Problematic Internet Use and Emotional States Among Secondary School Students

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Objective – The aim of the present study was to investigate the relationship between problematic Internet use and negative emotional states among secondary school pupils. **Method** – The sample consisted of 326 participants, ranging from 16 to 19 years of age. A Croatian adaptation of the Depression, Anxiety and Stress Scale was used to assess negative emotional state levels. The problems related to Internet use (obsession, neglect and control disorders) were assessed using the Problematic Internet Use Questionnaire. **Results** – Girls had statistically more significant difficulties with the inability to control Internet use and with the inability to end Internet use, in comparison to boys. Pupils who spent more time on the Internet had higher results on the obsession, neglect and control subscales in comparison to those who spent less time on the Internet. Furthermore, girls experienced higher levels of anxiety and stress than boys. The results of the regression analyses revealed that depression was significantly predicted by the time spent on the Internet and all three forms of problematic Internet use. In addition, it was found that neglect of daily activities and time spent on the Internet predicted negative emotional states of anxiety and stress. **Conclusion** – The results of this study confirm the positive relationship between problematic Internet use and negative emotional states in adolescents.

Introduction

The attention of researchers in the past two decades has been directed towards researching problematic Internet use (1, 2) which is also often called "Internet addiction" or "pathological Internet use" (3, 4). Problematic Internet use is most commonly conceptualized as an inability to control Internet use, which leads to negative results in everyday socio-emotional functioning (5). The Internet addiction symptoms as described by Young (6) encompasses compulsive use of Internet, withdrawal syndrome due to an increase in the Internet usage and symptoms related to negative impact on physical and social activities.

Studies about the prevalence of problematic Internet use among adolescents undoubtedly indicate that Internet addiction is a global problem (7-14). According to the results of these studies, between 2% and 11% of adolescents were classified as problematic Internet users (12, 14, 15). A recent comprehensive systematic review of risk factors related to problematic Internet use indicated a wide range of socio-demographic, Internet use, and psychosocial factors, as well as comorbid symptoms and disorders associated

with Internet addiction (16). For instance: male gender, younger age, more time spent on the Internet, impulsivity, neuroticism, loneliness and psychological difficulties are associated with a greater likelihood of developing problems with Internet use. A number of studies have examined the consequences of problematic Internet use. Problematic Internet usage has important adverse effects on emotional, behavioural and health functioning (17). The experience of negative emotional states has been identified as one of the most important and most frequently investigated consequences of problematic Internet use. The results of studies to date confirm that problematic Internet use is related to numerous psychological problems, such as depression (18, 19, 20), anxiety (21) and raised stress levels (21, 22).

Adolescents who use the Internet excessively are more likely to develop depression compared to adolescents who do not have a problem with excessive Internet use (23-26). Tan, Chen, Lu and Li (20) found significant relationships between problematic Internet use and depressive symptoms, as well as sleep disturbances. Longitudinal studies confirmed that individuals who pathologically use the Internet are at risk of developing depression (27). Studies (19) have shown that depressive symptoms range from mild to severe.

Anxiety is also a negative consequence of excessive Internet use (21, 23). When an internet-addicted individual has no access to the Internet, he or she may develop feelings of irritability, anxiety as well as aggression (22, 28). Furthermore, problematic Internet use may serve to worsen social anxiety and avoidance of social interaction (29). Excessive Internet use leads to Internet addiction, which may consequently cause problems such as anxiety and stress (21). In order to obtain a better understanding of changes in participants who use the Internet excessively, Kraut et al. (30) conducted a "post-hoc"

analysis, which revealed that the excessive use of the Internet may lead to a greater number of stressors. Increased use of the Internet has the effect of spending less time with family and friends and this contributes to the development of loneliness and stress (31).

Of particular interest are studies of the prevalence and consequences of problematic internet use among adolescents. Adolescence is a period characterized by the development of life style, system values and patterns of healthy behaviour (32). Adolescents are more vulnerable to the adverse effects of excessive internet use than adults since they are in the period of developing their own personality as well as in the period of rapid psychological maturation (9). Social skills developed in adolescence and decisions related to education define their future. Therefore, it is very important to recognize the symptoms of Internet addiction in this life period, especially as this adolescent group is encouraged by adults to use information technology as a tool for greater achievement in future work.

In Bosnia and Herzegovina, studies are still in the early stages dealing with research into the area of problematic Internet use. So far, a few studies have been conducted with specific focus on the habits and experiences of students using the Internet (33), and the relationship between interpersonal orientation and the time spent on Internet use among students (34), while some aspects of the psychological consequences of excessive Internet use are neglected. This makes our investigation a valuable contribution to the field by determining the existence and severity of Internet addiction in a sample of adolescents, and it gives a comparison with previous results in Europe and other parts of the world.

The aim of this study was to determine the association between problematic Internet use and negative emotional states among secondary school pupils. Specifically, this study

aimed to answer four questions. The first were the differences in problematic Internet use by pupils according to the time spent on the Internet and gender (P_1). Significant differences were expected between problematic Internet use and time spent on the Internet, whereby it was assumed that the problematic aspects of Internet use would be more obvious in pupils who spend more time on the Internet in comparison to pupils who spend less time on the Internet (H_1). The second question was related to gender differences in problematic Internet use, where we expected more problematic users among the boys compared to the girls (H_1). The third question was about differences in the symptoms of anxiety, depression and stress in relation to the time spent on the Internet and gender (P_2). Here more pronounced symptoms of negative emotional states were expected in pupils who used the Internet more often in comparison to the other group, and in girls as opposed to boys (H_2). Finally, this study examined the contribution of demographic (gender) and school variables (school achievement, class absence), the time spent on the Internet and problematic Internet use to negative emotional states (anxiety, depression and stress) (P_3). It was presumed that significant predictors of anxiety, depression and stress would be gender, time spent on the Internet and problematic Internet use (H_3).

Method

Participants

The study was conducted among 339 pupils from secondary schools in Posušje and Široki Brijeg. Thirteen pupils were excluded from the study because they had intellectual development difficulties or did not complete the questionnaires correctly. A total of 326 pupils (124 boys, 204 girls), aged 16–19, were included in this study. The average age of the participants was 17.03 years (SD=0.39). Of the total number of participants, 130 (39.76%) were from Posušje, and 196 (60.24%) from Široki Brijeg.

Procedure

The Ethics Committee of the Department of Psychology of the University of Mostar and the Ministry for Education, Science, Culture and Sport of the West Herzegovina Canton approved the study. Before the study was conducted, the participants were informed about whom they could contact if they had any further questions or if they wished to talk to someone about the research. The study was conducted during classes in the school classrooms. Before the study, the researcher presented himself to the participants and explained the purpose and the significance of the study, the questionnaire content and the time allotted for filling out the questionnaire (30 minutes). The participants were also informed about their right to anonymity and their right to withdraw from the study if they wished. After they had filled out the questionnaires, the participants were requested to seal them in envelopes and put them in a box located on a table at the back of the classroom.

Instruments

In this study, the participants answered questions regarding their gender, academic achievement (mid-year grade average, end of year grade average), class absences (frequency on a self-assessment scale from 1-3 times a term to 3-6 times weekly) and time spent on the Internet (frequency on a self-assessment scale - one hour daily, 2-3 hours daily, 4-6 hours daily, more than 6 hours daily, once per week, once per month, once in six months and once a year).

The Problematic Internet Use Questionnaire, PIUQ (3) was used to self-assess problematic Internet use. The questionnaire

consisted of 18 items, divided into three sub-scales: obsession, neglect and control disorder. The scale for obsession served to assess obsession with activities on the Internet (e.g., *How often do you feel tense, irritated, or stressed if you cannot use the Internet for as long as you want to?*). The scale for neglect served to assess the neglect of daily chores and activities (e.g., *How often do you spend time online when you'd rather sleep?*), and the scale for control disorder served to assess the inability to control Internet use and the inability to discontinue Internet use (e.g., *How often do you think that you should ask for help in relation to your Internet use?*). Participants were asked to respond to the items using a five-point Likert scale (1=*Never* to 5=*Always).* In this study, the factor analysis confirmed the original three-factor structure. Demetrovics et al. (3) established the medium internal consistency reliability of the questionnaire, and in their case the Cronbach alpha values were α=0.85 for the obsession subscale, α=0.74 for the neglect subscale and α=0.76 for the control disorder subscale. In this study, the reliability of subscales was examined, and the alpha coefficients of internal consistency were α=0.83 for the obsession subscale, α=0.74 for neglect α=0.79 for control disorder, and α=0.90 for the entire questionnaire.

For assessment of negative emotional states, the Depression Anxiety and Stress Scale, (DASS) of Lovibond & Lovibond (35) was used. The DASS consists of 42 items divided into three subscales, which measure the frequency and presence of three negative emotional states: *depression*, *anxiety* and *stress*. Each subscale contains 14 items and participants respond on a 4-point scale (1=*did not apply to me at all* up to 4=*applied to me very much, or most of the time*). *The Depression Scale* indicates symptoms such as dysphoria, hopelessness, self- deprecation, apathy and lack of interest (e.g., *I felt sad and depressed*). *The Anxiety Scale* assesses *autonomic* arousal, subjective experience of anxious affect and situational anxiety (e.g., *I felt I was close to panic*). *The Stress Scale* encompasses indicators of chronic, non-specific arousal, difficulty relaxing, agitation, irritability, impatience and the like (e.g., *I found it difficult to relax*). According to Brown et al. (36), the alpha coefficient of internal consistency shows an acceptable reliability of subscales with values between 0.71 and 0.81. The scale was shown to have a three-factor structure, similar to earlier studies (36, 37), with a high reliability (Cronbach alpha) for the depression scale α=0.90, for the anxiety scale α=0.81 and for the stress scale α=84.

Statistical Analysis

The normal distribution of all examined variables was verified using the Kolmogorov–Smirnov test. Variables with highly skewed distribution were normalised using logarithmic transformations. Mean and standard deviations were used to measure the central tendency. The differences in the problematic aspects of Internet use, with respect to the time spent on the Internet and gender, and the differences in the negative emotional states, with respect to the time spent on the Internet and gender, were tested using the t-test. The correlation between problematic Internet use and negative emotional states was calculated using the Pearson correlation coefficient, while hierarchical regression analysis was performed to identify significant predictive variables of negative emotional states. The statistical analysis was conducted using the computer programme: StatSoft, Inc. (38).

Results

Taking into consideration Kline's (39) criteria, the distributions of results on the subscales of problematic Internet use, negative emotional states, grade averages, absences and time spent on the Internet did not show satisfactory symmetry (<3.00) and skewness

(<8.00). In order to improve the normality of the results' distribution, logarithmic transformation (base 10) was performed. After this transformation, the distribution of all results showed a satisfactory symmetry and skewness, which justified the use of parametric statistical procedures.

The statistical analysis of the results of the sample participants showed that 321 (98.8%) pupils use the Internet every day, three pupils (0.92%) use the Internet once a week and one pupil (0.31%) uses it once a month. The four participants who stated that they used the Internet once a week or once a month were treated in the further analysis as extreme results and were excluded from the analysis, as was the participant (N=1) who failed to declare the frequency of his Internet use. As time spent on the Internet is one of the fundamental indicators of Internet addiction, we divided the participants into two groups according to the time spent on the Internet: "less time" and "more time." As no clearly defined criteria exist for assessment of the development of Internet addiction, we formed the criteria based on the time spent on the Internet, as follows: those participants who spent one hour on the Internet daily were categorized in the "less time" group. The "more time" group thus consisted of those

participants who spent from two to three hours on the Internet daily, four to six hours daily or more than six hours daily. The criterion was arbitrarily founded on the assumption that for pupils any time period longer than two hours spent daily on the Internet is unproductive for social and school activities.

According to the DASS, symptoms of stress were the most frequently reported symptoms among the participants, while symptoms of depression were less frequently reported. The PIUQ results show that the most common problems are related to control of spending time on the Internet, followed by difficulties related to the neglect of daily activities, with the difficulties related to obsessive activity on the Internet as the least common (Table 1).

A statistically significant difference was obtained for the results on the subscales of problematic Internet use (obsession, neglect and control disorder) regarding the time the participants spent on the Internet (Table 2). The results show that the pupils who spent more time on the Internet achieved higher values on the subscales of obsession, neglect and control disorder, in comparison to the pupils who spent less time using the Internet. The results indicating that 43.6% had problem with obsession with the Internet, 49.9%

Table 1. Scores of Adolescents on the Depression, Anxiety and Stress Scale (DASS) and the Problematic Internet Use Questionnaire (PIUQ)

Questionnaire	Score			
	No of respondents[*]	$\overline{x}\pm SD$	Potential range[†]	Given range[‡]
DASS				
Depression	326	8.56±8.13	0-42	0-42
Anxiety	326	9.32±7.20	0-42	0-36
Stress	326	13.62±8.30	0-42	0-40
PIUQ				
Obsession	326	12.49±4.83	6-30	6-28
Neglect	326	14.32±4.81	6-30	6-30
Control disorder	326	4.85±5.26	6-30	6-30

[*]The number of respondents who answered the question; [†]Theoretical maximum score range on the scale; [‡]The score range of the surveyed students.

with neglecting daily activities and 53.8% with control.

The differences in the frequency of problematic Internet use amongst boys and girls were examined by t-tests (Table 3). The results indicate that there are gender differences in the results on the control disorder subscale. Girls expressed greater difficulties with being unable to control Internet use and being unable to discontinue Internet use compared to boys. No statistically significant gender differences were found on the subscales for obsession and neglect.

From testing the differences in the symptoms of anxiety, depression and stress in relation to the frequency of Internet use, the results indicate that the pupils who spent more time on the Internet had higher levels of symptoms of depression and stress compared to pupils who spent less time on the Internet (Table 4). No differences were found in the symptoms for anxiety between these two groups.

Table 2. The Differences in Problematic Internet Use (Obsession, Neglect and Control Disorder) Regarding the Time Spent on the Internet

Problematic Internet use	Time	$\overline{x}\pm SD$	t	P
Obsession	More	1.72±0.87	4.424	0.000
	Less	1.17±0.47		
Neglect	More	1.77±0.83	4.489	0.000
	Less	1.23±0.61		
Control Disorder	More	1.76±0.74	4.493	0.000
	Less	1.26±0.66		

Time=Spending on Internet; Less=Spending one hour on the Internet daily; More=Spending two and more hours on the Internet daily.

Table 3. The Differences in Problematic Internet Use (Obsession, Neglect and Control Disorder) Regarding the Gender

Problematic Internet use	Gender	$\overline{x}\pm SD$	t	P
Obsession	Boys	1.52±0.80	1.953	0.052
	Girls	1.71±0.87		
Neglect	Boys	1.58±0.75	1.883	0.061
	Girls	1.75±0.86		
Control disorder	Boys	1.53±0.59	3.067	0.002
	Girls	1.79±0.84		

Table 4. The Differences in Negative Emotional States (Depression, Anxiety and Stress) Regarding the Time Spent on the Internet

Negative emotional states	Time	$\overline{x}\pm SD$	t	P
Depression	More	0.74±1.16	2.464	0.002
	Less	0.32±0.81		
Anxiety	More	1.26±1.40	1.817	0.255
	Less	0.88±1.23		
Stress	More	0.83±1.08	2.308	0.001
	Less	0.44±0.91		

Time=Spending on Internet; Less=Spending one hour on the Internet daily; More=Spending two or more hours on the Internet daily.

Table 5. The Differences in Negative Emotional States (Depression, Anxiety and Stress) Regarding the Gender				
Negative emotional states	Gender	x̄±SD	t	P
Depression	Boys	0.54±0.98	1.771	0.077
	Girls	0.76±1.20		
Anxiety	Boys	0.90±1.20	3.182	0.002
	Girls	1.40±1.46		
Stress	Boys	0.50±0.85	3.353	0.001
	Girls	0.91±1.16		

The results indicate that there are gender differences in the level of symptoms for anxiety and stress (Table 5). Girls had a higher level of anxiety and stress symptoms compared to the boys. This study did not obtain any significant differences in the level of depression symptoms between the boys and girls.

We calculated correlations between all variables to be used in the later analysis (gender, mid-year grade average, final grade average, class absences, time spent on the Internet, subscales for problematic Internet use and subscales for negative emotional states), prior to conducting a regression analysis (Table 6). The correlations between the predictor variables range from 0.01 do 0.76. The highest correlation was found between the

predictor variables for the mid-year grade average and the final grade average. Regarding the correlation coefficients between predictor variables on the three negative emotional states subscales, the highest correlations were found between the measures of problematic Internet use and the tested negative emotional states. All the correlations were in a positive direction, which means that the pupils who achieved higher results on the subscales of problematic Internet use (obsession, neglect and control disorder) also had higher results on the subscales for depression, anxiety and stress (Table 6).

In order to address the final aim of this study, a hierarchical regression analysis was conducted. The set of predictor variables included demographic (gender) and school

Table 6. Intercorrelation Matrix Between the Examined Variables											
Variable	1	2	3	4	5	6	7	8	9	10	11
1 Gender	1	0.25[†]	0.26[†]	-0.44[†]	0.24[†]	0.10	0.10	0.17[*]	0.09	0.17[*]	0.18[*]
2 Mid-year grade average	-	1	0.76[†]	-0.37[†]	0.05	-0.08	-0.13[*]	0.04	-0.01	-0.03	-0.03
3 Final grade average	-	-	1	-0.38[†]	-0.01	-0.07	-0.09	0.07	-0.01	-0.01	0.03
4 Absences	-	-	-	1	0.05	0.05	0.01	-0.06	0.07	0.01	-0.01
5 Time on the Internet	-	-	-	-	1	0.31[†]	0.28[†]	0.26[†]	0.24[†]	0.19[*]	0.22[†]
6 Obsession	-	-	-	-	-	1	0.63[†]	0.54[†]	0.32[†]	0.35[†]	0.34[†]
7 Neglect	-	-	-	-	-	-	1	0.61[†]	0.39[†]	0.34[†]	0.34[†]
8 Control disorder	-	-	-	-	-	-	-	1	0.45[†]	0.48[†]	0.44[†]
9 Depression	-	-	-	-	-	-	-	-	1	0.69[†]	0.63[†]
10 Anxiety	-	-	-	-	-	-	-	-	-	1	0.73[†]
11 Stress	-	-	-	-	-	-	-	-	-	-	1

[*]P<0.01; [†]P<0.001.

variables (mid-year grade average, final grade average and class absences), the variable of time spent on the Internet and the subscales of problematic Internet use (obsession, neglect and control disorder). The criteria variables were the results on the subscales of negative emotional states (depression, anxiety and stress). The hierarchical regression analyses were conducted in three steps. In the first step, demographic variables (gender) and school variables (mid-year grade average, final grade average and class absences) were entered; in the second step, the time spent on the Internet was entered, and in the third step, the results on the subscales of problematic Internet use (obsession, neglect and control disorder) were entered.

The results of the hierarchical analysis performed for the criterion of depression indicate that the described set of predictor variables can explain approximately 25.4% of the total variance of depression (Table 7). After controlling the eventual contribution of demographic variables in the first step, which explain an insignificant 2.9% of the results on the depression subscale, the addition of the time spent on the Internet in the second step was able to explain an additional 0.4% variance of depression. The participants who spent more time on the Internet ($\beta=0.320$; $P=0.000$) achieved higher results on the depression subscale. Variables of problematic Internet use (obsession, neglect and control disorder) additionally explained 15.9% of variance in depression. Participants who achieved higher results on the obsession subscale ($\beta=0.186$; $P=0.02$), neglect subscale ($\beta=0.161$; $P=0.02$) and control disorder subscale ($\beta=0.149$; $P=0.02$) achieved higher results on the depression subscale. The variable time spent on the Internet remained a significant predictor of depression, even in the last step of the analysis ($\beta=0.172$; $P=0.02$).

As for anxiety as a criterion variable, in the first step of the regression analysis, demographic and school variables were not found to be significant predictors. The introduction of the "time spent on the Internet" variable explained 1.2% of the variance of the criterion of anxiety ($\beta=0.182$; $P=0.02$). Variables of problematic Internet use additionally explained 19.2% of variance in anxiety, with obsession ($\beta=0.186$; $P=0.02$) and control disorder ($\beta=0.276$; $P=0.00$) proving to be significant factors. It is important to note that in the last step of the analysis, the time spent on the Internet stopped being a significant predictor of anxiety. The results of the analysis conducted indicated that the described set of variables could explain 25% of the variance of anxiety.

According to the results of the hierarchical analysis in the explanation of stress criteria, the variables of demographic characteristics and school variables in the first step of the analysis were not found to be significant predictors of the stress subscale. The introduction of the variable "time spent on the Internet" resulted in the explanation of 2.5% of variance in the stress variable, and time was found to be a significant stress predictor ($\beta=0.239$; $P=0.000$). In the third step, the percentage of the explained variance increased by 19.5%, and obsession ($\beta=0.212$; $P=0.001$), and control disorder ($\beta=0.234$; $P=0.000$) proved to be significant predictors. The time spent on the Internet stopped being a significant predictor. The set of variables described could explain 27.2% of the variance on the stress scale. The results are shown in Table 7.

Table 7. Hierarchical Regression Analysis of Possible Predictors of Negative Emotional States (Depression, Anxiety and Stress) in Adolescents Based on Scores of High-School Students on Gender, Academic Achievement, Class Absences, Time Spent on the Internet, and the Problematic Internet Use Questionnaire

| Added groups of predictors[*] | Subscales of the Depression, Anxiety and Stress Questionnaire | | | | | | | | |
| | Depression | | | Anxiety | | | Stress | | |
	R	R^2	R^2 Change	R	R^2	R^2 Change	R	R^2	R^2 Change
Demographic + school variables	0.171	0.029[†]	-	0.184	0.034[†]	-	0.228	0.052[†]	-
Demographic + school variables + Internet	0.181	0.033[†]	0.004	0.109	0.012[‡]	0.022	0.158	0.025[§]	0.027
Demographic + school variables + Internet + problematic Internet use	0.438	0.192[†]	0.159	0.451	0.204[†]	0.192	0.441	0.195[†]	0.170
Explained variance (%)	25.4			25			27.2		

[*]A new group of predictors was added in each further step of the analysis. Demographic variables included sex; School variables included mid-year grade average, final grade average, as well as absence from school; Internet variables included time spent on the Internet; Problematic Internet use variables included obsession, neglect and control disorder. R=The coefficient of multiple correlation; R^2=The coefficient of determination; R^2 Change=Percentage of variance explained by inclusion of the new group of predictors; [‡]P<0.05; [§]P<0.01; [†]P<0.001.

Discussion

The results show that 98.8% of the participants in this sample declared that they used the Internet on a daily basis. With respect to the time they spent on the Internet, 36.2% of the pupils claimed that they used the Internet from two to three hours, and 26.7% more than six hours daily. The existence of a high percentage of Internet use amongst young people is in accordance with the results of recent studies (40, 41) which stress that young people often use the Internet, although the results partially differ in the resulting percentages for Internet use. For instance, Livingstone et al. (42), on a sample of children ranging from the age of 9 to 16, indicated that Internet use varies from 62% to 85%. The greatest number of children used the Internet for school, and the least number of children for communication. Similarly, the results of the Eurobarometer study (43), conducted in the period from 2005 to 2008 on a sample of children aged from 6 to 17, indicated that in 2005 70% of adolescents used the Internet every day, and in 2008 this figure increased to 75%. From the obtained results, it is clear that in Bosnia and Herzegovina changes have occurred in the same range, indicating the pupils' greater need for daily Internet use. The high prevalence of Internet use may be the result of the greater availability of mobile phones and computers, which make the Internet more accessible. The trend of excessive Internet use may also be explained by public attitudes towards the Internet as a form of assistance in education and/or for entertainment and communication. The results regarding Internet use for more than two hours daily are in accordance with earlier studies (44, 45). On the one hand, a possible explanation for such results is that the general accessibility of the Internet and the attractive content, which the Internet offers, result in more frequent Internet use (46). On the other hand, the reason for frequent Internet use amongst pupils may be related to specific psychological difficulties such as loneliness and depression (47).

In accordance with earlier studies (3, 48), this study shows that frequent Internet use can be a risk factor for the development of Internet addiction. Since Internet addiction

is defined as the inability to control Internet use, along with the emergence of anxiety and dysfunctional disorders in daily life (49), the results of this study about obsessive Internet use, difficulties of self-control in using the Internet and the neglect of daily duties by the pupils, are in accordance with the elements of the definition of addiction. PIUQ results show that the most common problems are related to control of spending time on the Internet, followed by difficulties related to the neglect of daily activities, with the difficulties related to obsessive activity on the Internet as the least common.

The results suggest that there is a great need for the development and implementation of preventive programmes aimed at Internet addiction. It is interesting that the difficulties connected to the inability to control Internet use are more expressed amongst girls in relation to boys. These results are not in accordance with the results of studies to date regarding the gender differences in the problematic aspects of Internet use, which showed that boys have more problematic Internet use symptoms (21, 50) and more frequently develop Internet addiction compared to girls (51, 52). Such an unusual result may be explained by the fact that at the core of the difference between girls and boys in the prevalence of problematic aspects of Internet use lie different purposes for Internet use (53). It can be assumed that boys use the Internet more frequently for entertainment, and girls for socialising and learning.

In addition to these assumption are the results of studies which indicate that Internet activities aimed at establishing contact increase the probability of Internet addiction than other forms of Internet activities (50). Like earlier studies (21, 22, 54, 55), this study indicates that the time spent on the Internet is related to a huge number of psychological difficulties. The results of the regression analysis show that along with the time

spent on the Internet, significant predictors of negative emotional states were problematic aspects of Internet use. However, on the basis of the results we cannot clearly indicate whether negative emotional states preceded the development of problematic Internet use or were the outcome of problematic Internet use. The prevalence of negative feelings may result in frequent use of the Internet but a negative emotional state may occur due to Internet addiction since it is often related with social isolation (56, 57). Furthermore, the results of the regression analysis indicated that the correlation between the time spent on the Internet and anxiety, and experiencing stress depended on the expression of the difficulties of obsessive activity on the Internet and the inability to control Internet use. In general, individuals who spent more time on the Internet had more expressed difficulties with obsessive behaviour and the inability to control Internet use, which is connected to a higher level of experiencing anxiety and stress. Although it is important to bear in mind that these are correlation data and that no conclusion about causality is possible, in the symptomology of anxiety and depression the difficulties are evoked by reduced control over unexpected events and cognitive preoccupation with certain content. However, Caplan (58) finds that the relationship between problematic Internet use and the development of anxiety is determined by the preferences of the individual towards social interaction. Individuals who have social anxiety may perceive communication via the Internet as a safer form of interaction, thanks to their greater control over their self-image and the lower risk of negative evaluation (59), which can consequently lead to a higher risk for problematic Internet use. From the results, it is evident that problematic Internet use and the psychological consequences of such behaviour are very complex, which further studies should pay more attention to.

Limitations of the Study

The limitations of this study are primarily concerned with the sample, which is not representative of the adolescent population. In addition, the relatively low proportion in the explained variance of criteria of negative emotional states indicates that further studies should include other variables that could influence the relationship between negative emotional states and Internet addiction, such as the purpose of Internet use, the sites visited, family relation quality, social inclusion and the like. Finally, future studies should also examine whether age is a significant moderator of the relationship between psychological difficulties and problematic Internet use taking into consideration that results to date suggest that Internet use increases with age (33). Longitudinal studies which encompass the transition from childhood to adolescence would give an all-inclusive insight into the current field of research.

Conclusion

The results of the conducted study indicate that the susceptibility of adolescents towards frequent Internet use is exceptionally high. Frequent use of the Internet is connected to indicators of obsessive Internet use, the inability to control Internet use and the inability to discontinue Internet use. The difficulties related to the inability to control Internet use are more expressed amongst the girls in comparison to the boys. Problematic Internet use correlates positively with a higher level of negative emotional states. The results of this study suggest that the prevalence of adolescents who used the Internet daily and who had certain difficulties related to the Internet was very high, which means that it is necessary to create prevention programmes for this population. Prevention programmes should be focused on increasing knowledge about the results of long-term exposure to the Internet on individuals, as well as prevention strategies for its detrimental effects. Such programmes should be sensitive to gender differences and targeted at educating pupils who spend a long time on the Internet on a daily basis.

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

References

1. Morahan-Martin J. Internet abuse: Emerging trends and lingering questions. In: Barak A, editor. Psychological aspects of Cyberspace. Theory, research and applications. Cambridge, UK: Cambridge University Press; 2008. p. 32-69.

2. Widyanto L, Griffiths M. Internet addiction: Does it really exist? (revisited). In: Gackenbach J. editor. Psychology and the internet: Intrapersonal, interpersonal, and transpersonal implications. San Diego, CA, USA: Academic Press; 2007. p.141-63.

3. Demetrovics Z, Szeredi B, Rozsa S. The three-factor model of Internet addiction: The development of the problematic Internet use questionnaire. Behav Res Methods. 2008;40(2):563-74.

4. Lam TL, Peng ZW. Effect of pathological use of the internet on adolescent mental health: a prospective study. Arch Pediatr Adolesc Med. 2010;164(10):901-6.

5. Shapira NA, Lessig MC, Goldsmith TD. Problematic internet use: proposed classification and diagnostic criteria. Depress Anxiety. 2003;17:207–16.

6. Young KS. Internet Addiction: The Emergence of a New Clinical Disorder. Cyberpsychol Behav. 1996;1:237-44.

7. Chou C, Hsiao MC. Internet addiction, usage, gratification, and pleasure experience: the Taiwan college students' case. Comput Educ. 2000;35(1):65-80.

8. Johansson A, Götestam KG. Internet addiction: characteristics of a questionnaire and prevalence in Norwegian youth (12-18 years). Scand J Psychol. 2004;45:223-9.

9. Kaltiala-Heino R, Lintonen T, Rimpela A. Internet addiction? Potentially problematic use of the Internet in a population of 12-18 years old adolescents. Addict Res Theory. 2004;12(1):89-96.

10. Kim K, Ryu E, Chon MY. Internet addiction in Korean adolescents and its relation to depression

and suicidal ideation: a questionnaire survey. Int J Nurs Stud. 2006;43:185-92.

11. Pallanti S, Bernardi S, Quercioli L. The Sorter PROMIS questionnaire and the Internet Addiction Scale in the assessment of multiple addictions in a high school population: prevalence and related disability. CNS Spectrums 2006;11:966-74

12. Cao F, Su L, Götestam KG. Internet addiction among Chinese adolescents: prevalence and psychological features. Child Care Health Dev. 2007;33(3):275-81.

13. Siomos KE, Dafouli ED, Braimiotis DA. Internet addiction among Greek adolescent students. Cyberpsychol Behav. 2008;11:653-7.

14. Kuss DJ, Shorter GW, van Rooij AJ, van de Mheen D, Griffiths MD. The Internet addiction components model and personality: Establishing construct validity via a nomological network. Comput Human Behav. 2014;39:312-21.

15. Siomos KE, Dafouli ED, Braimiotis DA, Mouzas OD, Angelopoulos NV. Internet addiction among Greek adolescent students. Cyberpsychol Behav. 2008;11:653-7.

16. Kuss DJ, Griffiths MD, Karila L, Billieux J. Internet addiction: a systematic review of epidemiological research for the last decade. Curr Pharm Des. 2014;20:4026-52.

17. Atwal J, Klaus N, Daily R. Problematic Internet use in adolescents: an overview for primary care providers. KJM. 2012;108-13.

18. Bener A, Bhugra D. Lifestyle and depressive risk factors associated with problematic Internet use in adolescents in an Arabian Gulf culture. J Addicti Med. 2013;7(4):236-42.

19. Christakis AD, Moreno MM, Jelenchick L, Myaing MT, Zhou C. Problematic Internet usage in US college students: a pilot study. BMC Medicine. 2011;9(77):1-6

20. Tan Y, Chen Y, Lu Y, Li L. Exploring associations between problematic internet use, depressive symptoms and sleep disturbance among Southern Chinese adolescents. Int J Environ Res Public Health. 2016;13(3):313-25.

21. Azher M, Khan RB, Salim M, Bilal M, Hussain A, Haseeb M. (2014). The relationship between Internet addiction and anxiety among students of University of Sargodha. Int J Humanit Soc Sci. 2014;4(1):288-93.

22. Akin A, Iskender M. Internet addiction and depression, anxiety and stress. Int Online J Educ Sci. 2011;3(1):138-48.

23. Tonioni F., D'Alessandris L, Lai C., Martinelli D, Corvino S, Vasale M, Fanella F, Aceto P, Bria, P. Internet addiction: hours spent online, behaviors and psychological symptoms. Gen Hosp Psychiatry. 2012;34(1):80-7.

24. Bener A, Bhugra D. Lifestyle and depressive risk factors associated with problematic Internet use in adolescents in an Arabian Gulf culture. Journal Addict Med. 2013;7(4):236-42.

25. Durak M, Senol-Durak E. Associations of social anxiety and depression with cognitions related to problematic Internet use in youths. Egitim ve Bilim. 2013;38:169.

26. Wu X, Tao S, Zhang Y, Zhang S, Tao F. Low physical activity and high screen time can increase the risks of mental health problems and poor sleep quality among Chinese college students. PLoS ONE. 2015;10(3):e0119607.

27. Lam TL, Peng ZW. Effect of pathological use of the internet on adolescent mental health: a prospective study. Arch Pediatr Adolesc Med. 2010;164 (10):901-6.

28. Mihajlović G, Hinić D, Damjanović A, Gajić T, Đukić Dejanović S. Excessive Internet Use and Depressive Disorders. Psychiatria Danubina. 2008;20(1):5-14.

29. Lee BW, Stapinski LA. Seeking safety on the Internet: relationship between social anxiety and problematic Internet use. J Anxiety Disord. 2012;26: 197-205

30. Kraut R, Kiesler S, Boneva B, Cummings J, Helgeson V, Crawford A. 'Internet paradox revisited'. Journal of Social Issues. 2002;58(1):49-74.

31. Nie NH, Hillygus DS, Erbring L. Internet use, interpersonal relations, and sociability: A time diary study. U M. Wellman B and Haythornthwaite C. (editors), The internet in everyday life. Oxford: Blackwell, 2002.

32. Torre R. Drugs: A long journey through the night [in Croatian]. Promotor zdravlja, 2001.

33. Smailbegovič T, Kokić A. Experiences of Using the Internet of Elementary School Students in Sarajevo Canton [in Bosnian]. Sarajevo: Porodično savjetovalište, 2011.

34. Duvnjak B. The correlation between interpersonal orientation (IO) and Internet use in students [in Croatian]. Časopis putokazi. 2014;2(1):37-46.

35. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the depression

anxiety stress scales (DASS) with the Beck depression and anxiety inventories. Behav Res Ther. 1995;33(3):335-43.

36. Brown TA, Chorpita BF, Korotitsch W, Barlow DH. Psychometric properties of the depression, anxiety, stress scales (DASS) in clinical samples. Behav Res Ther. 1997;35(1):79-89.

37. Reić-Ercegovac I, Penezić Z. Subjective Well-Being of Spouses during the Transition to Parenthood. Društvena istraživanja. 2012;21(2):341-61.

38. StatSoft Inc., "Statistica," Data Analysis Software System, version 7, 2004.

39. Kline RB. Principles and practice of structural equation modeling. New York, NY: Guilford; 2011.

40. Jiménez J, Olry de Labry A, Bermudez C, Garcia FJ, Salcedo MC. Use of the internet as a source of health information by Spanish adolescents. BMC Med Inform Decis Mak. 2010;10(6):146-54.

41. Tahiroglu A, Celik G, Uzel M, Ozcan N, Avci A. Internet use among Turkish adolescents. Cyberpsychol Behav. 2008;11(5):537-43.

42. Livingstone S, Haddon L, Görzik A, Olafsson K. Risks and safety on the internet: the perspective of european children. London: EU kids online; 2011.

43. Eurobarometer. Towards a safer use of the Internet for children in EU- A parents' perspective. Flash Eurobarometer 249. Brussels: Directorate-General Communication of the European Comission; 2008.

44. Hardie E, Tee MY. Excessive internet use: the role of personality, loneliness and social support networks in internet addiction. AJETS. 2007;5(1):34-47.

45. Miguel I, Echevarría C, Ferrero E, Suárez P. Internet use by teenagers from Gijón (Asturias) as a source of health information. Atención Primaria. 2010;43(6): 281-6.

46. Puharić Z, Stašević I, Ropac D, Petričević N, Jurišić I. A study investigating the factors of internet addiction. Acta Med Croatica. 2014;68:361-73.

47. Kim J, LaRose R, Peng W. Loneliness as the cause and the effect of problematic Internet use: The relationship between Internet use and psy-chological well-Being. Cyberpsychology Behav. 2009;12(4):451-5.

48. Spada MM. An overview of problematic internet use. Addict Behav. 2014;39(1):3-6.

49. Pies R. Should DSM-V Designate „Internet Addiction" a Mental Disorder? Psychiatry. 2009;6(2):31-7.

50. Jeriček H. Internet Addiction: The Case of Slovenia [in Croatian]. Medijska istraživanja. 2002;8(2):85-101.

51. Gnisci M, Perugini R, Pedone R, Di Conza A. A construct validation of the use, abuse and dependence on the internet inventory. Comput Human Behav. 2011;27(1):240-7.

52. Shao IC, Fu YH, Su LC. An analysis on the correlation of gender differences between college students' internet addiction and mobile phone a addiction in Taiwan. IRSN Addiction. 2013;1-11.

53. Lin CH, Yu SF. Adolescent Internet usage in Taiwan: Exploring gender differences. Adolescence. 2008;43(170):317-31.

54. Kawa MH, Shafi H. Evaluation of internet addiction and psychological distress among university students. International Journal of Modern Social Sciences. 2015;4(1):29-41.

55. Tonioni F, D'Alessandris L, Lai C, Martinelli D, Corvino S, Vasale M, et al. Internet addiction: hours spent online, behaviors and psychological symptoms. Gen Hosp Psychiatry. 2012;34(1):80-7.

56. Orsala O, Orsalb O, Unsalc A, Ozalp, SS. Evaluation of internet addiction and depression among university students. Procedia Social and Behavioral Sciences. 2012;82:445-54.

57. Tsai C, Lin SJ. Internet addiction of adolescents in Taiwan: An interview study. Cyberpsychology Behaviour. 2003;6:649-52.

58. Caplan SE. A social skill account of problematic internet use. JCM. 2005;55:721-36.

59. Lee BW, Stapinski LA. Seeking safety on the Internet: relationship between social anxiety and problematic Internet use. J Anxiety Disord. 2012;26:197-205.