulses, and this characteristic is similar to addiction symptoms[11]. Studies to date have found that Internet addiction and pathological internet usage are significantly associated with SIB[11,42]. Our study also found that PIA and SIB are significantly associated, a finding that supports the literature. In reviewing the literature, no other study evaluating SIB in possibly Internet-addicted high school students was found. Comprehensive studies evaluating the cause-effect relationships between PIA and SIB are needed.

A study done by Yang[43] found that sleepiness during the day is significantly higher in excessive internet users. One study evaluating

addictive behavior related to the internet found that 40% of the participants sleep less than 4 hours at night due to Internet usage, and another study found that Internet addicts get smaller amounts of sleep[44,45]. Our study found that PIA frequency is significantly higher in adolescents who sleep less than 6 hours nightly. Also, as Internet usage time increases, the prevalence of sleeping less than 6 hours a night increases significantly. Going to bed late due to the increasing Internet usage time of adolescents with PIA may be responsible for reductions in sleep duration.

Several limitations of this study should be considered. Most importantly, as a cross-sectional study, our results do not clearly indicate whether the psychological characteristics in this study preceded the development of PIA or were a consequence of Internet use. Future studies should attempt to determine the predictive factors by identifying the causal relations between PIA and psychological characteristics of adolescents. Factors related to PIA may vary in different studies depending on the sample group. Therefore, the results obtained in our study can be generalized to and interpreted over only adolescents attending high school in Isparta. Another limitation of the study is that self-report scales and evaluation forms were the only materials used. Moreover, since it took significant time to complete these scale and forms, some adolescents may have filled out the forms in a hurried and superficial manner. In future studies, more information concerning PIA could be gathered by utilizing clinical interviews alongside questionnaires as well as by acquiring data from other sources such as teachers or families.

Certain Internet usage types (increases in weekly Internet usage time, going to Internet cafes daily) might be risk factors for PIA. Or, conversely, these usage types might have developed as a result of possible addiction. Since the possibly addicted group shows risky Internet behavior, it has been thought that adolescents with possible addiction are at risk of unhealthy social development and cybervictimization. PIA and SIB have been found to be significantly associated. Adolescents with PIA have been found to have characteristics similar to the addicted group in terms of their Internet usage purposes. Preventive intervention needs to be developed for possibly addicted adolescents. Families should also be included in preventive

procedures. Families should be informed about healthy and pathological uses of the internet, and family control over adolescents' internet use should be established. Our study found that the possibly internet-addicted group had high levels of life satisfaction and low levels of loneliness. However, these characteristics of possible addicts may play a conducive role in the gradual transformation of these adolescents to Internet addiction. Though this situation may seem positive in the short term, it can accelerate the transmission of the adolescents from possible addiction to addiction. There is insufficient research to date on the long-term effects of PIA on life satisfaction and loneliness levels. Thus, studies inquiring into the long-term interaction between these factors and PIA are required.

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