

Original Paper

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Attachment Style, Impulsivity, Sexual Desire, Mood, and Addictive Cybersex

Running title: Possible determinants of addictive cybersex

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Abstract

Background: Rising concerns have been reported related to problematic cybersex or cybersex addiction.

Objective: The aim of this study was to assess potential links between cybersex addiction and several psychological and psychopathological factors, including sexual desire, mood, self-esteem, attachment style, and impulsivity, by taking into account the age, sex, and sexual orientation of cybersex users.

Methods: An online survey was conducted in which participants were assessed for sociodemographic variables and with the following instruments: Compulsive Internet Use Scale adapted for cybersex use, Sexual Desire Inventory, Short Depression-Happiness Scale, Self-Esteem Scale, and UPPS-P scale for impulsivity. Attachment style was assessed with the Experiences in Close Relationships-Revised questionnaire (Anxiety and Avoidance subscales).

Results: A sample of 145 subjects completed the study. Cybersex addictive use was associated with male gender, depressive mood, higher levels of sexual desire, and avoidant attachment style, but not with impulsivity.

Conclusion: Addictive cybersex use is a function of avoidant attachment, sexual desire, and depressive mood.

Keywords: Attachment, cybersex addiction, Internet sex addiction, problematic cybersex, compulsive cybersex, Compulsive Internet Use Scale, Internet addiction, impulsivity, sexual desire, porn

Introduction

The Internet is widely used in everyday life, including for health-related queries [1-3] and sexual health-related purposes [4]. Cybersex is a common online behavior that refers to sexually oriented online activities that aim to provide erotic fulfillment or sexual gratification [5]. Cybersex includes various activities such as chatting, on-line dating, searching for off-line dates, three-dimensional sexual role playing, and use of webcam sex, virtual reality, and pornography.

Moderate use of cybersex may contribute to expansion of sexual knowledge and enhance offline intimate interactions and sexual communications with partners [6]. Similar to those who engage in other Internet-related behaviors such as gaming [7-9], however, some cybersex users may develop excessive patterns of use with possible negative consequences [10,11]. Excessive involvement in cybersex is usually described as excessive and poorly controlled use of Internet-based sexual activities that leads to problems or functional impairment and persists despite such difficulties [12,13]. No consensus has been achieved about the conceptualization of this disorder [10,14], although it is commonly considered to be cybersex addiction [15-18]. Nevertheless, as reported for other online problem behaviors [19], excessive cybersex is probably an umbrella term that refers to different types of cybersex activities (solitary Internet porn, sex webcams, etc.) and to different mechanisms [10,20]. Several studies have reported similarities between excessive cybersex behaviors and those related to addictive disorders, including reduction in executive control [21], association between subjective pornographic cue-related arousal and excessive online sexual activity [22,23], association between striatal cue reactivity and sexual desire [24], and subjective symptoms of cybersex addiction [25] and patterns of positive and negative reinforcement of online sexual behaviors [26]. Although it seems to be of scientific significance, cybersex addiction remains little examined [22]. In particular, factors related to the development and

maintenance of problematic cybersex use remain understudied [10]. This can partly be explained by the lack of consensus about such behavioral addictions.

Possible determinants of excessive cybersex use have nonetheless received preliminary attention. In some studies, for instance, men were shown to be more prone to excessive cybersex use than women were [27-31], and isolated online sexual behaviors seemed to be more common among men than among women, who were more prone to interactive forms of cybersex [16]. In concordance with other reports on behavioral addictions and excessive Internet use [7,32,33], several studies on the psychopathological correlates of excessive use of cybersex frequently described an association with psychiatric disorders such as depression [20,34]. In addition, in agreement with other studies on addictive Internet gaming [35], some studies suggested that excessive cybersex is at least partly a coping behavior that aims to regulate negative emotions [18,36]. It was furthermore [37] shown that the ratios of problematic pornography use is elevated in individuals with emotional insecurities such as anxious or avoidant attachment and traumatic souvenirs of the past. Insecure attachment such as ambivalent and avoidant attachment style [17] and anxious attachment [31] are associated with general excessive Internet use [17], as well as with intensive online sex use [31].

Sexual desire reflects the powers that lean a person toward or away from sexual behavior [38]. Yet, despite the importance of sexual desire as a determinant of sexual behaviors [20,39], studies on the association between sexual desire and cybersex are still lacking. Moreover, impulsivity is a transdiagnostic factor involved in addictive behaviors such as problem gaming [40] and Internet gambling [19]. Nonetheless, to date, the association between cybersex and impulsivity has also received little attention [18], and in those studies that have examined this association, mixed results were found. In some studies, lack of executive control [22,23] and impulsivity facets were associated with hypersexuality [41,42] or addictive cybersex [22,23]. In contrast, Wetterneck et al [28] did not find any differences

on impulsivity measures between problematic and non-problematic pornography use. A recent study [18] showed that negative urgency (the tendency to act impulsively when experiencing negative emotions) and negative affect interact together in predicting addictive cybersex, whereas no other associations were found with the other impulsivity dimensions assessed, such as lack of premeditation, lack of perseverance, or positive urgency (the tendency to act impulsively when experiencing positive emotions).

The aim of this study was to assess the links between cybersex addiction and several psychological and psychopathological factors, including sexual desire, mood, attachment style, and impulsivity, by taking into account the age, sex, and sexual orientation (heterosexual, homosexual, bisexual) of cybersex users.

Methods

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The sample consisted of users of cybersex sites and forums recruited online via advertising on specialized forums and websites. To be included, participants had to be more than 18 years old and to understand the language of the questionnaires. The participants gave online consent and then completed the questionnaires anonymously via SurveyMonkey links. The study protocol was approved by the Ethical Committee of the Geneva University Hospitals.

Instruments

Compulsive Internet Use Scale (CIUS) [43]

The CIUS consists of 14 items rated on a 5-point Likert scale from 0 (never) to 4 (very often). The scale involves items related to different aspects of addictive behaviors such as loss of control, preoccupation, withdrawal, coping, and conflict. In different samples and linguistic validations of the CIUS, a 1-factor solution was repeatedly retained as the best fit model [44-48]. The items of the CIUS ask about general use of the Internet (ie, “Do you find it difficult to stop using the Internet when you are online?”). In order to specifically assess cybersex activities, we asked participants to answer the questions while keeping in mind that the word

“Internet” specifically refers to cybersex use. The CIUS and other Internet addiction scales have previously been successfully adapted (without alterations of the psychometric properties) to assess Internet gaming, Internet gambling [49], and online sexual activities [50].

Sexual Desire Inventory (SDI)

Consisting of 14 items on a Likert scale, the SDI was used to evaluate sexual desire [51].

Higher SDI scores reveal higher sexual desire.

Short Depression-Happiness Scale (SDHS)

The SDHS was used to evaluate mood variation from depression to happiness during the last 7-day period. It consists of 6 items, 3 positive and 3 negative, rated on a 4-point Likert scale from never (0) to often (3). The lower the score, the higher the depressive symptoms [52].

Experiences in Close Relationships-Revised (ECR-R) questionnaire [53,54]

This questionnaire was used to evaluate attachment style. The inventory includes 18 items for anxious attachment (characterized by possessive love and fear of loss) and 18 items for avoidant attachment (characterized by fear of romantic love and low relationship success). The items are rated on a 7-point Likert scale from 1 (completely disagree) to 7 (completely agree).

UPPS-P

The UPPS-P [55], in its short 20-item version [56], is used to measure impulsivity according to 5 dimensions: positive urgency (strong reactions while experiencing intense positive emotions), negative urgency (strong reactions while experiencing intense negative emotions), lack of premeditation (tendency to disregard the consequences before acting), lack of perseverance (difficulty staying focused on a difficult or boring task), and sensation seeking. Responses are rated on a 4-point Likert scale ranging from 1 (strongly agree) to 4 (totally disagree).

Self-esteem scale

This 1-item scale was used to measure self-esteem [57].

Sociodemographic characteristics and sexual orientation (heterosexual, homosexual, and bisexual) were also assessed.

Analyses

To assess the variables associated with a high score on the CIUS, we performed a mixed linear model. The dependent variable was the CIUS score and the independent variables were sex, sexual orientation, the SDI score, self-esteem, the UPPS-P subscales, the SDHS score, and the ECR-R subscales. An interaction term between sex and sexual orientation was also included in the model. Because there were 19 missing values, age was included in the model, but the bivariate association between age and the CIUS score did not reach statistical significance.

This type of model is suitable for correlated measurements (McCulloch, Searle & Neuhaus, 2008), as it accounts for the lack of independence of the observations because the data come from 2 different linguistic populations; therefore, language was modeled as a random effect.

Residual analyses and collinearity diagnostics showed that the tested model is valid regarding statistical assumptions. The mixed linear model was used to predict CIUS scores.

Results

The recruitment procedure resulted in 761 people clicking on the link to participate in the study, 605 giving their consent. After we removed cases with missing data, the final sample included 145 participants.

The sample was composed of 60% men (n=87) and 40% women (n=58). Regarding marital status, 37.9% of the participants were celibate (n=55), 39.3% (n=58) in a relationship or not

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married, 20.7% (n=30) in a relationship or married, and 2.1% (n=3) widows or widowers.

Sexual orientation and sexual orientation linked to sex were also measured: 77.9% (n=113) of the participants reported being heterosexual, 7.6% (n=11) homosexual, and 14.5% (n=21) bisexual. Among men, 79.3% (n=69) reported being heterosexual, 6.9% (n=6) homosexual, and 13.8% (n=12) bisexual, and among women, 75.9% (n= 44) reported being heterosexual, 8.6% (n=5) homosexual, and 15.5% (n=9) bisexual.

The results of the mixed linear model are reported in Table 1. Gender (male), higher SDI scores, lower SDHS scores (meaning more depressive scores), and higher avoidance styles were significantly associated with higher CIUS scores.

Discussion

The aim of this study was to assess the links between cybersex addiction and possible determinants of such behavior, namely, sexual desire, mood, attachment style, and impulsivity, by taking into account the age, sex, and sexual orientation of cybersex users. We concluded that addictive cybersex use, as assessed by the CIUS adapted for sexual activities online, is associated with depressive mood, sexual desire, an avoidant style of attachment, and male gender. Sexual orientation, UPPS-P impulsivity subscores, and self-esteem do not have a significant influence on addictive cybersex.

Our finding of an association between addictive cybersex use and depressive mood is congruent with other findings that showed the importance of links between addictive cybersex and diverse assessments of psychological distress and depression [20,23,34]. This finding is also in line with other reports of the association between excessive Internet gaming [58] or Internet gambling [19] and depression. Such associations suggest that excessive cybersex is at least partly a coping behavior that aims to regulate negative emotions [18,35,36,41,59]. This finding opens the debate, as has occurred for other Internet addictive-like behaviors, about an appropriate diagnostic framework [14] and adequate understanding of such an association

[60]. The possible development of psychopathological distress and depression secondary to the negative impact of addictive cybersex (interpersonal isolation, reduction of offline sexual activities) cannot be ruled out [61] and thus, further prospective studies are warranted.

Sexual desire is an important drive of sexual behavior and is positively associated with emotional intimacy [62]. In the present study, elevated sexual desire was associated with addictive cybersex use. This finding is consistent with the gratification hypothesis [23] and with previous findings showing an association between cybersex use and arousal and craving for specific porn cues [63]. The results suggest that at least part of excessive cybersex use is linked to positive reinforcement. Sexual desire is also known for its modification related to depressed mood [64]. Possible fluctuations between mood modification, sexual desire, and cybersex use could be assessed in future studies by using methods that are based on ecological momentary assessment [65].

We also found an association between cybersex addictive use and avoidant attachment but not anxious attachment. These results are congruent with those of other studies showing the implications of insecure attachment in excessive Internet use [17] and cybersex [31,37,66]. Beutel and colleagues [31] found an increase in the intensity of Internet sex use with the importance of anxious attachment. Their results failed, however, to reach statistical significance for the link between the importance of Internet sex use and avoidant attachment. Such differences could possibly be explained by differences in cybersex use assessment methods. In fact, the Beutel et al study used more items related to cybersex use (eg, “I have searched for sexual materials online...”) and only 2 items related to online sexual compulsivity (ie, “I believe that I am an Internet sex addict”; “I have promised myself to stop using the Internet for sexual purposes”). Items were furthermore on a dichotomous scale (true or false), which may limit the ability to detect variability. The association found with avoidant attachment could be explained by displeasure and fear of close relationships, which lead to an

increase in cybersex activities that less involve closeness in relationships. In the present study, the lack of association between addictive cybersex and anxious attachment style was possibly due to the limitations in sample size. One could hypothesize differences in attachment style across specific online sexual activities (ie, anxious attachment may have more online interactions with potential partners because of anticipated fear of rejections). Further studies should assess specific cybersex activities in more detail. Despite such differences across studies, insecure attachment styles play an important role in cybersex addiction. As suggested elsewhere [17], such findings deserve clinical investigation and treatment of attachment style for patients who are highly involved in cybersex use.

The present study also showed an association between addictive cybersex and male gender, as has repeatedly been found [27-31]. Sexual orientation had no effect, however, on the assessed behavior. Similarly, no effect was found in the interactions with gender sexual orientation. Sexual orientation was assessed, however, in only 3 main categories (heterosexual, bisexual, homosexual). Further studies should assess sexual orientation in detail by taking into consideration, for instance, disturbances related to gender identity.

Impulsivity and cybersex addiction were not significantly associated in our study. These results are similar to those of Wetterneck et al [28] and Wery et al [18]. Using the same UPPS-P scale, the latter study showed that among the 5 UPPS-P facets, negative urgency interacted with negative affects in predicting addictive cybersex. The results of the present study, however, contrast those of other studies regarding the links between the UPPS-P and Internet-related addictive behaviors [19,40]. Impulsivity is probably not a main determinant of cybersex addictive use. However, we cannot exclude the possibility of modifications in executive functions when an individual faces specific cybersex cues [21] or during interactions with negative states and cybersex use [18].

Finally, self-esteem had no impact on CIUS scores. This result contradicts those of other studies that show, for instance, an association between low self-esteem and adolescent sexting (sharing sexual photos) [67]. These differences between studies may be due to sample characteristics or to participants' specific online activities.

Limitations

Several limitations of the study must be considered. The sample was relatively small but adequate for the study statistics. The sample was furthermore exposed to self-selection biases [68]. The cross-sectional design did not allow assessment of longitudinal interplay between the assessed variables. Furthermore, the study did not take in consideration the different cybersex activities that could influence cybersex use across different activities and cybersex communities. Finally, there is no consensus related to cybersex addiction, and thus the study used the CIUS adapted to cybersex as a proxy. Using a continuous approach rather than a categoric one, however, allows assessment of some determinants of the intensity of addictive cybersex use with an adequate research instrument related to addictive use of Internet-delivered services.

Conclusion

Addictive cybersex is influenced by sexual desire, an avoidant style of attachment, and depressive mood. Males are at increased risk. Self-esteem and impulsivity do not seem to have a significant influence on addictive cybersex.

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Conflicts of Interest

None declared.

Abbreviations

CIUS: Compulsory Internet Use Scale

ECR-R: Experiences in Close Relationships-Revised

SDHS: Short Depression Happiness Scale

SDI: Sexual Desire Inventory

UPPS-P: UPPS Impulsive Behavior Scale

Table 1: Results of the mixed linear model.^a

Characteristics and Measures		Regression Coefficient	Standard Error	<i>t</i> Value	<i>P</i> Value
Female					
		-3.82	1.75	-2.18	.031
Sexual orientation					
	Homosexual	0.08	3.67	0.02	.983
	Bisexual	-1.37	2.61	-0.52	.601
Interaction					
	Female: Homosexual	1.62	5.58	0.29	.772
	Female: Bisexual	5.81	4.13	1.41	.162
SDI^b					
		0.11	0.04	2.48	.014
Self-esteem					
		-0.68	1.00	-0.67	.501
UPPS-P ^c					
	Positive Urgency	0.19	0.33	0.57	.570
	Negative Urgency	-0.15	0.37	-0.39	.694
	Lack of Premeditation	0.31	0.34	0.92	.359
	Lack of Perseverance	-0.07	0.36	-0.20	.840

	Sensation Seeking	0.07	0.30	0.25	.805
SDHS^d					
		-0.85	0.22	-3.95	.000
ECR-R^e					
	Anxiety	-0.56	0.70	-0.81	.420
	Avoidance	2.20	0.79	2.79	.006

^aBoldface represents...

^bSDI: Sexual Desire Inventory

^cUPPS-P: UPPS Impulsive Behavior Scale

^dSDHS: Short Depression Happiness Scale

^eECR-R: Experiences in Close Relationships-Revised

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