

The association between internet addiction and disordered eating attitudes among Turkish high school students

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Abstract

Purpose The aim of the present study is to investigate the prevalence of disordered eating attitudes (DEAs) and internet addiction (IA) among a non-clinical sample of adolescents and to investigate the relationship between IA, DEAs, and selected socio-demographic characteristics.

Methods A total of 584 adolescents (34.8 % $n = 203$ males and 65.2 % $n = 381$ females) completed three instruments: the Eating Attitude Test-26 (EAT-26), the Internet Addiction Test (IAT), and a socio-demographic questionnaire.

Results It was found that 15.2 % ($n = 89$) of the participants have DEAs, and IA was detected in 10.1 % ($n = 59$) of the participants. There was a statistically significant difference between the IA and non-IA groups in terms of body mass index ($\chi^2 = 10.31$, $p < 0.01$). We found a significant positive correlation between the IAT and EAT-26 scores ($r = 0.34$, $p < 0.01$). The presence of DEAs, male gender, and high BMI were found to be the strongest predictor variables of IA.

Conclusions IA and DEAs are relatively frequent phenomena among young students in Turkey. Future studies should attempt to determine the predictive factors by identifying the causal relations between IA and DEAs.

Keywords Internet addiction · Disordered eating attitudes · Adolescents · Body mass index

Introduction

The internet, an important modern means of obtaining information and establishing communication with others, has become an increasingly essential element of human life. Although internet use makes life easier, it can become problematic in the event of non-functional use [1]. Internet use has grown exponentially worldwide to nearly 3 billion users. As of December 31, 2013, the number of internet users worldwide had reached 2,802,478,934, i.e., 39.0 % of the world's population. In Turkey, in June of 2012, there were 36,455,000 internet users, which corresponds to 45.7 % of the population [2]. It is known that, worldwide, internet use is the highest among adolescents and young adults. It is reported that the age group that most frequently uses the internet is 14–24 years [1]. This age group primarily uses the internet for social communication, for entertainment, and for professional development, which makes the internet indispensable for high school and university students [3, 4].

In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), internet addiction (IA) is not listed among the non-substance addictions (a group that currently only includes gambling disorders), but “internet gambling disorder” is listed in the appendix as a condition that deserves further study [5]. One significant measure of IA is frequency of daily or weekly use. As a point of agreement among studies, internet use of 5 h a day and more is regarded as problematic [1]. Prevalence statistics of IA in adolescents vary widely from 2 to 20 % across cultures and societies [6]. The prevalence of IA

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among young people in Europe has been reported to be 2.5–4 % [7]. Widespread use of the internet started relatively late in Turkey in comparison to other European countries. However, in studies carried out in this country on the prevalence of IA, similar results to those of other European countries were reported [6, 8].

Previous study findings have indicated that both family dynamics and parenting styles are proximally associated with the development of IA among adolescents [9]. In particular, parenting styles that are either unsupportive or confrontational have been associated with the development of IA among adolescents [10]. Moreover, adolescents' perception of dysfunctional intrafamilial relationships, as well as dissatisfaction with such relationships, has also been correlated with IA [11, 12]. Adolescents are more vulnerable to IA than adults, and the social performance, psychology, and lifestyle habits of adolescents can be affected by this condition [13]. Numerous cross-sectional studies have shown that IA is associated with several lifestyle-related factors in adolescents; it can result in irregular dietary habits, extended periods of time spent on the internet, physical inactivity, short duration of sleep, and increased use of alcohol and tobacco [13, 14].

Disordered eating attitudes and behavior (DEAs), especially among adolescents and young adults, have become an issue of worldwide concern. The growing prevalence of obesity among adolescents in most countries in the world could be a contributory factor to the spread of this disorder among this age group. Adolescent obesity is linked with an increased risk of disordered eating, including unhealthy eating attitudes, weight concerns, dieting, binge eating, anorexia, and bulimia [15]. Several studies suggest a positive association between obesity and disordered eating among adolescents and young women [16–18]. Nevertheless, there are many social, cultural, and psychological factors associated with eating attitudes and behaviors. In developing countries, nutrition and cultural transition, social changes, Westernization, family environment, exposure to mass media, and globalization all have a significant impact on eating attitudes and behaviors, especially among young people [19, 20].

However, information regarding the relationship between IA and eating attitudes of adolescents is limited. Therefore, the aim of the present study is to investigate the prevalence of DEAs and IA among adolescents and to investigate the relationship between IA and DEAs and selected socio-demographic characteristics.

Methods

Participants

A cross-sectional design was employed. Public high school students aged 14–20 years were the target group.

Adolescents ($n = 603$) from four high schools in different socio-economical regions of Afyon city were included. Afyon is a low-middle socio-economic status city in the Western rural area of Turkey. The Turkish education system is under the supervision and control of the state, namely the Ministry of National Education. According to the Constitution of the Republic of Turkey, everyone has the right to receive an education. Secondary or high school education is mandatory (it lasts 12 years), and it is required in order to progress to universities.

Data were collected between March of 2014 and July of 2014. The study was approved by the Committee of Afyon Kocatepe University School of Medicine's Local Ethical Committee for Clinical and Laboratory Studies. Our study included a large convenience sample of high school students, but it is not representative of the national population of school children in Turkey.

Procedure

With permission from the local education authority and the governor of Afyon, researchers visited students in their classrooms, and students were provided with a detailed explanation of the objectives and procedures of the study. After the study was explained to them, youths who volunteered gave written consent, and a set of self-report questionnaires were given to the volunteer subjects. They were informed that they were free to withdraw at any stage. Issues of confidentiality and anonymity were discussed, and consent to participate was implied by the return of a completed and anonymous questionnaire. Questionnaires were distributed during free time between classes. Volunteers were asked to answer all items of the Socio-demographic Information Form, the Internet Addiction Test (IAT), and the Eating Attitude Test-26 (EAT-26). The participants took about 45 min to fill out the questionnaires. Of the participants who began the study, 19 returned incomplete tests and were excluded from the study. The final sample included 584 students. No participation fees were paid.

Measures

Socio-demographic Information Form

A socio-demographic questionnaire was developed for this study that assessed age, sex, economic situation, lifestyle habits (such as current use of alcohol and cigarette smoking), height (meters), and weight (kg). A volunteer's socio-economic situation was determined based on responses to the question, "what is your household's economic status?" The response categories were high, moderate, and low. A smoker was defined as someone who smokes at least one

cigarette per day, and an alcohol drinker was defined as one who has a reported weekly alcohol intake greater than 30 ml of ethanol. Volunteers were also asked about their family type (core, extended, or divorced family) and perceived school achievement (low, moderate, or high). Body mass index (BMI) was determined by dividing each individual's body weight by the square of his or her height (kg/m^2). According to the World Health Organization's recommendations, participants were classified into three weight categories: underweight ($\text{BMI} < 18.5 \text{ kg}/\text{m}^2$), normal weight ($18.5 \text{ kg}/\text{m}^2 \leq \text{BMI} \leq 24.9 \text{ kg}/\text{m}^2$), and overweight ($\text{BMI} \geq 25 \text{ kg}/\text{m}^2$) [21].

Internet Addiction Test (IAT)

The IAT, which is one of the first standardized tests for the assessment of disturbed internet use, has been validated among adolescents and adults and is used globally [22, 23]. The test contains 20 items, which ask respondents to rate how often they show symptoms of damaging internet usage, such as excessive time spent online, neglect of daily routine tasks, disruption of academic or job performance, concealment of online time and behaviors from others, loss of sleep, social isolation, depressive feelings if usage is restricted, and failed attempts to cut down on internet use. Each item is scored from 1 to 5, with 1 representing "not at all" and 5 representing "always." Hence, possible total scores range from 20 to 100, with higher scores indicating greater problems associated with internet usage. The following cut-off points were applied to the total IAT score: (1) normal internet use (NIU): scores 20–49 and (2) potential internet addiction: scores over 50. In validation studies, those who had scores of at 50—which is the cut-off value in the IAT—or over were considered to have IA [24]. The Turkish version of the IAT was used in the present study. It was shown to produce valid and reliable measures in several studies on Turkish youth [25, 26]. Internal consistency of the IAT for the current sample was 0.93.

Eating Attitude Test-26 (EAT-26)

The EAT-26 is a widely used 26-item scale measuring eating attitudes and behaviors. It consists of the following three subscales: dieting (13 items), bulimia/food preoccupation (six items), and oral control (seven items). Scoring is based on a six-point Likert scale. Total scores range from 0 to 78. Higher scores indicate more symptoms and concerns that are characteristic of an eating disorder. A score greater than 20 is indicative of DEAs [27]. Savasir and Erol demonstrated the validity of the Turkish version of the questionnaire in distinguishing eating-disordered patients from other psychopathology groups and healthy controls. Factorial validity was shown in the population sample, and

reliability coefficients of the Turkish version of the test were found to be high [28]. Internal consistency of the EAT-26 for the current sample was 0.86.

Statistical analysis

The data obtained were evaluated using the SPSS package (SPSS 19 for Windows; SPSS Inc., Chicago, IL). Descriptive statistics (means and standard deviations as appropriate) and percentages were computed for the study sample on demographic variables and all psychometric scales. DEAs were measured with the 26-item EAT-26. Participants who scored ≥ 20 on the EAT-26 were considered to have DEAs. Participants who scored ≥ 50 on the IAT were considered to have IA. To compare the characteristics of Turkish adolescents with and without IA, χ^2 tests were performed for categorical variables. The Pearson correlation analysis was used to determine the correlation coefficients between IAT and EAT-26 scores. To investigate the associations between IA and factors potentially associated with IA ($p < 0.05$), odds ratios (ORs) and 95 % confidence intervals (CI) were derived from a series of logistic regression analyses. The presence of IA was used as the dependent variable, and factors potentially associated with IA were used as predictor variables. All independent variables were entered into logistic regression analysis, but the best final models were created by selected variables. Differences were considered significant if p values were < 0.05 .

Results

A total of 584 adolescents (34.8 % $n = 203$ male and 65.2 % $n = 381$ female) aged 14–20 years (16.12 ± 1.04) were included in this study. Socio-demographic characteristics of the students are shown in Table 1.

According to the IAT, the distribution of IA was 10.1 % ($n = 59$). The IA rate was found to be significantly higher in males ($\chi^2 = 12.97$, $p < 0.01$). A comparison of cases with and without IA is given in Table 2. When the IA and non-IA groups were compared with respect to age ($t = 1.03$, $p = 0.3$), mother's education level ($\chi^2 = 2.75$, $p = 0.09$), father's education level ($\chi^2 = 0.71$, $p = 0.39$), and school achievement ($\chi^2 = 4.63$, $p = 0.09$), no significant differences were found between groups. When the IA and non-IA groups were compared with respect to income level ($\chi^2 = 6.65$, $p = 0.01$), smoking habits ($\chi^2 = 11.35$, $p < 0.01$), and alcohol use ($\chi^2 = 7.28$, $p < 0.01$), significant differences were found between groups. Of the cases, 23.1 % ($n = 135$) were underweight, 69.2 % ($n = 404$) were normal weight, and 7.7 % ($n = 45$) were overweight. There was a statistically significant difference between the

Table 1 Demographic and lifestyle characteristics of participants

	<i>n</i>	%
Gender		
Female	381 (16.07 ± 1.0 years)	65.2
Male	203 (16.22 ± 1.1 years)	34.8
Class		
1 year	150	25.7
2 year	239	40.9
3 year	134	22.4
4 year	61	10.4
Mother's education level		
Not literate	8	1.4
Graduated primary school	412	70.5
Graduated high school	119	20.4
Graduated university	45	7.7
Father's education level		
Not literate	3	0.5
Graduated primary school	255	43.6
Graduated high school	188	32.2
Graduated university	138	23.6
Number of siblings		
None	26	4.5
1	171	29.3
2	217	37.2
3	108	18.5
4 or more	46	7.9
Income level		
Low	35	6.0
Moderate	359	61.5
High	190	32.5
Family type		
Core family	469	80.3
Extended family	98	16.8
Divorced family	17	2.9
School achievement		
Low	40	6.8
Moderate	331	56.7
High	213	36.5
Level of BMI		
Underweight (BMI < 18.5)	135	23.1
Normal weight (BMI ≥ 18.5–24.9)	404	69.2
Overweight and obese (BMI ≥ 25)	45	7.7
DEAs		
Yes	89	15.2
No	495	84.8

IA and non-IA groups in terms of BMI ($\chi^2 = 10.31$, $p < 0.01$).

According to the EAT-26, the prevalence of DEAs in our sample of Turkish high school students was 15.2 % ($n = 89$). There was no statistically significant difference

between genders in terms of DEAs ($\chi^2 = 0.16$, $p > 0.05$). When comparing the groups on the EAT-26 total score, those with IA scored significantly higher than those in the non-IA group ($\chi^2 = 11.35$, $p < 0.01$). When binary logistic regression analysis was performed to predict the

Table 2 Results of the logistic regression analysis where IA is the dependent variable

Variable	Non-IA <i>n</i> (%)	IA <i>n</i> (%)	OR	95 % CI	<i>p</i>
DEAs					
No	454 (86.5)	41 (69.5)	1	1.25–4.47	0.008*
Yes	71 (13.5)	18 (30.5)	2.36		
Gender					
Female	170 (32.4)	33 (55.9)	1	1.08–3.56	0.027*
Male	355 (67.6)	26 (44.1)	1.96		
Educational status of mother					
<8 years	383 (73.0)	37 (62.7)	1	0.65–2.59	0.455
≥8 year	142 (27.0)	22 (37.3)	1.30		
Educational status of father					
<8 years	235 (44.8)	23 (39.0)	1	0.43–1.61	0.588
≥8 years	290 (55.2)	36 (60.1)	0.83		
Family income					
Low moderate	363 (69.1)	31 (52.5)	1	1.01–3.41	0.057
High	162 (30.9)	28 (47.5)	1.85		
Alcohol use status					
No	483 (92.0)	48 (81.4)	1	0.432–3.13	0.767
Yes	42 (8.0)	11 (18.6)	1.16		
Smoking status					
No	501 (95.4)	50 (84.7)	1	0.85–0.72	0.095
Yes	24 (4.6)	9 (15.3)	2.56		
Level of BMI					
Underweight and normal	490 (93.3)	49 (83.1)	1	1.12–5.69	0.024*
Overweight and obese	35 (6.7)	10 (16.9)	2.53		

OR odds ratio, CI confidence interval

* Significance level of $p < 0.05$

probability risk of each of the variables studied, it was found that adolescents with DEAs were 2.36 ($p < 0.01$, CI 1.25–4.47) times more likely to have IA. Male adolescents were 1.96 ($p < 0.05$, CI 1.08–3.56) times more likely to have IA than females. Furthermore, adolescents with a higher BMI were 2.53 (OR = 2.53, $p < 0.05$, CI 1.12–5.69) times more likely to have IA than normal BMI participants. Table 2 displays multivariate associations between independent factors and IA. Finally, significant correlations were found between the IAT and EAT-26 total scores ($r = 0.34$, $p < 0.01$).

Discussion

We aimed to determine the frequency of DEAs and IA and then evaluate the relationship among DEAs, IA, and selected socio-demographic characteristics in Turkish adolescent students. In the present study, 10.1 % ($n = 59$) of the participants met the criteria for IA. This rate is similar to those previously reported from Turkey [6, 8]. This finding indicates that one out of ten high school students in Turkey is affected by IA.

According to our results, male students exhibit a higher level of IA than females. There are many studies in the literature reporting that the prevalence of IA is higher among males than females [8, 29, 30], and our results are in agreement with them. One explanation for this may be that males are more likely to play online games, engage in cybersex, view cyber porn, and gamble online, all of which are associated with IA [31]. The lower percentage of IA among female students is explained by the fact that they often receive more family supervision than males, preventing them from spending as much time as men on the internet [32]. Moreover, not surprisingly, binary logistic regression analysis showed that male adolescents were nearly two times more likely to have IA than females. Despite the difference in IA rate between sexes—which has also been established by other studies—the reasons underlying these differences have yet to be investigated in detail.

In our study, it was established that alcohol use, smoking habits, and perceived income level were significantly higher in the IA group than in the non-IA group. Results from two cross-sectional studies on Korean high school students [33] and Taiwanese high school students [12]

found a strong association between IA and high use of alcohol and tobacco. Alcohol and tobacco companies use the internet to promote and advertise their products using themes and icons of popular youth culture, games and contests, and commercially sponsored websites and homepages [34]. Therefore, IA users are more likely to be exposed to tobacco and alcohol advertisements, and they are more likely to drink and smoke than other internet users. Turkey is a developing country that has been in a rather transitional stage in recent decades. With a unique cultural and social background, it has recently come under the influence of Western culture, including its system of values. Socio-economic status (SES) is an important factor, especially in the developing countries, where the digitalization process still exists to some degree. We can state that a significant difference between income levels is an expected finding and consistent with prior research [35].

According to the EAT-26, the prevalence of DEAs in our sample of Turkish high school students was 15.2 % ($n = 89$). Studies using the EAT-26 with non-clinical samples found rates of DEAs that were higher than or similar to those found in this study. Two studies from Turkey reported relatively low rates of DEAs in mixed-gender university samples (7.5 % [36], 7.9 % [37]). One Canadian study reported that the prevalence of DEAs was 9.7 % among 1829 adolescents aged 12–18 years [38]. Additionally, a recent national study conducted in US high schools found that the prevalence of DEAs was 14.4 % among girls and 3.8 % among boys in a sample of 5618 students [39]. The variability of rates in the literature may be due to the fact that the studies were conducted with different age groups and with populations from different socio-cultural backgrounds; it could also be due to the different instruments used.

DEAs and IA, especially among adolescents, have become an issue of worldwide concern. The main aim of our study was to assess the relationship between IA and DEAs. There are many social, cultural, and psychological factors associated with eating attitudes and behaviors. Nutrition and cultural transitions, social changes, Westernization, family environment, exposure to mass media, and globalization all have a significant impact on eating attitudes and behaviors, especially among young people [19, 20]. To our best knowledge, there have been no previous studies investigating the relationship between IA and DEAs in our country. The present data show that DEAs are significantly higher in the IA group than in the non-IA group. Likewise, Tao and Liu [40] reported high levels of disordered eating among individuals with IA compared to controls. Additionally, there was a statistically significant difference between the IA and non-IA groups in terms of

BMI, and a positive relationship was found between IA and IAT scores. In a very recent study conducted in Turkey among high schools students, a significant positive correlation was found between BMI and the IAT scores [6]. Furthermore, Rodgers et al. evaluated 392 French young adults and reported that IA and time spent online were correlated with disordered eating among participants [41]. We can hypothesize that DEAs caused by IA use may indirectly cause obesity because IA leads to less physical activity. Our results point out the fact that adolescents with DEAs and with higher BMIs were more likely to have IA.

Several limitations of the present study should be noted. Its cross-sectional nature and the utilization of self-rated scales are among the main limitations of our study. Information such as students' height, weight, and income level was collected from students. Thus, the accuracy of this information is in doubt because it was self-reported and not measured by the researchers. Our study included a large convenience sample of high school students, but the sample was not representative of the national population of high school students in Turkey. Additionally, depression, anxiety, impulse control disorders, body dissatisfaction, social desirability, and diet style might affect the relationship between IA and DEAs. However, these were not evaluated in the present study. Lastly, students' other technology-related habits—such as television viewing and cellular phone use—were not investigated.

In conclusion, the main finding of the present study is that IA and DEAs are relatively frequent phenomena among young students in Turkey. Alcohol use, smoking habits, and perceived high income level were found at a higher rate in the IA group than in the non-IA group. The presence of DEAs, male gender, and higher BMI were found to be the strongest predictor variables of IA. Adolescents are particularly vulnerable to developing addictive behavioral patterns and health-compromising behaviors, such as irregular dietary habits, alcohol use, and smoking habits. We suggest further studies with sample sizes of adolescents. Preferably, a prospective approach should be used to confirm these results as well as establish strategies for better detection and management of IA and DEAs when working with adolescents.

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Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval The study was approved by the local ethics committee and adhered to the Declaration of Helsinki.

Informed consent Informed consent was obtained from all individual participants included in the study.

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