Research Reports

Sexual Compulsivity Comorbidity With Depression, Anxiety, and Substance Use in Students From Serbia and Bosnia and Herzegovina

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Abstract

The main purpose of this study was to examine relationships between sexual compulsivity, depression (including level of self-esteem) anxiety, and the use of tobacco, alcohol and drugs in a sample of 1,711 students from Serbia and Bosnia and Herzegovina. Sexual compulsivity, depression, and anxiety were measured with standardized scales and inventories (the Sexual Compulsivity Scale – SCS, the Beck Depression Inventory – BDI, and the Spielberger's State-Trait Anxiety Inventory-Trait, STAI-T, respectively), whereas specific questions about tobacco, alcohol, and drug use were modified for the purpose of this study. Results indicated positive, significant but low correlations between sexual compulsivity and depression; sexual compulsivity and anxiety; and sexual compulsivity and substance use; whereas a low, negative but significant correlation was obtained between sexual compulsivity and self-esteem. The strongest predictor of sexual compulsivity was drug use; two other significant predictors were alcohol and depression. Limitations of the study are discussed in the end.

Keywords: sexual compulsivity, depression, anxiety as a trait, self-esteem, substance use

Introduction

Sexual compulsivity is a clinical syndrome, opposite to what is known as sexual aversion or hyposexual desire disorder. Sexual compulsive behavior implies difficulties in regulation (decrease or inhibition) of sexual thoughts, feelings or behaviors, despite negative consequences to self and/or others, causing clinically significant levels of interpersonal distress, and it can include activities which are incongruent to personal goals, believes or values (Reid & Woolley, 2006). Sexual compulsivity means any sexual behavior in an individual, persisting over time despite numerous repetitive attempts to stop it, causing clinically significant levels of stress to the individual (Del Giudice & Kutinsky, 2007). Sexual compulsive behavior can be determined as an individual's preoccupation with sexual thoughts, desires and behaviors, resulting in subjective distress and interfering in social and work functioning. Analyzing the existing literature, Berberovic (2012) claims that sexual compulsivity is characterized by: obsessive thoughts about sexual behavior, loss of control over that behavior, and continuing such sexual behavior despite its negative consequences.

Sexual compulsivity was found to be highly correlated to other psychological problems and mental disorders, especially to anxiety and mood disorders, as well as to different impulse control problems (Black, Kehrberg, Flumerfeit, & Schlosser, 1997; Goodman, 1993, 1998; Grant & Steinberg, 2005; Kafka & Hennen, 1999; Raymond,

Coleman, & Miner, 2003; Schneider & Schneider, 1996). Many authors (i.e., Carnes, 1983, 1991, 1996; Goodman, 1993, 1998; Kafka & Hennen, 1999) argued that sexual compulsivity is very often comorbid with other addictions or substance abuse. Sexually compulsive individuals can also have physical health problems caused by sexually transmitted diseases (i.e., Coleman, 1992; Dew & Chaney, 2005) or they may suffer from some personality disorders (Carnes, 1991; Finlayson, Sealy, & Martin, 2001; Rickards & Laaser, 1999). Bipolar and psychotic disorders can also be related to sexual hyperactivity (Finlayson, Sealy, & Martin, 2001). Symptoms of depression, schizophrenia, antisocial personality disorder and substance abuse were found in adolescents who were likely to engage in risky sexual behavior (Sussman, 2007). Blankenship and Laaser (2004) revealed several common characteristics in ADHD persons and sexual compulsives.

Moskowitz and Roloff (2007) proposed two sexual compulsivity etiology perspectives. The first one is based on the anxiety model and the second on the depression/mood model. According to the anxiety - based model, sexual desire is activated by anxiety states (Quadland, 1985) such as low self-confidence or loneliness, which are then constructed as a need for sex, meaning that they become the triggers to start looking for sexual encounters (Moskowitz & Roloff, 2007). Anxiety reduction can be linked to sexual behavior through early learning processes, meaning that, when anxiety levels increase, a need to reduce it through some kind of sexual behavior or encounter becomes strong (Gold & Heffner, 1998). However, reduced anxiety is only temporary and when it reoccurs, previous sexual behaviors are not sufficient to reduce high anxiety levels, so additional sexual practices may occur (Berberovic, 2012). Moskowitz and Roloff (2007) argue that sexual compulsivity is better explained by the mood - or depression - based model, because some individuals, when depressive, become less worried about the consequences of their behaviors, so they engage in more risky sexual activities (i.e., Wright, 2012). Sexual activity might then serve as an instrument to recover psychological equilibrium, since depressive states activate a search for satisfying the need (Bancroft & Vukadinovic, 2004). It was demonstrated that depression and sexual compulsivity were positively related, and that a higher prevalence rate of depression was found in males (Weiss, 2004). However, we must consider the fact that depression is frequently comorbid with other psychological disorders (First, 2005), not only with sexual compulsivity.

Nelson and Oehlert (2008) found significant comorbidity levels of depression, anxiety and substance addiction (especially cocaine addiction) with sexual compulsivity. This study aims to find whether sexual compulsivity is comorbid with depression, anxiety, and substance use in students from non-western countries (Serbia and Bosnia and Herzegovina), since the sexual compulsivity phenomenon has not been the subject of research in the Balkan area so far. On the other hand, higher rates of sexual compulsivity are expected in lower socio - economic countries (Marshall, Marshall, Moulden, & Serran, 2008; Mmidi & Delmonico, 2001) such are Serbia and Bosnia and Herzegovina.

Carnes, Murray, and Charpentier (2005) demonstrated that sexual compulsivity (named sexual addiction) simultaneously existed with sexual anorexia, explaining that these sexual behavior extremes are two dimensions of the same problem. Addiction in one area can lead to addiction in another area (Eisenman, Dantzker, & Ellis, 2004). Males were more likely to report addictions to sex, alcohol, drugs, gambling, while females were more likely to report chocolate, cigarette and food addictions (Eisenman et al., 2004). Carnes (1991) found that 42% of 932 sexually addicted individuals, were also addicted to other chemical substances, 38% of them had eating disorders; 28% reported that they worked compulsively and 26% reported compulsive buying. Participants also mentioned addiction problems in their siblings, fathers and mothers (Carnes, 1991). There is strong correlation between

stimulant drugs and sex (Brown, Domier, & Rawson, 2005). Pathological gambling was also found to be highly correlated to sexual compulsivity, significantly higher in male than in female gamblers (Grant & Steinberg, 2005).

The main purpose of this study was to explore the sexual compulsivity comorbidity with depression (including self-esteem levels), anxiety, and tobacco, alcohol, and drug use in students from Serbia and Bosnia and Herzegovina (B&H). This study is the first of this kind to explore the sexual compulsivity phenomenon in its relation to depression, anxiety, and substance use in a young (student) population only. Its importance lies in the fact that it explores only young people from 19 to 25 years of age, while previous studies used a broader age range (i.e., from 18 to 65) when exploring sexual compulsivity. On the other hand, the sexual compulsivity phenomenon has never been explored in any population in the Balkans, so this study highlights the importance of one of the more acute problems of young people in these economically poor countries, where sexual behavior can serve as a coping mechanism to overcome stressful life events people from these countries encounter every day. This kind of study is particularly interesting since, in the Balkans, such a phenomenon is not well recognized as problematic and uncontrolled sexual behavior is seen as extremely negative in females, but extremely positive in males, which is also the case in other cultures (Caroll, 2007). Emphasizing this problem among young students could motivate other researchers to broadly explore sexuality issues in young populations in these two countries on an even wider scale, especially since sexual compulsive behavior does not have a place in the current mental disorders classification systems. This study also emphasizes the importance of exploring the sexual compulsivity phenomenon in economically poor countries, because it can be ignored and neglected by mental health professionals when counseling clients who demonstrate problems with depression, low self-esteem, anxiety, and substance use.

Given the previous findings mentioned above, it was hypothesized that higher scores in sexual compulsivity would be (1) positively correlated to the higher scores in depression; (2) negatively correlated to the lower scores in self-esteem; (3) positively correlated to the higher scores in anxiety; (4) positively correlated to the substance use (cigarette smoking, alcohol, and drug use. The last hypothesis was that (5) depression, anxiety, self-esteem, and substance use, when considered together, would be good predictors of sexual compulsivity in a student population.

Method

Participants

The sample of this study consisted of 1,711 students from four universities in Serbia (N = 570) and B&H (N = 1,141); 649 males and 1,062 females, within the 19 to 25 age range, M = 21.88; SD = 1.67. A total of 896 students from both countries were from rural areas, while 894 students came from urban areas (one participant did not report her geographic location). No significant differences were found in any of the socio-demographic variables (sex, geographic location: urban/rural area; state: Serbia/B&H, marital status, and family status).

Material

Four instruments were used in this research: the Sexual Compulsivity Scale-SCS, the Beck's Depression Inventory-BDI-II, the Rosenberg's Self-Esteem Scale-RSS, and the Spielberger's Stait - Trait Anxiety Inventory – STAI-T. A Socio - demographic questionnaire was developed for this study in order to obtain data about sex, age, year of study, faculty, department, state, geographic location (urban/rural area), monthly economic income (socio-eco-nomic status), as well as to obtain data about substance use (cigarettes, alcohol, and drugs) indicating consumption, daily quantity, type of substance used. No data about substance use frequency were obtained as part of this study. Self-report of cigarette, alcohol, and drugs consumption were used as categorical variables in this research.

Participants were asked to note whether they smoke, drink alcohol, or use drugs (in the form of "Yes/No" answers). If their answers were positive, they were asked to note how many cigarettes they smoked on a daily basis, which type(s) of alcohol they consumed, and which type(s) of drugs they used. Only self-report data about the participants' substance use were collected.

The Sexual Compulsivity Scale (SCS, Kalichman & Rompa, 1995) was used to determine sexual compulsive participants. The scale was translated from English to Serbian and vice versa to test whether there were significant changes in sense of the scale's items when translated to the Serbian language. No significant changes were found. Beside high internal consistency of the scale mentioned above, the Principal Component Analysis (PCA) revealed one significant component (factor) explaining 66.89% of variance (KMO = .95) with significant Bartlett's test of sphericity (p = .000) (Berberovic, 2012). It consists of 10 4-point Likert scale items measuring tendencies toward sexual preoccupation and hypersexuality. Participants who scored above the score of 32 (two standard deviations of the mean sample score) were classified into the "sexual compulsives" group. A total of 153 sexual compulsive participants were identified in this study (116 males and 37 females). Alpha coefficients for internal consistency of the scale are from .85 to .91, with high levels of construct and criterion validity (McBride, Reece, & Sanders, 2008). In this study, Cronbach's alpha of .943 indicates high internal consistency of this scale. This study was the first in using this scale for research purposes.

The Beck Depression Inventory – II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess depression. This form of the inventory was constructed in 1996 (Beck et al., 1996), but was officially translated in Serbian in 2008. Its psychometric properties were explored in Serbian student population, demonstrating good internal consistency, test-retest reliability, convergent, and divergent validity (Novovic, Mihic, Tovilovic, Jovanovic, & Biro, 2011). Good psychometric properties were also found in clinical settings (i.e., Bugarski, Sakac, & Vodopivec, 2007). BDI-II form consists of 21 items regarding pessimism, sense of failure, feelings of guilt, punishment, self-hatred, self-accusations, suicidal thoughts, crying, irritability, social isolation, etc. Every item consists of 4 statements, which are scored between 0 (no depressive symptom) and 3 (severe state). The higher the score on this scale, the higher the depression level. This inventory showed also good internal consistency and test-retest consistency in clinical (.48 to .86) and non-clinical (.60 - .90) samples (Beck et al., 1996; Beck, Steer, & Carbin, 1988). In the current study, the BDI-II showed high internal consistency, with the Cronbach's alpha = .885.

The Rosenberg's Self-Esteem Scale (RSS; Rosenberg, 1965) is the most frequently used instrument to measure global self-esteem. It consists of ten 5-point Likert scale items. The higher the score, the higher the self-esteem level (negative items are scored reversely). Metric characteristics of this scale were explored several times in different ex-Yugoslavian populations. Internal consistency of this scale is Cronbach's alpha = .85 (Burusic & Brajsa-Zganec, 2005). Test-retest reliability of this scale is from .82 to .88, depending on the sample, whereas internal consistency (Cronbach's alpha) is from .77 to .88 (Jelic, 2003). This research also revealed high internal consistency of this scale, Cronbach's alpha = .803, as it was indicated in the previous research (i.e., Jelic, 2003).

The Spielberger's State - Trait Anxiety Inventory – Trait (STAI-T, Spielberger, Gorsuch, Rushene, Vagg, & Jaccobs, 1999) is self - assessment questionnaire of anxiety as a trait. This scale was standardized first in Croatian population in 2000 (Spielberger et al., 1999). No other norms of this scale for other ex - Yugoslavian countries were made, but the scale is widely used and it metric properties were showed to be good. It consists of twenty 4-point Likert scale items. Higher scores indicate higher levels of anxiety as a trait. Test-retest correlation of this inventory was .86, and good convergent validity was reported (Spielberger et al., 1999; Tilton, 2008), making this instrument

very suitable for research issues. Research in Serbian samples (i.e., Popov, 2004) indicated high internal consistency of the scale. In this study, Cronbach's alpha of .864 indicates very high internal consistency of the instrument.

Procedure

All participants were approached during the spring semester of the 2010/2011 academic year at four biggest universities (two in each country): University of Belgrade and University of Novi Sad (Serbia); University of Sarajevo and University of Tuzla (Bosnia and Herzegovina). Students of almost all departments of the four universities were approached during regular lectures (giving access to groups of 30 to 100 people); the main scope of the study was briefly explained to every group of participants. Participants were told to complete the questionnaires, which were anonymous, being assured that the results would be used for this study (and related scientific purposes) only. Students were also told that they can stop their participation at any time. The procedure of approaching participants was agreed with university members prior to collecting data. It took about 30 to 60 minutes to complete the questionnaires. The same procedure was administered at each university.

Since the distribution for the above variables was asymmetric, non-parametric statistical procedures were used. Statistical analysis was performed with the help of *SPSS for Windows 12.0* One database for the whole sample was formed, giving every participant of the research his/her own code.

Results

To test the first three hypotheses regarding sexual compulsivity comorbidity with depression, self - esteem, and anxiety, Spearman correlations were performed. The results in a form of correlation matrix are shown in Table 1.

Table 1

Sexual Compulsivity Comorbidity With Depression and Anxiety

	Sexual compulsivity	Depression	Self-esteem	Anxiety
Sexual compulsivity	1.00	.142**	-.175**	.141**
Depression	.142**	1.00	-.525**	.568**
Self-esteem	-.175**	-.525**	1.00	-.626**
Anxiety	.141**	.568**	-.626**	1.00

**$p < .01$, two-tailed.

As it is indicated in the table, all the correlations were significant at the .01 level. Correlation between depression and anxiety was positive and moderate (ρ = .568, p = .000, N = 1,704), whereas correlations between depression and self-esteem (ρ = -.525, p = .000; N = 1,708); and between anxiety and self-esteem (ρ = -.626, p = .000; N = 1,701) were negative and moderate. Sexual compulsivity was positively correlated with depression (ρ = .142, p = .000; N = 1,711) and anxiety (ρ = .141, p = .000; N = 1,704), but negatively related with self-esteem (ρ = -.175, p = .000; N = 1,708). However, all the correlations of sexual compulsivity with depression, anxiety, and self-esteem, even when significant, were very low. Results showed that the higher the sexual compulsivity, the higher the depression, the lower the self-esteem, and the higher the level of anxiety.

Of the 153 identified sexual compulsive subjects in this study, 37.9% (N = 58) reported they smoked cigarettes, while 24.4% (N = 380) of sexual non-compulsives reported smoking. Smokers had significantly higher levels of

sexual compulsivity (M = 18.57; SD = 8.68; Mdn = 15; N = 438) than non-smokers (M = 16.12; SD = 7.47; Mdn = 13; N = 1273), U = 224 632.5; p = .000.

To test the fourth hypothesis, point-biserial correlations were performed to reveal the relations between sexual compulsivity and substance use. The point-biserial correlations were run because the substance use variables were all categorical and dichotomous. The results are shown in Table 2.

Table 2

Sexual Compulsivity and Substance Use

	Sexual compulsivity	Cigarette smoking	Alcohol consumption	Drug use
Sexual compulsivity	1.00	.136**	.279**	.345**
N	1711	1711	1711	1711

**p < .01, two-tailed.

The results indicate significant correlations between sexual compulsivity and substance use (cigarette smoking, alcohol consumption, and drug use). Regarding their power, it could be said that all the correlations were relatively weak. The weakest correlation was obtained between sexual compulsivity levels and cigarette smoking (r_{pb} = .136, p = .000, N = 1,711), whereas the strongest correlation was found between sexual compulsivity and drug use (r_{pb} = .345, p = .000, N = 1,711), with correlation between sexual compulsivity and alcohol consumption in the middle (r_{pb} = .279, p = .000; N = 1,711). All the correlations were positive, meaning that those who smoke cigarettes, consume alcohol drinks, and use drugs, have a greater probability to score higher in sexual compulsivity, comparing to those who do not smoke cigarettes, do not consume alcohol, or do not use drugs.

A total of 79 subjects of those 81 who reported drug use, answered the question of which type of drugs they used. Out of those 79 drug users, 29 (36.70%) reported using stimulant drugs, whereas 50 (63.30%) reported only use of marihuana. The Mann-Whitney U test revealed a significant difference in sexual compulsivity levels between the former (Mdn = 34; N = 29) and the latter (Mdn = 18; N = 50), U = 396; p = .001. The former drug users (those using stimulant drugs) had most frequently the score of 34 on the SCS, indicating sexual compulsivity. Out of the 29 stimulant drug users, 18 subjects (62.1%) were also identified as sexual compulsives, whereas only 22% of the sexual non-compulsives were prone to stimulant drug use. Results demonstrated that sexual compulsivity was more prevalent in stimulant drug users group than it was the case with the marihuana users group, χ^2(1, n = 79) = 11.02; p = .000, phi = .40.

Logistic regression was performed to test the fifth hypothesis regarding the prediction of sexual compulsivity when all the explored variables (depression, self-esteem, anxiety, and substance use) were considered together. The results are shown in Table 3.

Logistic regression was performed to test the contribution of several factors on probability that the participants would be classified as sexual compulsives (or sexual non-compulsives). The model consisted of six independent variables (depression, self-esteem, anxiety, smoking, alcohol, and drugs). The dependent variable was sexual compulsivity. The whole model (with all predictors) was significant, χ^2(6, N = 1711) = 146.87, p = .000, implying that the model discriminated sexual compulsives from sexual non-compulsives. However, the model explained between 8.2% (Cox & Snell R square) and 18.2% (Nagelkerke R square) of variance, but it classified correctly 91.2% of the cases. As it is indicated in Table 3, only three independent variables gave significant contribution to

Table 3

Predicting the Probability of Being Classified as Sexual Compulsive

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Depression	.075	.011	46.556	1	.000	1.078	1.055	1.101
Self-esteem	-.029	.015	3.731	1	.053	.971	.942	1.000
Anxiety	-.027	.012	4.713	1	.030	.974	.951	.997
Smoking	.142	.203	.487	1	.485	1.152	.774	1.715
Alcohol	.861	.208	17.187	1	.000	2.366	1.575	3.555
Drugs	1.304	.286	20.784	1	.000	3.685	2.103	6.457
Constant	-1.655	.955	3.004	1	.083	.191		

Note. Variable(s) entered on step 1: Depression, Self-esteem, Anxiety, Smoking, Alcohol, Drugs.

the model (depression, alcohol consumption, and drug use). Drug use was found to be the strongest predictor in predicting probability of being classified as sexual compulsive (drugs as indicated in the table), with odds ratio of 3.68. It demonstrated that participants who used drugs were more than 3.5 times more likely to be classified as sexual compulsives than those who do not use drugs. Those who consume alcohol drinks were more than 2 times more likely to be classified as sexual compulsives than their alcohol non-consumers counterparts. The odds ratio for depression was just a little bit above 1 but the result was also significant when all other factors in the model were controlled.

Discussion

Depression is the most frequently researched disorder among sexual compulsive individuals. This study also demonstrated that sexual compulsivity was positively and significantly correlated to more severe depressive states. Positive correlation means that the higher the depression levels, the higher the sexual compulsivity levels and vice versa. The depression prevalence rate in this study was 16.3% among sexual compulsives, which is very similar to the results of Weiss (2004) who found a 18.4% depression prevalence rate among sexual compulsives. The finding which confirms the positive correlation between sexual compulsivity and depression is congruent with results from other studies (Chaney & Chang, 2005; Muench et al., 2007; Nelson & Oehlert, 2008), in which depression was a frequent characteristic of individuals who express sexual compulsive behavior. On the other hand, high depression levels are highly correlated to low levels of self-esteem. Results from this study revealed that sexual compulsivity was significantly and negatively correlated to self-esteem levels. A negative correlation between these two variables explains that the higher the sexual compulsivity levels, the lower the self-esteem. This is congruent with another finding (Muench et al., 2007), which confirmed that low self-esteem is one of the characteristics of sexual compulsives. This result was expected, since sexual compulsivity was positively correlated to depression, and depression was negatively correlated to high self-esteem levels. Sexual compulsive behavior can result in high levels of tension or it can severely damage general mood and the well-being of the individual. Young people may think that sexual activity can serve as a coping mechanism against everyday stressors. However, not staying in long-term relationship and constantly changing sex partners can fortify a negative self-concept, since this type of satisfaction (through sexual activity) is only temporary, not permanent, and the self-concept is a more permanent characteristic, which is hardly changed by temporary satisfactions, such as are sexual experiences with different sex partners.

Several studies found interesting relationships between depression and hypersexual behavioral patterns. For illustration, Fielder and Carey (2010) found that students, who had been more depressed at the beginning of the semester, were more likely to engage in casual sex at the end of the semester. In another study (Grello, Welsh, Harper, & Dickson, 2003) more depressive young people (adolescents) were more likely to engage in casual sex than their less or non-depressed counterparts. Wright (2012) suggests that unhappy people can be indifferent to the negative consequences of uncontrolled sexual behaviors. It could suggest that depressed individuals are not likely to think about the long-term consequences of their behaviors, so they engage in sexual activities with the scope of "curing" themselves of their own emotional state dominated by unhappiness (Wright, 2012). Casual sexual encounters could be one of the temporary solutions to problems related to depression and low self-esteem. However, self-esteem level in this research was not found to be a significant predictor of sexual compulsivity, when all other variables were held constant. It should be noted that significant correlations between sexual compulsivity and depression, as well as those between sexual compulsivity and self-esteem, were obtained in a relatively big sample of students. When their magnitude is considered, they are both very low; even depression was demonstrated to be one of the three significant predictors of sexual compulsivity, which was not the case with self-esteem.

A positive and significant, but also very low correlation was found between sexual compulsivity and anxiety, which means that sexual compulsivity levels rise as anxiety levels rise. However, the anxiety variable was found to be a significant predictor at the .05 (exactly .03) level of sexual compulsivity, when other variables in the model were held constant. However, its odds ratio was less than 1, indicating that there is even a probability of being classified as a sexual compulsive as anxiety levels decline. Anxiety was found to be comorbid with sexual compulsivity in other research (i.e., Nelson & Oehlert, 2008). In the current study, sexual compulsives scored significantly higher on anxiety than their non-compulsive counterparts. This result could possibly be explained by coping mechanisms students in Serbia and B&H use to overcome stress in everyday life, meaning that sexual activities might be used as coping strategies by students in these countries. On the other hand, both countries are considered as developing countries whose inhabitants have a low socio-economic status. Research (Marshall, Marshall, Moulden, & Serran, 2008) suggests that sexual compulsivity could be considered as a more serious problem of people with lower socio-economic status, which means that higher sexual compulsivity rates are expected in developing than in more developed countries. This was confirmed by the findings of research among African males (Mmidi & Delmonico, 2001), reporting very high sexual compulsivity rate in African men who simultaneously belonged to lower socio-economic levels. Those who belonged to low socio-economic groups might have little coping strategies that could be used in everyday life, which is the reason why sex could be one of the main activities employed to overcome everyday problems. However, further research is needed to explore the relationship between social class, economic status, and sexual compulsivity levels in student population.

Students who reported smoking, had higher average sexual compulsivity scores than their non-smoker counterparts. This result was congruent with other findings (Eisenman et al., 2004; Sussman, 2005, 2007). Sussman (2005, 2007) claims that sexual compulsivity is expected to be positively correlated to smoking in young people because media models very often advertise cigarette smoking in sexualized ways, influencing vulnerable young people not only to start smoking, but also to behave sexually. Those who start smoking earlier are more likely to start earlier to engage in sexual activities than their non-smoker peers, and are prone to a sexual risky behavior (Sussman, 2005, 2007), possibly because of their tendency to "grow up" sooner and to behave congruently with adult models behavior. A positive correlation between sexual compulsivity and cigarette smoking and other addictions or substance abuse was also confirmed in another research (Eisenman et al., 2004). In any case, it should

be mentioned that, despite its significance, the correlation between sexual compulsivity and cigarette smoking obtained in the current study was very low, whereas cigarette smoking was not found to be a significant predictor of sexual compulsivity when other variables were controlled. However, as some authors claim (Carnes, 1983, 1991, 1996; Eisenman et al., 2004; Goodman, 1993, 1998), people who are addicted to one substance are more likely to become addicted to another substance. This means that cigarette smoking can facilitate likeliness to consume alcohol or use drugs, which were shown to be significant predictors of sexual compulsivity in the current research.

It was confirmed that sexual compulsives significantly differed from their non-compulsive counterparts in their proneness to alcohol drinking, meaning that the former were more likely to consume alcohol than the latter. Significantly higher sexual compulsivity prevalence rate was found among those who drank alcohol than among those who did not. However, this result cannot be supported by another research (i.e. Nelson & Oehlert, 2008) in which no significant correlation between sexual compulsivity and likeliness to alcohol consumption was found. Eisenman et al. (2004) showed that alcohol consumption was more characteristic for sexual compulsive males than for sexual compulsive females. Further analysis is needed to test gender differences in alcohol consumption in relation to sexual compulsive behavioral patterns. Cooper (2002) suggested that the relationships between alcohol use and sexual behaviors could not be explained simply by considering people who use or do not use alcohol. The relationship between sexual risky behavior and alcohol use is very complex, and it reflects various underlying processes, causal or non-causal in nature (Cooper, 2006). Alcohol is frequently used as a stimulant in sexual activities. Even in the media, alcohol is presented through sexualized scenarios of intimate relationships between sex partners. However, alcohol consumption, as it is the case with the use and abuse of other substances, can serve as a coping mechanism to overcome depression, anxiety, or other inner negative emotional states. Alcohol and substance use support a distorted self-image, meaning that they can be used due to the individual's low levels of self-esteem and proneness to develop depression. Some authors (i.e., Carnes, 1983, 1991, 1996; Eisenman et al., 2004; Goodman, 1993, 1998) claim that sexual compulsivity is an addiction process, and that the development of one addiction (i.e., addiction to alcohol or drugs) can lead to the development of another (i.e., sexual addiction). Alcohol consumption was found to be one of the significant factors in predicting sexual compulsivity in the current study. Participants who self-reported alcohol consumption were found to be more than twice as likely to be classified as sexual compulsives compared to peers who did not report this type of consumption. It seems that alcohol could serve as a facilitator in engagement in a risky sexual behavior. On the other hand, it can be related to the positive reinforcement of sexual engagement, leading young people to participate in risky sexual behavior over and over again.

The results of this research showed that sexual compulsive students were generally more likely to consume cigarettes, alcohol, and drugs more often and in bigger quantities than their non-compulsive counterparts. Drug use was found to be the strongest predictor of sexual compulsivity when other variables in the model were controlled. Drug users were more than 3.5 more likely to be classified as sexual compulsives than drug non-users. Out of the 153 sexual compulsive individuals in this research, one fifth self-reported using drugs. Furthermore, sexual compulsives were more likely to use stimulant drugs (such as cocaine, speed, ecstasy), which is congruent with the finding of another research (Brown et al., 2005). Men and women who use methamphetamines are more likely to participate in sexual activities while using these drugs, than when using some other types of drugs (Brown et al., 2005). Other authors also confirmed relatively strong correlation between substance use and sexual compulsivity (i.e., Carnes, 1991; Nelson & Oehlert, 2008). Carnes (1991) found that 42% of sexual addicts were simultaneously addicted to another chemical substance, claiming that those who are addicted to drugs are regularly addicted

to alcohol as well. Nelson and Oehlert (2008) revealed sexual compulsivity comorbidity with substance abuse, especially cocaine, on a sample of veterans.

Conclusions

It was hypothesized that sexual compulsivity would be positively correlated with depression, negatively with low self-esteem, positively with anxiety, as well as with substance use. Results indicated the hypothesized significant correlations, but they all were very low. All the variables were considered in a model meant to discover whether it was possible to predict sexual compulsivity. Only three variables were found to be significant: drug use, alcohol consumption, and depression. The strongest predictor of sexual compulsivity was drug use, given the probability of more than 3.5 for those who use drugs to be classified as sexual compulsives. Alcohol consumption was also a significant predictor, making individuals who drink alcohol 2.37 more likely to be classified as sexual compulsives compared to their non-alcohol drinking counterparts. Depression was shown to be a significant predictor of sexual compulsivity but its contribution was far less than the contribution of alcohol and drug use. Similarly, anxiety was shown to be a weak predictor of sexual compulsivity, whereas smoking and self-esteem levels were not found to be significant. Alcohol and drug use were the strongest predictors of sexual compulsivity in the Serbian and Bosnian student population, which leads to the conclusion that problems young people encounter in their lives may be attempted to be overcome through alcohol- and drug-related (risky) behaviors, which then, in turn, might facilitate their likeliness to engage in risky sexual activities. These activities could serve as a strong risk-factor to develop more severe problems, such as sexual compulsivity, which is comorbid with other psychological disorders.

This study has several limitations. First of all, the sample consisted of students, so results cannot be generalized to a broader young population. Further research should include young people who work and are not involved in the process of higher education. Second, questions about drug use refer to illegal behavior, which students are not likely to report. A higher number of drug users is expected than it was obtained in this research. Further research could use more objective data to analyze relationship between sexual compulsivity and drug use and/or abuse. Third, this study only shows correlations between sexual compulsivity and other psychopathological phenomena, meaning that we do not know the exact causal relations between each these variables. Experimental research is needed to reveal whether sexual compulsivity leads to depression, low self-esteem levels, anxiety, and substance use or vice versa.

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