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FULL-LENGTH REPORT

Co-occurring compulsive sexual behaviour in an inpatient substance use population: Clinical correlates and influence on treatment outcomes

LINDSEY A. SNAYCHUK[1,3], SARAH S. DERMODY[1], NASSIM TABRI[2], CHRISTINA A. BASEDOW[3] and HYOUN S. KIM[1,4*]

[1] Department of Psychology, Toronto Metropolitan University, Toronto, Canada

[2] Department of Psychology, Carleton University, Ottawa, Canada

[3] EHN Canada, Toronto, Canada

[4] Department of Psychology, University of Calgary, Calgary, Canada

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ABSTRACT

Background and Aims: Many individuals with substance use disorders (SUDs) present with co-occurring mental health disorders and other addictions, including behavioral addictions (BAs). Though several studies have investigated the relationship between SUDs and BAs, less research has focused specifically on compulsive sexual behaviour (CSB). Given that poly-addiction can hinder treatment outcomes, it is necessary to better understand the impact of co-occurring CSB and SUD. Therefore, the current study aimed to 1) determine the rate of CSB in a sample seeking treatment for SUDs, 2) identify demographic and clinical correlates of co-occurring CSB, and 3) to determine if co-occurring CSB impacts treatment outcomes for SUD. *Methods:* Participants were 793 adults (71.1% men) ranging in age from 18–77 (M = 38.73) at an inpatient treatment facility for SUDs who were assessed for CSB upon admission into treatment. Participants completed a battery of questionnaires upon admission and at discharge to assess psychological and addiction symptoms. *Results:* Rates of CSB were 24%. Younger age and being single were associated with greater CSB. Mental distress and addiction symptoms were higher in participants with CSB. Predictors of CSB severity included greater symptoms of traumatic stress and interpersonal dysfunction. Rates of treatment completion were similar between participants with and without CSB. *Discussion and Conclusions:* These results highlight several clinical and demographic correlates of CSB amongst individuals in treatment for SUD. However, CSB was not associated with poorer treatment outcomes. Further identifying characteristics associated with CSB can help clinicians identify individuals who may be at higher risk.

KEYWORDS

addiction, substance use, compulsive sexual behaviour, treatment

INTRODUCTION

Substance use disorders (SUDs) commonly co-occur with a variety of other psychiatric conditions. For example, amongst those with an SUD, the odds of having a co-occurring mental health condition were fivefold (Rush et al., 2008). Another study found that 50% of people with SUD had at least two other co-occurring mental health conditions (Forman-Hoffman, Batts, Hedden, Spagnola, & Bose, 2018), with the most common co-occurring mental health disorders with SUDs being major depressive disorder (MDD; Blanco et al., 2012; Forman-Hoffman et al., 2017; Hunt, Malhi, Lai, & Cleary, 2020), generalized anxiety disorder (GAD; Conway, Compton, Stinson, & Grant, 2006; Forman-Hoffman et al., 2017), and posttraumatic stress disorder (PTSD; Forman-Hoffman et al., 2018; Schäfer & Najavits, 2007).

*Corresponding author.
E-mail: andrewhs.kim@torontomu.ca

Many individuals diagnosed with an SUD also experience at least one other addictive disorder, which can include both psychoactive substances and behavioral addictions (Bhalla, Stefanovics, & Rosenheck, 2017; John et al., 2018; McCabe, West, Jutkiewicz, & Boyd, 2017). The co-occurrence of substance and behavioral addictions (BAs) is not surprising given the similar etiology and clinical features of substance and behavioral addictions (Grant, Potenza, Weinstein, & Gorelick, 2010). Of importance to the present study, one of the more common BAs in individuals with SUDs is compulsive sexual behaviour (CSB; Derbyshire & Grant, 2015).

Compulsive sexual behavior and comorbidity with substance use disorders

CSB is characterized by patterns of impulsive and "out of control" sexual behaviours. Compulsive sexual behaviour disorder (CSBD) is classified as an impulse control disorder in the eleventh version of the International Classification of Diseases (ICD-11; World Health Organization, 2019). Per the diagnostic criteria in the ICD-11, individuals with CSBD typically report persistent failure to control strong, repetitive sexual impulses or urges which results in impulsive sexual behaviour over a period of at least six months. Symptoms of CSBD include disruptive sexual activity that interferes with functioning and unsuccessful attempts to reduce the behaviour despite marked consequences (World Health Organization, 2019). CSBD can manifest in different ways such as through sexual activity with others, masturbation, and pornography use. Despite being included as an impulse control disorder in the ICD-11, CSB is commonly conceptualized as a BA (Grubbs et al., 2020; Stark, Klucken, Potenza, Brand, & Strahler, 2018). The sexual addiction model posits that CSB is accompanied by preoccupation, loss of control, and despair (Carnes, 2001). Although epidemiological and population-level studies of CSB are limited, Briken et al. (2022) found that 4.9% of men and 3.0% of women reported lifetime experience with CSB in a large (n = 4,633) representative German sample. Further, a systematic review of the last 25 years of literature on CSB found that prevalence estimates ranged from 4.4% to 18.3% in men and from 1.2% to 7% in women (Grubbs et al., 2020), suggesting that CSB may be a relatively common BA.

CSB is a putative BA and findings suggest high rates of co-occurrence with SUDs, with estimates as high as 71% (Ballestar-Arnal et al., 2020; Derbyshire & Grant, 2015; Najavits, Lung, Froias, Paull, & Bailey, 2013). Though more limited, a small number of studies have also specifically evaluated the rates of comorbidity of CSB and SUD amongst treatment-seeking populations, with rates of co-occurrence ranging from 21% to 42% (Carnes, 2001; Denke et al., 2015; Hartman, Ho, Arbour, Hambley, & Lawson, 2012; Stavro, Rizkallah, Dinh-Williams, Chiasson, & Potvin, 2013). Furthermore, being diagnosed with multiple SUDs may place an individual at higher risk of being diagnosed with CSB (Antonio et al., 2017; Konkolÿ Thege, Hodgins, & Wild, 2016), suggesting that poly-addiction may be associated with an increased likelihood of CSB comorbidity.

CSB and SUD share many key features that may help explain the high rate of their co-occurrence (Efrati, Kraus, & Kaplan, 2021). For instance, aggression, emotion dysregulation, pleasure-seeking, and impulsivity are shared underlying mechanisms of both CSB and SUD (Cashwell, Giordano, King, Lankford, & Henson, 2017; Dingle, Neves, Alhadad, & Hides, 2017; Elmquist, Shorey, Anderson, & Stuart, 2015; Kennett, Matthews, & Snoek, 2013; Kingston & Bradford, 2013). Both disorders are also associated with psychiatric comorbidity and elevated rates of mental distress (Lozano, Rojas, & Fernández Calderón, 2016; Scanavino et al., 2013). For example, Brem, Shorey, Anderson, and Stuart (2017) studied a sample of participants admitted to residential treatment for SUD and found that both anxiety and depressive symptoms were associated with co-occurring SUD and CSB. Though research on the specific risk factors for co-occurring SUD and CSB is limited, factors implicated as predictors of poly-addiction broadly include male gender (Edwards, Vowles, & Witkiewitz, 2017; Konkolÿ Thege et al., 2016) and unemployment (Hartman et al., 2012). Moreover, studies also suggest that mood disorders, such as depression, are risk factors for poly-addiction (Jongenelis, Pettigrew, Lawrence, & Rikkers, 2019).

Influence of compulsive sexual behavior on substance use outcomes

Research generally suggests positive effects of inpatient treatment for a variety of SUDs including alcohol, cannabis, and opioids (American Addiction Centers, 2019; Giovannetti, Garcia Arce, Rush, & Mendive, 2020; Shumway, Bradshaw, Harris, & Baker, 2013; Snaychuk et al., 2023, 2024). However, paralleling findings that comorbidity of mental health and addictions have a deleterious influence on SUD treatment outcomes (Rush, Urbanoski, Bassani, Castel, & Wild, 2010; SAMHSA, 2009), there is some evidence to suggest that co-occurring SUD and CSB is associated with poorer treatment outcomes. For example, one narrative review highlighted the evidence suggesting that co-occurring SUD and CSB is associated with greater risk of relapse (Schneider & Irons, 2001). On the other hand, Hartman et al. (2012) compared outcomes between participants diagnosed with CSB to those diagnosed with comorbid SUD and CSB receiving treatment at an inpatient facility and found that both groups experienced decreases in addiction symptoms and increases in quality of life at a six-month follow-up, suggesting that there were no differences between groups. Given the conflicting results, there is a need to further examine the potential impact of co-occurring CSB on SUD outcomes. Indeed, further elucidating the impact of CSB on SUD outcomes may help in designing integrated treatments that target both.

In summary, the extant literature suggests a high rate of co-occurrence between SUDs and CSB. Unfortunately, however, little is known about the associated factors and predictors of this comorbidity. This is particularly true in clinical populations, as most of the research has been conducted using general population samples, limiting the

clinical utility of previous findings on the comorbidity between CSB and SUD. Further, very few studies have investigated the influence of co-occurrence of CSB with SUD on treatment outcomes. Given the gaps identified in the literature, the aims of the proposed study were threefold: (i) to determine the rate of CSB in individuals with SUD, (ii) to identify clinical and demographic correlates of co-occurring SUD and CSB, and (iii) to determine whether comorbid CSB influences treatment outcomes for SUD. The clinical constructs (described below) examined in this study as potential correlates of co-occurring SUD and CSB were selected as they are some of the more salient risk factors for both SUD and CSB. Given the limited body of research on treatment outcomes associated with co-occurring CSB and SUD, this study was exploratory.

METHODS

Participants

The current study used secondary data from 793 adults admitted to a residential treatment program for SUDs between 2019 and 2022 at Edgewood Treatment Centre. Men comprised 71.1% of the sample. Participants' ages ranged from 18 to 77 years, with an average age of 38.73 (SD = 11.48). Most participants were employed (77.7%) and were single or separated/divorced (71.8%). All participants had a diagnosis of at least one SUD, with the most common primary diagnosis being alcohol use disorder (64.9%), followed by stimulant use disorder (14.4%), opioid use disorder (9.1%), and cannabis use disorder (5.5%).

Measures

Compulsive sexual behaviour. The Sex Addiction Screening Test - Revised (SAST-R; Carnes, 2010) is a 45-item (α = 0.92) measure used to assess compulsive sexual behaviour (i.e., sex addiction) based on the sexual addiction model of CSB. Assessment domains on the SAST-R include preoccupation about sex, loss of control, interpersonal disturbances, and affect disturbances. Twenty yes/no questions comprise the 20-core item scale with a clinical cut-off of six. This cut-off was established as it yielded the highest classification accuracy in detecting the four core addiction dimensions (Carnes, Green, & Carnes, 2010). The SAST-R was administered upon admission (α = 0.92).

Addiction symptoms. The Leeds Dependence Questionnaire (LDQ; Raistrick et al., 1994) is a 19-item self-report measure used to assess dependency on substances. Questions on the LDQ are scored on a four-point response scale ranging from 0 (never) to 3 (almost always). Scores on the LDQ can range from 0 to 30 with higher scores indicating greater dependence on substances. The LDQ was administered at the time of admission (α = 0.94) and again at the time of discharge (α = 0.93).

The Craving Experience Questionnaire - Severity (CEQ-S11; May et al., 2014) is a 22-item self-report measure used to assess the strength and frequency of substance cravings. Participants are asked to respond to questions about their craving or desire for their substance or behaviour of choice. Questions on the CEQ-S11 are measured on an 11-point response scale, with responses ranging from 0 (not at all) to 10 (extremely/constantly). The CEQ-S11 was administered upon admission (α = 0.97) and at the time of discharge (α = 0.98).

Trauma. The Posttraumatic Stress Disorder Checklist - Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993) is a 17-item self-report questionnaire used to assess posttraumatic stress symptoms in the general population. Questions on the PCL-C are scored on a five-point Likert-style scale ranging from 1 (not at all) to 5 (extremely). Items were summed to produce a total score. Scores on the PCL-C can range from 17–85. The PCL-C was administered upon admission (α = 0.93) and at the time of discharge (α = 0.92).

Depressive symptoms. The Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001) is a 9-item self-report measure used to assess symptoms of depression. Questions on the PHQ-9 are scored on a 4-point response scale, with responses ranging from 0 (not at all) to 3 (nearly every day). The PHQ-9 was administered upon admission (α = 0.89) and at the time of discharge (α = 0.86).

Anxiety. The Generalized Anxiety Disorder 7-Item (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) is a 7-item self-report measure used to assess symptoms of generalized anxiety. Questions on the GAD-7 are scored on a 4-point response scale, with responses ranging from 0 (not at all) to 3 (nearly every day). The GAD-7 was administered upon admission (α = 0.91) and at the time of discharge (α = 0.89).

Emotion dysregulation. The Difficulties in Emotion Regulation Scale (DERS-18; Victor & Klonsky, 2016) is an 18-item self-report measure used to assess multiple dimensions of emotion dysregulation. Questions on the DERS-18 are measured on a 5-point Likert scale, ranging from 1 (almost never) to 5 (almost always). The DERS-18 includes both positively and negatively worded statements. The DERS-18 was administered upon admission (α = 0.91) and at time of discharge (α = 0.91).

Treatment outcomes. Treatment outcomes were assessed using a combination of descriptive statistics and standardized assessments. First, discharge information from the participants' medical records was used to determine dropout and retention. The Outcome Questionnaire (OQ-45; Lambert, Gregersen, & Burlingame, 2004) is a 45-item tool to assess functional impairment across three domains including symptom distress, interpersonal relations, and social role. Questions on the OQ-45 are scored on a 5-point response scale, with responses ranging from 0 (never) to 4 (always). Scores on the OQ-45 can range from 0–180 and total scores can be obtained by summing all items across

domains. The OQ-45 was administered upon admission ($\alpha = 0.94$) to treatment and at discharge ($\alpha = 0.93$).

Procedure

All participants completed an average of 50 days ($SD = 2$) of inpatient treatment. Treatment utilized an integrative bio-psycho-social approach using evidence-based modalities including cognitive behavioural therapy, dialectical behavioural therapy, motivational interviewing, and 12-step groups. Each week, participants received two hours of individual treatment, four hours of group therapy, and five hours of psychoeducation.

Within the first two days of the program, each participant completed a battery of standardized questionnaires on electronic tablets related to their mental health and addiction symptoms. All participants were evaluated by a psychiatrist and physician upon admission into treatment, and psychiatric medications were prescribed as needed. Patients at the treatment centre who were detoxing from substances completed a detox program prior to beginning their inpatient programming and completing the assessments. These questionnaires were completed again within two days of discharge for pre-post evaluation of symptoms.

Statistical analysis

Aim i. Data analysis was carried out in SPSS version 28 and Mplus version 8.2. SPSS was used to carry out frequency and descriptive statistics as well as univariate analyses. Mplus was used for multivariate analyses to allow for the inclusion of participants with missing data in the analyses using Full Information Maximum Likelihood. Less than 2% of participants were missing data at admission (time 1) and 25% of participants were missing data at discharge (time 2). Frequency statistics and associated 95% confidence intervals were used to examine the rate of CSB (6+ on the SAST-R) and treatment completion in the sample. Descriptive statistics were also computed to obtain total CSB severity scores on the SAST-R.

Aim ii. Univariate analyses were conducted to examine the demographic and clinical correlates of CSB. Categorical data comparisons were carried out using Chi-square analyses and Fisher's exact tests in cases where expected cell counts were less than five. For continuous variables, both Mann-Whitney U and independent samples *t* tests were used depending on whether each variable violated the assumption of normality. Rank-biserial correlation coefficient effect sizes are reported for Mann-Whitney *U* tests, and Cohen's *d* effect sizes are reported for independent samples *t* tests. Next a linear regression was used to determine the demographic and clinical predictors of CSB. Only variables that attained a *p*-value of 0.05 or less from the univariate analyses were included in the regression model. Unstandardized beta value effects are reported for each significant predictor.

Aim iii. Finally, clinical outcomes using change scores on functional impairment and substance dependence using several linear regression analyses. The independent variable in all models was CSB (SAST-R) scores and the dependent variable was the change score of a given outcome (i.e., time 2 minus time 1). In the first regression analysis, the dependent variable was a difference score indexing the change on functional impairment scores from admission (time 1) to discharge (time 2). Three additional analyses were carried out for each subscale of the OQ-45 (symptom distress, interpersonal relations, social role). In the final model, the dependent variable was the change score for substance dependence. Each of the above regression analyses were carried out a second time including demographic variables (age, gender, marital status, employment status) as covariates. Approximately 25% of participant data were missing across discharge measures due partly to attrition, and partly to missed assessment administration.

Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. Ethical approval for secondary use of the present data was obtained from both the Vancouver Island University and Toronto Metropolitan University Research Ethics Boards.

RESULTS

Aim i

Twenty-four percent ($n = 190$; 95% CI [0.21, 0.27]) of the sample met the cut-off (6+) for CSB on the SAST-R. Total CSB scores on the SAST-R ranged from 0–18 (out of a possible 20), with an average total score of 3.47 ($SD = 4.27$) (See Table 1).

Aim ii

Univariate analyses revealed several correlates of CSB. In terms of demographic factors, participants with CSB tended to be younger in age ($r = -0.09$). However, there were no statistically significant gender differences between participants with CSB (24.2% men, 22.3% women) and without CSB (75.5% men, 77.7% women). Also, there were no statistically significant differences between groups for marital status or employment status.

Participants with CSB endorsed greater scores across all clinical measures. Specifically, participants with CSB had higher total scores on measures of addiction symptoms including substance dependence ($r = 0.12$) and cravings ($r = 0.16$). Participants with CSB scored higher functional impairment overall ($d = 0.62$) and across the three subscales which include: symptom distress ($d = 0.53$), social role ($r = 0.21$), and interpersonal relations ($r = 0.25$). Participants with CSB also scored higher on emotion dysregulation ($r = 0.22$), and measures of mental distress including trauma symptoms ($r = 0.25$), anxiety ($r = 0.23$), and depressive symptoms ($r = 0.18$). Full results can be found in Table 1. The linear regression model accounted for

Table 1. Univariate analyses examining demographic and clinical correlates of CSB

Characteristics	No CSB (SAST-R < 6) (n = 603)				CSB (SAST-R 6+) (n = 190)				Test statistic	p
	N	%	*M*(*SD*)	*Median* (*SE*)	*N*	%	*M*(*SD*)	*Median* (*SE*)		
Age				38.00 (0.48)				35.00 (0.75)	U = 50196.0	**0.013**
Gender									$\chi2$ = 0.45	0.502
Man	425	75.5			138	24.5				
Woman	178	77.7			51	22.3				
Marital status									$\chi2$ = 1.7	0.427
Single	339	74.5			116	25.5				
Partnered	255	78.5			70	21.5				
Widowed	8	72.2			3	27.3				
Employment status									$\chi2$ = 0.32	0.852
Employed	465	76.5			143	23.5				
Unemployed	90	75.6			29	24.4				
Other	41	73.2			15	26.8				
Substance dependence total				17.00 (0.45)				20.00 (0.75)	U = 67797.5	**<0.001**
Substance cravings total				94.50 (3.74)				137.00 (5.31)	U = 67652.0	**<0.001**
Functional impairment total			78.50 (23.44)				93.66 (25.52)		t = −7.61	**<0.001**
Symptom distress total			43.73 (14.34)				51.74 (15.52)		t = −6.58	**<0.001**
Social role total				15.00 (0.18)				18.00 (0.43)	U = 73898.5	**<0.001**
Interpersonal relations total				21.00 (0.33)				25.00 (0.56)	U = 73898.0	**<0.001**
Posttraumatic stress total				45.00 (0.60)				56.00 (1.08)	U = 76834.0	**<0.001**
Anxiety total				10.00 (0.24)				14.00 (0.43)	U = 74391.0	**<0.001**
Depression total				11.00 (0.30)				15.00 (0.55)	U = 70227.0	**<0.001**
Emotion dysregulation total				48.00 (0.60)				56.00 (1.08)	U = 74065.5	**<0.001**

Note. SAST-R = Sex Addiction Screening Test - Revised. Fisher's Exact test was used as expected cell counts were <5. p = level of significance. N = absolute values. % = relative values. M = mean. SD = Standard deviation. U = Mann-Whitney U test. χ^2 = chi-square test. Missing data: Age N = 1, Gender N = 1, Marital status N = 2, Employment status N = 10, Substance dependence N = 10, Substance cravings N = 14, Anxiety N = 9, Depression N = 9, Emotion dysregulation N = 3. Bold denotes significance at the p < 0.05 level.

12.5% (R^2) of the variance in CSB symptoms. Two predictors, scores on the interpersonal relations subscale of the OQ-45 and posttraumatic stress scores, made significant (p < 0.05) contributions to the model (see Table 2 for detailed results).

Aim iii

Regarding treatment outcomes, a total of 87.3% of participants in the sample successfully completed treatment. There were no significant differences in rates of treatment completion between participants with CSB (83.7%) and those without (88.4%). In the linear regression analysis, CSB severity predicted greater reduction in functional impairment scores (B = −0.23), the interpersonal relations subscale (B = −0.41), and the social role subscale (B = −0.28) (see Table 3). These results remained the same when statistically controlling for demographic variables. Lastly, CSB severity was not predictive of change in average substance dependence scores (see Table 4).

DISCUSSION

In the current study, 24% of the sample met the criteria for CSB as per the established clinical cut-off (6+) using the SAST-R. This finding is consistent with previous research suggesting that rates of co-occurring SUD and CSB in treatment-seeking populations range from 21% to 42% (Carnes, 2001; Denke et al., 2015; Hartman et al., 2012; Stavro et al., 2013). Interestingly, when comparing the present rate of CSB to rates of other BAs that co-occur with SUDs, it appears to be higher than other BAs such as gambling disorder, for which comorbidity estimates are approximately 14% (Cowlishaw, Merkouris, Chapman, & Radermacher, 2014). Consequently, the result of the present study suggests a greater need to implement screening into residential SUD programs for CSB, given it may be relatively frequently comorbid amongst people living with SUD.

The present study also examined several demographic characteristics of CSB. However, younger age was the only

Table 2. Linear regression analysis examining predictors of CSB severity

Model coefficient	CSB severity			
	B	SE(*B*)	β	*p*
Age	<0.01	<0.01	−0.78	0.433
Interpersonal relations average	0.07	0.02	3.80	**0.001**
Symptom distress average	−0.04	0.03	−1.24	0.214
Social role average	0.02	0.02	0.97	0.334
Posttraumatic stress average	0.04	0.01	3.25	**0.001**
Emotion dysregulation average	0.02	0.02	1.09	0.275
Anxiety average	0.02	0.02	0.98	0.325
Depression average	−0.02	0.02	−1.19	0.233
Substance dependence average	<0.01	0.01	0.12	0.901
Substance cravings average	<0.01	<0.01	−0.78	0.302

Note: $N = 793$. Bold denotes significance at the $p < 0.05$ level.

Table 3. Three linear regression analyses examining CSB scores as a predictor of change on functional impairment (OQ-45) subscales

Predictor	Social role			Interpersonal relations			Symptom distress		
	B	SE	*p*	*B*	SE	*p*	*B*	SE	*p*
Intercept	−0.55**	0.03	<0.001	−0.51**	0.03	<0.001	−0.63**	0.02	<0.001
CSB	−0.28*	0.14	0.042	−0.41**	0.14	0.004	−0.16	0.12	0.191
R^2	0.01						0.00		
N	793			793			793		

Note: OQ-45 = Outcomes Questionnaire. Regression coefficients are unstandardized.
*$p < 0.05$, **$p < 0.01$. $N = 793$.

Table 4. Two linear regression analyses examining CSB scores as a predictor of change in functional impairment and substance dependence score changes

Predictor	Functional impairment			Substance dependence		
	B	SE	*p*	*B*	SE	*p*
Intercept	−0.58**	0.02	<0.001	−1.48**	0.04	<0.001
CSB	−0.23*	0.12	0.044	−0.35	0.21	0.098
R^2	0.01			0.01		
N	793			793		

Note: OQ-45 = Outcomes Questionnaire. Regression coefficients are unstandardized.
*$p < 0.05$, **$p < 0.01$. $N = 793$.

factor associated with CSB. This is not particularly surprising given that younger age is linked to both SUDs (Glantz et al., 2020) and CSB (Clemente et al., 2017). Interestingly, CSB was not linked to single relationship status or unemployment in the present study. This suggests that the current sample of participants may not be representative of the broader literature. Specifically, it might suggest that private residential treatment-seeking samples have different characteristics. For example, our sample contains a greater proportion of individuals who are married and employed given the high cost of attending residential treatment. There were also no differences in the rates of CSB between genders. This is surprising, given that the literature suggests that men tend to endorse CSB at a much higher rate than women in the general population (Kowalewska, Gola, Kraus, & Lew-Starowicz, 2020), as well as treatment-seeking populations (Stavro et al., 2013). However, to our knowledge, there are no studies that have examined co-occurring SUD and CSB in women specifically, so our understanding of the rates of co-occurrence is limited. Further, it is possible that rates of CSB in women are higher in the present sample compared to the general population due to all participants having an SUD, which may place them at higher risk for developing CSB given that previous studies suggest that individuals with SUDs are more likely to have co-occurring BAs (Di Nicola et al., 2015). Women may be less likely to disclose symptoms of CSB due to stigma and biases related to sexuality (Dickenson, Gleason, Coleman, & Miner, 2018; Ferree, 2001). Therefore, further research is needed to better understand the potential confounding variables impacting the relationship between gender and CSB in general, and specifically amongst individuals with SUDs.

When comparing addiction symptoms between groups, scores tended to be more severe in SUD patients with CSB. Specifically, participants with CSB endorsed a significantly greater degree of substance dependence compared to those without. Moreover, substance cravings were more than 30% higher amongst individuals with CSB. Taken together, the

present findings suggest that co-occurring CSB is linked to more severe symptoms of addiction amongst individuals with SUDs. One possible explanation for this finding is related to the theory of "cross-addiction," which suggests that individuals who engage with multiple addictive behaviours may switch between them, potentially resulting in increased or exacerbation of associated addiction symptoms (Reid & Meyer, 2016). Further, it is possible that some individuals may be more likely to report engaging in CSB within the context of substance use. For example, engaging in impulsive sexual behaviour when under the influence of substances or exchanging sex for substances. Though the literature on co-occurring CSB and SUD is limited, we can refer to literature on the impact of simultaneous use broadly which suggests that it is associated with greater symptoms of addiction (Bravo et al., 2021; Linden-Carmichael, Stamates, & Lau-Barraco, 2019). For example, the use of substances while engaging in sex or to facilitate sex (i.e., chemsex), is linked to greater harm, such as risky sexual behaviour (Leigh & Stall, 1993; Sewall et al., 2017). However, it is important to note that chemsex should be distinguished from co-occurrence of CSB and SUD broadly by the use of substances specifically to *facilitate* sexual behaviour. Future research may wish to specifically assess rates of chemsex amongst inpatient substance use samples.

The SUD + CSB group also endorsed greater levels of mental distress. First, participants with CSB tended to have higher baseline scores on functional impairment upon admission into treatment. This finding is unsurprising, given that previous research suggests that over 75% of individuals with CSB endorse some degree of functional impairment (Spenhoff, Kruger, Hartmann, & Kobs, 2013). Participants with CSB had higher scores across all three subscales of the OQ-45, which included decreased social roles, decreased interpersonal relations, and greater symptom distress. In regard to the interpersonal impairments, although addiction broadly is often associated with interpersonal problems (Hassel, Nordfjærn, & Hagen, 2013), this may be particularly true for individuals with CSB, given that they may have established unrealistic or unhealthy expectations of sexual relationships (Fong, 2006). Previous research suggests that CSB is not only linked to intimate partner difficulties, but also strained relationships with friends and other family members (Black, Kehrberg, Flumerfelt, & Schlosser, 1997; Love, Moore, & Stanish, 2016; Spenhoff et al., 2013). It is possible that this may be particularly true for individuals with co-occurring CSB and SUD, given that SUDs are also linked to interpersonal difficulties (Hassel et al., 2013).

Lastly, CSB was associated with increased severity of depression, anxiety, and trauma. All three mental health conditions have been linked to CSB in the literature in both clinical (Brem et al., 2017; Stavro et al., 2013) and non-clinical populations (Fontanesi et al., 2021; Odlaug et al., 2013). One possible explanation for these findings is that individuals with CSB may experience a greater degree of mental distress associated with the behaviour, and subsequently use substances to cope. This finding could also be due in part to the domains of the SAST-R that assess for mental distress such as trauma. Identifying these patterns of comorbidity is essential as they are linked to poorer outcomes (Elmquist, Shorey, Anderson, & Stuart, 2016; Schäfer & Najavits, 2007; Schulte, Meier, Stirling, & Berry, 2010). Finally, emotion dysregulation was higher amongst participants with CSB, which is consistent with the broader addiction literature suggesting that emotion dysregulation is an underlying mechanism for both CSB (Lew-Starowicz, Lewczuk, Nowakowska, Kraus, & Gola, 2020), and SUDs (Stellern et al., 2023; Weiss et al., 2022). However, it is important to note that emotion dysregulation was not a significant predictor of CSB at the multivariate level when controlling for shared variance, suggesting that there may be moderating or mediating effects of other variables. Taken together, results suggest that individuals with co-occurring SUD and CSB present with greater clinical complexities than individuals with SUD alone in a treatment-seeking sample. It is important to note, however, that only some clinical characteristics emerged as predictors of CSB severity in the multivariate analyses, which may be due in part to the statistical controlling of shared variance between variables in the regression analyses. Nonetheless, the present findings provide some evidence that distress and impairment may be greater in individuals with CSB and SUD, which underscores the importance of screening for co-occurring mental health symptoms in individuals admitted to inpatient treatment for SUDs.

In regard to treatment outcomes, there were no statistically significant differences in treatment completion between groups. Furthermore, when examining the influence of CSB scores on clinical outcomes, results suggest that greater CSB scores were associated with greater score changes in functional impairment from admission to discharge. There was also no association between CSB scores and change scores for substance dependence, suggesting that co-occurring CSB may not negatively affect treatment outcomes for SUDs. Taken together, these results suggest that co-occurring CSB was not linked to worse program completion outcomes in the current sample.

A possible explanation for our findings is that the treatment programming adequately addressed shared underlying mechanisms of both SUD and CSB. Moreover, though the program is targeted towards the treatment of SUDs, there may have been a transdiagnostic effect on the co-occurring CSB. For example, the treatment programming included in the present study relies heavily on both cognitive-behavioural and dialectical-behavioural approaches to target underlying mechanisms of both SUD and CSB, and both modalities also can minimize co-occurring symptoms of mental distress. Therefore, it is possible that treatment had enough of a positive influence on mental health symptoms that individuals with CSB did not have higher rates of attrition. Given the present finding that participants with CSB did not have poorer treatment outcomes, this could suggest that the features of SUD and CSB may be more similar than they are different. Additionally, our findings may reflect regression to the mean, such that participants with higher scores on baseline measures had greater room for change.

Limitations

There are several limitations of the current study that must be considered. First, causal inferences about the influence of CSB on treatment outcomes cannot be made due to the use of an observational research design. Though the present results highlight several important correlates of CSB, future research would need to use a randomized controlled design to more accurately determine whether CSB predicts treatment outcomes. Further, a controlled study would help eliminate potential confounding variables. Another methodological limitation is the use of self-report measures to assess for CSB and associated addiction and mental health symptoms. Though self-report measures are an efficient way to assess symptom severity, they cannot be used to make formal diagnoses. Specifically, the use of the SAST-R to assess for CSB is a limitation for several reasons. Despite being a common assessment tool for CSB in inpatient treatment centres (Hartman et al., 2012; Stavro et al., 2013), the items on the SAST-R do not accurately reflect the current diagnostic criteria for CSBD in the ICD-11. The SAST-R also contains a number of items that assess domains other than CSB, including history of child sexual abuse, illegal sexual behaviour, and shame associated with sexual behaviour. These items may be more reflective of trauma, illegal activity, and moral incongruence. All of these items contribute to the total score and therefore the suggested clinical cut-off of six may not be solely indicative of CSB. The SAST-R was used given this study was a secondary analysis of existing data and we were not able to select the assessment tool for CSB. Future research would benefit from using measures that are more consistent with current diagnostic criteria for CSB. Future research should also attempt to determine that CSB is not attributed to the use of substances, medication, or another mental health condition, particularly given the high rates of endorsement in inpatient treatment settings. A third limitation is the limited number of demographic variables examined in the current research. Because the current research involved a secondary analysis of data that had already been collected, we were not able to examine potentially important demographic factors that were not measured including, but not limited to, race, ethnicity, sexual orientation, and socioeconomic status. Finally, the data were collected from a private treatment centre and therefore the sample was not representative of most individuals with SUDs. Therefore, future research should aim to collect a more diverse sample (e.g. race, ethnicity, socioeconomic status) to increase generalizability of the findings.

CONCLUSION

The results of the present study address multiple gaps in the literature on co-occurring SUD and CSB. We identified several correlates of CSB, which highlight the need for proper screening upon admission into treatment to ensure that treatment needs are adequately met. The high rates of mental distress associated with co-occurring SUD and CSB suggest that these individuals may benefit from trans-diagnostic treatment interventions to bolster recovery. Further, continuing to identify demographic and clinical correlates may help clinicians identify which patients with SUD are at higher risk of developing co-occurring CSB. Though the results of the present study did not find that co-occurring CSB exacerbated treatment completion or associated outcomes, further research is needed to elucidate the potential reasons for this unexpected finding. Finally, broadening our knowledge of CSB and its relationship with SUDs can help further add to our understanding of its conceptualization and underlying mechanisms to facilitate the development of more targeted interventions.

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Conflict of interest: Lindsey A. Snaychuk and Christina A. Basedow declare employment contracts with EHN Canada. The authors declare no other conflicts of interest.

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