Factors Related to Internet Addiction in Adolescents: A Cross-Sectional Study

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Abstract

Background: The term "internet addiction" (IA) describes a compulsive behavior associated with any online activity that disrupts everyday social interactions. Main aim of this research was to determine variables and development predictors of Internet addiction.

Methods: A total of 1,669 respondents participated in this research; 1,040 of them (62.3%) were female, 590 (35.4%) were male, and 39 (2.3%) did not want to declare their gender. The average age of the respondents was 15.09±1.757. Data were collected using an online form consisted of demographic data, questions related to the use of the Internet, the Internet Addiction Scale, and the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego-auto questionnaire version (TEMPS-A) for adolescents.

Results: The relationship between Internet addiction and age, addictive substance use frequency, purpose, time spent on the internet, and type of temperament has been proven. Analysis results indicate that the risk of developing internet addiction is higher if an adolescent spends 1-3 hours and more than 3 hours daily (2.8 and 8.2 times, respectively). Increasing age numbers for 1 unit (year), the risk of internet addiction developing is decreasing by 11.3%. Hyperthymic temperament type decreases the risk of 70.9% of internet addiction developing.

Conclusion: It is important to highlight importance of our results since practitioners can utilize our findings to create targeted treatments and prevent internet addiction in adolescents.

Keywords: Internet; Addiction; Adolescents; Temperament

Introduction

In recent years, the time spent on the Internet by adolescents has increased rapidly. The educational system and adolescents' social lives are increasingly influenced by online activities, including social networks and other online applications (1). The activities of young people on the Internet

during the COVID-19 pandemic have significantly intensified due to the transition of the educational system to online teaching (2).

The term "internet addiction" (IA) describes a compulsive behavior that is associated with any online activity and that disrupts everyday life and social interactions. "Problematic internet use," also known as internet addiction, refers to an individual's inability to control their internet usage, which is a serious global health concern (3). One in eight Americans reports having trouble using the internet (4), 2.4% of Chinese people (5), 1.5% and 8.2% of Americans and Europeans (6), and 3.2% of UK citizens (7) said they were addicted to the internet. According to previous research, the possible causes of excessive Internet use are dysfunctional family, degree of parental overprotection, parental control over the adolescent's free time, the adolescent's personality type (level of impulsivity, degree of self-control), aggressiveness, and neuroticism (6).

Excessive Internet use has similar effects on the central nervous system as drug addiction, causing increased dopamine secretion, particularly in adolescents, who are often most vulnerable; therefore, it is invaluable to examine the predictors and factors that influence the appearance and outcomes of this "new" form of addiction that has a negative impact on health, especially mental health.

In the present study internet addiction has been examined in adolescents in Serbia, and correlation to differences in sex, place of residence, parent's education, psychoactive substances use, as well as temperament type.

Methods

Sample

The sample of our research consisted of 1,669 adolescents aged 11 to 19 attending primary and secondary schools in Serbia. Research was conducted from October to December 2023.

Instruments

We created an online form (Google Forms) that consisted of five parts.

First part was related to the demographic data of the respondents (age, gender, class, level of professional education of the parents, success in the current and previous semester, and use of psychoactive substances).

Second part was related to the use of the Internet: from which device they connect to the Internet most often, how much time a day they spend on the Internet for school duties and extracurriculars, which group of applications they devote the most time to (social networks, games, viewing media (movies, music, etc.), whether their parents control them in this, and to what extent.

Third part consisted of the Internet Addiction Scale, a scale validated on the Croatian adolescent population was used to diagnose Internet addiction, with the author's permission and consent (8). This scale consists of 20 questions, which can be answered with 5 answers: 0-never, 1-rarely, 2-occasionally, 3-often, 4-very-often, and 5-always. The respondent can score 0-100 points. The classification of the points obtained is as follows: 0–19 = no signs of Internet addiction; 20–39 = low level of addiction; 40–69 = medium level; and 70–100 = high level of signs—existence of Internet addiction.

Fourth part of the questionnaire consisted of the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego-auto questionnaire version (TEMPS-A) for adolescents (9) for personality assessment and as a predictor of pathological behavior and temperament. This scale consists of 41 questions with T (true) and N (not true) options. Constituent subscales and items were formulated based on diagnostic criteria for affective temperaments that distinguish five types: cyclothymic, depressed, irritable, hyperthymic, and anxious (10).

Fifth part of the questionnaire for adolescents consisted of the Depression Anxiety Stress Scale - DASS 21 (11) for the assessment of mental health, but these indicators were not included in the current study.

Design and procedure

In this research, a cross-sectional epidemiological study was used. Schools were contacted randomly by emails and then, after principal approval, a form link was forwarded to students. For minors (below 18 years) parents signed informed consent, previously approved by University Ethics committee (approval number: 01-6816; date of approval 3 July 2023).

Responses were instantly available after form completion and presented in an Excel spread sheet. Every response triggered a notification email in the researcher's mailbox. The protocols used in this study followed the guidelines of the Declaration of Helsinki (12).

Statistical Analyses

Statistical data processing was performed using the standard SPSS software package, version 19.0. (IBM Corp., Armonk, NY, USA). Descriptive statistics measures were used in this research: arithmetic mean, standard deviation, median, quartiles, frequencies, and percentages. The reliability of the measuring scales was tested using the Kronbach coefficient. The normal distribution of numerical variables was checked using the Shapiro-Vilk test and the Kolmogorov-Smirnov test. The correlation of category variables was examined using the Chi-square diagram for the contingency tables. Univariate and multivariate factors analysis was used for predicting internet addiction.

Results

A total of 1,669 respondents participated in this research; 1,040 of them (62.3%) were female, 590 (35.4%) were male, and 39 (2.3%) did not want to declare their gender. The average age of the respondents was 15.09±1.757, with the youngest respondent being 11 and the oldest being 19.

Other sociodemographic data about the respondents can be found in Table 1. The distribution of answers to questions related to Internet use is presented in Table 2.

Table 1: Sociodemographic characteristics

Question	*Categories*	*N (%)*
Do you go to primary or secondary school?	Primary school	381 (22.8)
	Secondary school	1288 (77.2)
Do you have brother or sister from same parents?	No	285 (17.1)
	Yes	1384 (82.9)
Which city is your place of residence (or closest)?	Belgrade	670 (40.1)
	Sombor	788 (47.2)
	Kragujevac	22 (1.3)
	Krusevac	82 (4.9)
	Nis	37 (2.2)
	Other	70 (4.2)
Your parents are?	Divorced or separated	341 (20.4)
	Married	1253 (75.1)
	Live together	75 (4.5)
Your mother's education?	Primary school	79 (4.7)
	Secondary school	747 (44.8)
	College	188 (11.3)
	Faculty	655 (39.2)
Your father's education?	Primary school	99 (5.9)
	Secondary school	833 (49.9)
	College	179 (11.3)

Table 1: Continued…

	Faculty	548 (32.8)
Your grades last school year were?	Acceptable (2, D)	22 (1.3)
	Good (3, C)	193 (11.6)
	Very good (4, B)	555 (33.3)
	Excellent (5, A)	899 (53.9)
Do you use any of these substances?	No, nothing	1134 (68.0)
	E- cigars	217 (13.0)
	Tobacco	100 (6.0)
	Alcohol	198 (11.9)
	Marihuana	4 (0.2)
	Sleeping pills	13 (0.8)
	Other	2 (0.1)
How often do you use above mentioned?	Never	1087 (65.1)
	Rarely	176 (10.5)
	Only when I go out with my friends	220 (13.2)
	Every day	186 (11.1)

Table 2: Distribution of responses related to internet usage

Question	Categories	N (%)
Usually, I use? to go to internet	Computer	126 (7.5)
	Smartphone	1511 (90.5)
	Laptop	32 (1.9)
Internet Content mostly visited?	Gaming	202 (12.1)
	Social networks (Facebook, Instagram, Snapchat, Tik Tok...)	1060 (63.5)
	Media content (YouTube, Spotify, Netflix, HBO…)	371 (22.2)
	School activities	36 (2.2)
Do you use internet every day?	No	51 (3.1)
	Yes	1618 (96.9)
If every day used, approximately how long?	Max 1h	109 (6.5)
	1h-3h	617 (37.0)
	More than 3h	943 (56.5)
Does your parents control time you spend on internet?	No	700 (41.9)
	Sometimes	694 (41.6)
	Yes	275 (16.5)
Do you use internet for school activities?	Never	81 (4.9)
	Sometimes	748 (44.8)
	Often	840 (50.3)

According to TEMPS-A scale all participants were categorized in one out of five temperament types, whereas majority of those (61.0%) was categorized as hyperthymic type.

After totaling/summing of single Internet Addiction scale questions, IAS score for each participant was obtained. Average value of Internet Addiction Score (IAS) was 28.90±15.210, where minimal score was 0 and maximum was 99. According to this IAS score, all participants were divided categories as follows: 514 (30.8%) with no signs of internet addiction, 773 (46.3%) low level of internet addiction, 361 (21.6%) medium

level of internet addiction and 21 (1.3%) high level of internet addiction.

Sex (Chi square=20.7, *P*=.002), attendance to primary or secondary school, (Chi square=21.4, *P*<.001) and city of residence (Chi square=33.3, *P*=.004) were sociodemographic characteristics which were significantly related to internet addiction level. Regarding mother's education, significantly more participants without internet addiction (39.3%), with low internet addiction signs (42.3%) and with medium internet addiction signs (34.8) had a mother with university education (high education level) in relation to the ones with high internet addiction signs (14.3%) (Chi square=20.7, *P*=0.014). Similar result was observed with relation to father's education- responders with high level of internet addiction had

the least percentage of highly educated fathers comparing to other groups (23.8%) (Chi square=12.1, *P*=.028).

Also, representation of students with excellent (A) grades was the least in the high internet addiction level group (33.3%) relating to other groups (Chi square=42.3, *P*<.001). Usage of psychoactive substances that may result in developing addiction (Chi square=85.7, *P*<.001) same as frequency of substances usage was significantly related to internet addiction level (Chi square=58.2, *P*<.001) as described in Table 3. Significant relatedness/connection in all characteristics of internet use and internet addiction level sings, was observed (*P*<.001), as described in Table 4.

Table 3: Sociodemographic characteristics related to internet addiction presence

Question		*No signs* N (%)	*Low level* N (%)	*Medium level* N (%)	*High Level* N (%)	*Chi – Square/P value*
Sex	Female	299 (58.2)	504 (65.2)	227 (62.9)	10 (47.6)	20.7/ .002
	Male	204 (39.7)	253 (32.7)	125 (34.6)	8 (38.1)	
	Undeclared	11 (2.1)	16 (2.1)	9 (2.5)	3 (14.3)	
Do you attend primary or secondary school?	Primary	152 (29.6)	152 (19.7)	70 (19.4)	7 (33.3)	21.4/< .001
	Secondary	362 (70.4)	621 (80.3)	291 (80.6)	14 (66.7)	
Siblings from same parents?	No	91 (17.7)	121 (15.7)	69 (19.1)	4 (19.0)	2.4/ .500
	Yes	423 (82.3)	652 (84.3)	292 (80.9)	17 (81.0)	
Nearest city for residence?	Belgrade	184 (35.8)	344 (44.5)	138 (38.2)	4 (19.0)	33.3/ .004
	Sombor	265 (51.6)	329 (42.6)	180 (49.9)	14 (66.7)	
	Kragujevac	5 (1.0)	15 (1.9)	1 (0.3)	1 (4.8)	
	Krusevac	26 (5.1)	34 (4.4)	22 (6.1)	0 (0.0)	
	Nis	11 (2.1)	18 (2.3)	6 (1.7)	2 (9.5)	
	Other cities	23 (4.5)	33 (4.3)	14 (3.9)	0 (0.0)	
Your parents are?	Divorced or separated	91 (17.7)	155 (20.1)	90 (24.9)	5 (23.8)	9.6/ .143
	Married	403 (78.4)	583 (75.4)	253 (70.1)	14 (66.7)	
	Live together	20 (3.9)	35 (4.5)	18 (5.0)	2 (9.5)	
Mother's education?	Primary school	26 (5.1)	32 (4.1)	18 (5.0)	3 (14.3)	20.7/ .014
	Secondary school	240 (46.7)	327 (42.3)	169 (46.8)	11 (52.4)	
	College	46 (8.9)	87 (11.3)	51 (14.1)	4 (19.0)	
	University degree	202 (39.3)	327 (42.3)	123 (34.9)	3 (14.3)	
Father's education?		31 (6.0)	39 (5.0)	27 (7.5)	2 (9.5)	12.1/ .028
	Primary school					
	Secondary school	262 (51.0)	344 (47.1)	196 (54.3)	11 (52.4)	
	College	59 (11.5)	92 (11.9)	35 (9.7)	3 (14.3)	

Table 3: Continued…

	University degree	162 (31.5)	278 (36.0)	103 (28.5)	5 (23.8)	
School grades last year?	Acceptable (2, D)	4 (0.8)	9 (1.2)	7 (1.9)	2 (9.5)	42.3/< .001
	Good (3, C)	61 (11.9)	70 (9.1)	58 (16.1)	4 (19.0)	
	Very good (4, B)	161 (31.3)	245 (31.7)	141 (39.1)	8 (38.1)	
	Excellent (5, A)	288 (56.0)	449 (58.1)	155 (42.9)	7 (33.3)	
Do you use any of below mentioned substances?	No	392 (76.3)	531 (68.8)	197 (54.6)	14 (66.7)	85.7/< .001
	E-cigars	39 (7.6)	88 (11.4)	85 (23.5)	5 (23.8)	
	Tobacco	31 (6.0)	40 (5.2)	28 (7.8)	1 (4.8)	
	Alcohol	49 (9.5)	103 (13.3)	46 (2.7)	0 (0.0)	
	Marihuana	2 (0.4)	2 (0.3)	0 (0.0)	0 (0.0)	
	Sleeping pills	1 (0.2)	8 (1.0)	3 (0.8)	1 (4.8)	
	Other drugs	0 (0.0)	0 (0.0)	2 (0.6)	0 (0.0)	
How often do you use above mentioned?	Never	383 (74.5)	506 (65.5)	187 (51.8)	11 (52.4)	58.2/< .001
	Rarely	45 (8.8)	82 (10.6)	48 (13.3)	1 (4.8)	
	Only when I go out with friends	43 (8.4)	107 (13.8)	67 (18.6)	3 (14.3)	
	Every day	43 (8.4)	78 (10.1)	59 (16.3)	6 (28.6)	

Table 4: Characteristics of internet usage associated with internet addiction

Question		No signs N (%)	Low level N (%)	Medium level N (%)	High level N (%)	Chi – Square / P value
Usually, I visit internet via?	Computer	43 (8.4)	41 (5.3)	40 (11.1)	2 (9.5)	20.1/ .003
	Smart phone	457 (88.9)	724 (93.7)	311 (86.1)	19 (90.5)	
	Laptop	14 (2.7)	8 (1.0)	10 (2.8)	0 (0.0)	
Usual time spent on internet?	Gaming	58 (11.3)	73 (9.4)	65 (18.0)	6 (28.6)	75.0/< .001
	Social networking (Facebook, Instagram, Snapchat, Tik Tok...)	282 (56.2)	510 (66.0)	248 (68.7)	13 (61.9)	
	Media (YouTube, Spotify, Netflix, HBO…)	143 (27.8)	180 (23.3)	47 (13.0)	1 (4.8)	
	For school activities	24 (4.7)	10 (1.3)	1 (0.3)	1 (4.8)	
Do you use internet each day?	No	28 (5.4)	18 (2.3)	5 (1.4)	0 (0.0)	15.4/ .002
	Yes	486 (94.6)	755 (97.7)	356 (98.6)	21 (100.0)	
If used each day, what time approximately would that be?	1h max	76 (14.8)	28 (3.6)	5 (1.4)	0 (0.0)	250.1/< .001
	1h-3h	266 (51.8)	288 (37.3)	63 (17.5)	0 (0.0)	
	More than 3h	172 (33.5)	457 (59.1)	293 (81.2)	21 (100.0)	
Do your parents control the time you spend on in-	No	198 (38.5)	327 (42.3)	160 (44.3)	15 (71.4)	14.9/ .021
	Sometimes	214 (41.6)	331 (42.8)	145 (40.2)	4 (19.0)	
	Yes	102 (19.8)	115 (14.9)	56 (15.5)	2 (9.5)	

Table 4: Continued…

ternet? Do they warn you?						
Do you use internet for school activities and learning?	Never	22 (4.3)	31 (4.0)	24 (6.6)	4 (19.0)	29.9/< .001
	Sometimes	206 (40.1)	344 (44.5)	187 (51.8)	11 (52.4)	
	Often	286 (55.6)	398 (51.5)	150 (41.6)	6 (28.6)	

All responders with high level of internet addiction signs declared to use internet each day (Chi square=15.4, *P*=.002), same as usage of internet more than 3 hours per day (Chi square=250.1, *P*<.001). Temperament type was statistically significant associated to internet addiction level (Chi square=181.9, *P*<.001) as described in Table 5.

Table 5: Temperament type in association with internet addiction

Variable		No signs N (%)	Low level N (%)	Medium level N (%)	High level N (%)	Chi – Square / P value
Temperament type	Depressive	74 (14.4)	251 (32.5)	181 (50.1)	12 (57.1)	181.9/<0.001
	Cyclothymic	16 (3.1)	42 (5.4)	37 (10.2)	3 (14.3)	
	Hyperthymic	410 (79.8)	464 (60.0)	138 (38.2)	6 (28.6)	
	Irritable	11 (2.1)	13 (1.7)	5 (1.4)	0 (0.0)	
	Anxious	3 (0.6)	3 (0.4)	0 (0.0)	0 (0.0)	

Responders without or with low level of internet addiction mostly showed as hyperthymic temperament type (79.8% and 60.0%, respectively). In participants with medium internet addiction level, the most represented temperament type was depressive one (50.1%), which was also the case with high level of internet addiction (57.1%).

According to level of internet addiction signs all responders were classified as follows: group without signs of internet addiction: 514 (30.8%) and group with signs of internet addiction signs (low, medium, and high level) 1155 (69.2%). After univariant logistic regression is done, all variables which showed significancy (*P*<.05) were integrated into multivariant model. This model clarifies 17.6-24.8% variance of dependent variable and has good predictive power according to results of Hosmer and Lemeshow test (*P*>.05). Accuracy of this model was 73.8%. Significant factors in this model were age, addictive substances use frequency, purpose and time spent on the internet and temperament type (*P*<.05) (Table 6).

Other variables that were significant in univariable model, lost their significancy in multivariable model after impact assessment of other variables. Analysis results indicate that risk for internet addiction developing is higher if adolescent is spending 1-3h and more than 3h daily (2.8 and 8.2 times, respectively). Increasing age numbers for 1 unit (year), risk of internet addiction developing is decreased for 11.3%. Hyperthymic temperament type decrease risk for 70.9% from internet addiction developing sings rather than depressive temperament type.

Other statistically significant variables are described in the Table 6.

Table 6: Univariant and multivariant factor analysis for internet addiction prediction

Variable		Univariant logistic regression		Multivariant logistic regression	
		Odds Ratio	P	Odds Ratio	P
Age	11-19 years	1.105 (1.042-1.173)	.001	0.887 (0.791-0.895)	.040
Sex	Female	1	ref	1	ref
	Male	0.764 (0.615-0.948)	.015	0.975 (0.748-1.271)	.850
Primary or secondary school respondents?	Primary	1	ref	1	ref
	Secondary	1.698 (1.338-2.155)	< .001	1.501 (0.980-2.300)	0.062
Parents relation?	Separated or divorced	1	ref	1	ref
	Married	0.768 (0.587-0.965)	.05	0.899 (0.665-1.215)	.487
City of residence?	Belgrade	1	ref	1	ref
	Sombor	0.747 (0.597-0.936)	.011	0.807 (0.600-2.138)	.157
Addictive substances use?	None	1	ref	1	ref
	E-cigars	2.411 (1.670-3.482)	< .001	0.657 (0.295-1.461)	.303
	Alcohol	1.606 (1.138-2.269)	.007	0.607 (0.267-1.379)	.233
How often above mentioned?	Never	1	ref	1	ref
	Rarely	1.584 (1.104-2.272)	.012	2.087 (0.941-4.628)	.070
	Only when go out with friends	2.239 (1.569-3.196)	< .001	2.490 (1.106-5.605)	.028
	Each day	1.809 (1.259-2.601)	.001	2.022 (0.948-4.315)	.069
Internet content spending time often?	Games	1	ref	1	ref
	Media (YouTube, Spotify, Netflix, HBO…)	0.642 (0.444-0.929)	.019	0.616 (0.399-0.951)	.029
	School activities	0.201 (0.094-0.429)	< .001	0.261 (0.110-0.620)	.002
Do you use internet each day?	No	1	ref	1	ref
	Yes	2.836 (1.617-4.973)	< .001	1.116 (0.581-2.142)	.742
How much time do you spend on internet daily?	1h max	1	ref	1	ref
	1h-3h	3.039 (1.960-4.712)	< .001	2.775 (1.706-4.512)	< .001
	More than 3h	10.323 (6.644-16.042)	< .001	8.205 (4.962-13.568)	< .001
Does your parents control time you spend on internet?	No	1	ref	1	ref
	Yes	0.669 (0.498-0.898)	.008	0.984 (0.695-1.393)	.927
Temperament type	Depressive	1	ref	1	ref
	Hyperthymic	0.247 (0.188-0.326)	< .001	0.291 (0.216-0.392)	< .001
	Irritable	0.273 (0.124-0.601)	.001	0.332 (0.137-0.803)	.014
	Anxious	0.167 (0.033-0.841)	.030	0.088 (0.016-0.497)	.006

Discussion

This research aimed to identify the most predictive variables for Internet addiction, finding that 96.9% of surveyed adolescents use the internet daily, which is consistent with global studies (13). Affective temperaments were classified by Akiskal into five categories: hyperthymic, cyclothymic, irritable, anxious, and depressive (9). In this research, the largest number of respondents belonged to the hyperthymic type (1018 or 61.0%) and to the depressive type of temperament (518 or 31.0%), which is in accordance with the results of the research conducted on a sample of students in Poland (14). Based on the IAS score, adolescents in our research were divided into the following groups: 30.8% had no signs of Internet addiction, 46.3% had a low level of addiction, 21.6% had a moderate level of addiction, and 1.3% had a high level of signs of Internet addiction. These findings confirm a Croatian study revealing high internet addiction rates among 352 high school students, with 35.4% showing signs of addiction using the same assessment instrument (8).

Results for 31 nations were given in a meta-analysis of 164 independent samples (N = 89,281) by authors (15). The Middle East has the highest incidence of high internet addiction (10.9%). The countries of North and West Europe have the lowest prevalence of internet addiction (2.6%), followed by Southeast European countries with a frequency of 6.1% (15).

In this study, a significant correlation was observed in all characteristics of Internet use with the degree of Internet addiction, because all respondents with a high level of signs of Internet addiction stated that they use the Internet every day or use the Internet for more than 3 hours a day, while 71.4% of respondents with a high level of signs of Internet addiction stated that their parents do not control the time they spend on the Internet. Our findings are consistent with research conducted on a sample of 426 students in Saudi Arabia (16). The same instrument as in our study (20-item IAT) was used to measure

Internet addiction, and it was shown that 40.8% of respondents used the Internet 5-7 hours a day, mainly for social networking (88.5%) and to download media files. Approximately 6% were classified as Internet addicts, and 42% had occasional problems. Internet addiction was significantly higher in those who used the Internet for more than 10 hours a day (16).

In our study, after conducting univariate logistic regression, the following were identified as significant factors predicting addiction to the Internet: age, frequency of use of addictive substances, purpose of spending time on the Internet, time spent on the Internet, and type of temperament, which is in agreement with the results of other studies (17).

The connection between Internet addiction and the frequency of use of addictive substances is expected because the characteristic features of both physical and psychological addictions, including mental rumination, fluctuating emotions, tolerance, withdrawal, interpersonal conflict, and relapse, are evident in behavioral addictions (18). The "self-medication hypothesis" states that patients typically utilize drugs to manage their cognitive deficiencies, lessen excruciating anxiety, and alter undesirable temperamental positions (19). This may be seen in Internet addiction, which is a behavioral addiction, as well as in other behavioral issues that young people face, such as substance abuse.

The previously discussed variables that showed significance in the univariable model lost it in the multivariable model after assessing the influence of other variables, and in the final addiction prediction model, the results of the analysis showed that the risk of developing addiction to the Internet is greater if the child spends more than 1-3 hours and more than 3 hours a day (2.8 and 8.2 times, respectively), that with an increase in the number of years by 1, the risk of Internet addiction decreases by 11.3%, and that the hyperthymic type of temperament decreases the risk of Internet addiction by 70.9% compared to the depressive type of temperament. These findings are expected and in accordance with the research conducted by Kolaib et al (16).

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Preventative efforts should focus on promoting emotional and social competence, responsible media use, and current technology usage among adolescents, as well as treating those with high internet dependence.

Our study has certain limitations. Because this is a cross-sectional design study, it cannot produce knowledge about causal relationships. Since we used a self-report questionnaire in data collection, self-reporting bias may be present. However, in addition to the above limitations, the strength of our study is that our findings highlight the need for additional research on mental health and internet addiction in adolescents. Early program interventions on safe internet use are key to reducing high levels of Internet addiction among adolescents.

Conclusion

Internet addiction is linked to age, substance use frequency, purpose, time spent online, and temperament type. Internet addiction is more likely to be developed by girls, adolescents surfing the Internet using smartphones, and those from larger cities. While temperament type was found to be a major predictor of Internet addiction, the use of psychoactive substances was not found to be a significant predictor of developing Internet addiction.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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