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Female sexual dysfunction in patients with substance-related disorders

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OBJECTIVE: To estimate the prevalence of female sexual dysfunction symptoms and the associated risk factors in a sample of patients with substance-related disorders admitted to a specialized in-patient care unit.

METHODS: This study used a cross-section design, with eight months of data collection, conducted with substance-dependent women using structured questionnaires to collect socio-demographic data and identify their drug of choice. The Drug Abuse Screening Test, Short Alcohol Dependence Data questionnaire, Fagerström Test for Nicotine Dependence, and Arizona Sexual Experience Scale were also administered.

RESULTS: The sample consisted of 105 women who had a mean age of 34.8 years (SD = 12.1, range = 18-65) and were predominantly heterosexual (74.3%), single (47.6%), Caucasian (50.5%), catholic (36.2%), and educated only to the level of primary education (40%), with a monthly family income of up to one minimum salary (37.5%). In 42.9% of the patients, crack was the drug of choice; 47.6% of the sample qualified for the Drug Abuse Screening Test (substantial problems related to drugs), 43.8% exhibited Short Alcohol Dependence Data (moderate or severe dependency), 47.6% exhibited Fagerström Test for Nicotine Dependence (high or very high nicotine dependence). The prevalence of sexual dysfunction symptoms was 34.2% (95% CI = [25.3, 44.1]), and a high level of nicotine dependence and low income increased the chances of having sexual dysfunction by 2.72-fold and 2.54 fold, respectively. An association was also observed between female sexual dysfunction symptoms and schooling and levels of drug dependence.

CONCLUSIONS: Female sexual dysfunction symptoms were common among this sample and primarily associated with high levels of nicotine use.

KEYWORDS: Sexual Dysfunction; Substance-Related Disorders; Women; Crack/Cocaine; Tobacco Use Disorder.

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INTRODUCTION

Female sexual dysfunction (FSD) is a common disorder in societies worldwide, but it is also a complex multifactor phenomenon that encompasses emotional intimacy and relationship satisfaction, along with other psychosocial factors across all cultures, all sexual orientations and various socio-economic statuses, with a great potential to affect relationships negatively and impair quality of life (1-3).

Epidemiological studies in the United States have estimated that FSD affected 43% of women in the general population over the past 12 months (4). In the United Kingdom, 5.8% of women have reported recent sexual dysfunction, and 15.5% have reported lifelong sexual dysfunction (1), whereas in Latin America, the rate of FSD for middle aged women it is approximately 58% (5). Some studies on this issue have indicated that among women with any sexual difficulty, an average of 64% (range = 16-75%) experienced difficulty with desire, 35% (range = 16-48%) experienced difficulty achieving orgasm, 31% (range = 12-64%) experienced difficulty becoming aroused, and 26% (range = 7-58%) experienced sexual pain (1,4,6).

Unfortunately, this condition remains a largely under-explored field in medicine, despite (a) sexual dysfunction being more prevalent in women than in men and (b) the evolution of nonlinear models due to understanding the intricacy of female sexual function that recognize the importance of both nonbiological and biological factors (1,7-9).

Some of the psychological factors associated with FSD include the unconscious avoidance of sex and pleasure, fear, structured rigid families, the demands of a relationship, and an excessive need to satisfy the partner. In addition, the guilt that comes from experiencing pleasure can be internalized as a potential risk and danger, which in turn

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leads to both insecurity and a repression of the body and possible pleasure that it can experience (4,7).

Alcohol consumption, tobacco smoking, and illicit drug abuse/dependence have long been associated with sexual dysfunction (10-12). Among chronic heroin and morphine users, for example, a review study noted decreases in sexual intercourse frequency, masturbation, and the quality and frequency of orgasm (13). These effects occur because opioids inhibit the hypothalamic-pituitary-gonadal axis and increase prolactin levels, which affect both the male and female sexual response (13).

Animal and in vitro studies examining the effects of cannabis abuse on sexual function have identified potential links between chronic cannabis smoking and inhibited orgasms (13-15). Chronic cocaine abuse is also associated with hyperprolactinemia and sexual dysfunction symptoms, such as diminished libido and difficulty reaching orgasm (11,12).

In alcohol-dependent women, the most common forms of sexual dysfunction observed include dyspareunia, high rates of genitourinary health problems, and low vaginal lubrication, revealing problems with sexual arousal (13,16).

Other factors that may predict symptoms of sexual dysfunction in this population include a history of sexual abuse, psychiatric comorbidities (such as depression, anxiety, and eating disorders) that commonly co-occur with dependence to alcohol and other drugs in women, various specific symptoms associated with the abuse of psychoactive substances (such as "crashing" after cocaine use), and insomnia problems (3,10,16).

Furthermore, research on the relationship between FSD symptoms and drug abuse (especially for other drugs, such as crack) has been neglected to an even greater extent (11,13). Nevertheless, identifying the magnitude of this problem and managing the sexual health issues among this population may have a significant impact on the prevention of relapse. Managing this problem is especially important because the use of psychoactive substances may be involved in the relief of symptoms related to sexual dysfunction or result from a search for ''anesthesia feelings'' in response to the frustration of not achieving sexual pleasure (17).

The scarcity of data on the prevalence of sexual dysfunction symptoms in women, especially among crack users, justifies the expansion of scientific evidence in this area (6,13). Our hypothesis is that FSD occurs more frequently in addict patients than the general population and is largely associated with alcohol, crack, and polydrug abuse.

The objective of this study was to evaluate the prevalence of sexual dysfunction and the associated risk factors among a sample of substance-dependent women admitted to an inpatient care service.

METHODS

This study was approved by the Federal University of São Paulo Ethics Committees (protocol number 1193/09), and all of the subjects signed an informed consent form. The patients did not receive any financial reward or compensation for participating in this study. The study used a cross-sectional design and was conducted at the public inpatient care center of the Alcohol and Drugs Research Unit of the Federal University of São Paulo, which specializes in the treatment of disorders related to substance use, is dedicated exclusively to women, and is located within a tertiary psychiatric hospital near Sao Paulo, Brazil. This unit has 28 beds for women over the age of 18 years, with an average occupancy of 15 beds per month. The average duration of treatment for each patient is approximately 45 days and includes individual and group activities with a multidisciplinary staff that employs a combination of pharmacological treatment and several psychosocial approaches, such as relapse prevention, 12-step program facilitation, motivational interviewing, cognitive behavioral therapy, harm reduction, and complementary therapies, such as physical activity and dance (18).

Procedures

During the eight months of data collection between February 2011 and October 2011, a psychologist and a nurse, both with expertise in addiction and previous training, administered a questionnaire developed by the authors to 105 women who had been diagnosed with substance-related disorder and who were older than 18 years of age. All of the patients had a confirmed clinical diagnosis of dependence according to the diagnosis criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision, (19) up to the first week of admission to this setting. The interview duration was 40 minutes on average. No refusals were recorded.

Main outcomes measures

Socio-demographic data: The following socio-demographic data were collected: age, sexual orientation, educational level, ethnicity, marital status, monthly income, employment status, and religious affiliation.

Drug of choice: The term "drug of choice" refers to the preferred drug of the substance abuser, and this information is often important to the clinical status of the patient because substance users often meet diagnostic criteria for dependence on multiple drugs. Certain characteristics, such as age, race, and marital status, have been shown to vary between individuals according to their drug of choice preferences. These data are not collected on a scale, but each patient is asked a simple question: ''What is your drug of choice?'' (20).

Short Alcohol Dependence Data (SADD) questionnaire: This instrument is a 15-item self-report questionnaire used to provide a measure of the severity of alcohol dependence within a continuum ranging from a mild drinking problem to severe alcohol dependence; it evaluates the behavioral and subjective aspects of alcohol dependence, with an adequate construct validity and high correlation with other instruments. The Brazilian version of the SADD and original English version were highly correlated. The coefficient of internal consistency was 0.79 (21).

Drug Abuse Screening Test (DAST-20): This survey comprises 20 questions relating to drug use during the last year. The questions pertain specifically to abuse, dependence, withdrawal (signs and symptoms), social impairment, familial relationships, legal implications, medical problems, and previous treatment. The problem severity was classified on a scale from 0 to 20 and scored as follows: 0 = no problem; from 1 to 5 = mild; 6 to 10 = moderate; 11 to 15 = substantial; and 16 to 20 = severe. This scale has been used in several studies and validated in other countries with good results in concurrent and discriminate validity, but it has yet to be validated in Brazil (22). *Fagerström Test for Nicotine Dependence (FTND)*: This questionnaire is a screening instrument that has been

extensively translated and used in many countries, including Brazil, to assess physical nicotine dependence. The instrument consists of six items that are easily understood and can be rapidly applied. The scores obtained on the test permit the classification of nicotine dependence into five levels: very low (0 to 2 points); low (3 to 4 points); moderate (5 points); high (6 to 7 points); and very high (8 to 10 points). The reliability index of this instrument is excellent (0.87), and Cronbach's alpha coefficient ranged from 0.55 to 0.74, indicating that the FTND has moderate internal consistency. The FTND showed satisfactory sensitivity (0.75) and specificity (0.80) (23).

Arizona Sexual Experience Scale (ASEX): This instrument is a scale designed to measure five specific items as the core elements of sexual function: sexual drive, arousal, penile erection/vaginal lubrication, ability to reach orgasm, and satisfaction from orgasm. The instrument measures these items with five questions in a relatively nonintrusive bimodal fashion using a six-point Likert scale that ranges from hyperfunction (1) to hypofunction (6). The scores range from 5 to 30, and scores higher than or equal to 19 indicate sexual dysfunction. The ASEX was designed to be either self- or clinically administered and can be used in either heterosexual or homosexual populations, regardless of whether the subject has a sexual partner. Questions addressing the frequency/preference of sexual activity were considered unrelated to sexual dysfunction. Cronbach's alpha analysis indicated that the ASEX demonstrated excellent internal consistency and scale reliability (alpha = 0.9055). The ASEX also demonstrated strong test-retest reliability (for patients, $r = 0.801$, $p<0.01$; for controls, $r = 0.892$, $p<0.01$). The sensitivity and specificity of the ASEX in terms of the identification of sexual dysfunction were 82% and 90%, respectively (24). The main rationale for using the ASEX scale instead of well-established measures for sexual dysfunction in women, such as the Female Sexual Function Index or Female Sexual Distress Scale, was that the ASEX scale is shorter than those mentioned and more easily incorporated into the protocols of our service, which already includes many other instruments and also provides inpatient care for men with substance-related disorders (6,7,18).

Data analyses

For the descriptive analysis, we evaluated the absolute and relative frequencies of the categorical variables and summary measures: means, quartiles, minimums, maximums and standard deviations of the numeric variables. To investigate the association between the characteristics of the categorical variables of the sample with sexual dysfunction symptoms, we used the χ^2 test or Fisher exact test if the sample was insufficient (25).

The use of categorical variables in the SADD, DAST-20, FTND, and ASEX scales was adopted owing to their nonlinear functional relationship with the variable of interest and because the cut-off points are already well accepted in the literature (18,25).

To compare the means of the numerical variables between the two groups, we used the Student t test for independent samples. To make comparisons between the averages of more than two groups, we used an analysis of variance (ANOVA) after confirming the assumption of observed data normality using the Kolmogorov-Smirnov test (25).

Initially, all of the variables were included in the model. Then, the variables that were not significant at the 5% level were excluded one by one in order of significance (reverse method). Furthermore, the Hosmer-Lemeshow test was used to evaluate the suitability of model adjustment means in the final model. The sensitivity and specificity were calculated from the odds of sexual dysfunction final model, which was estimated using the ROC curve (25).

In this study, two pseudo R^2 (coefficient of determination) values were obtained. The first was Cox-Snell, and the second was Nagelkerke. Logistic regression does not have an R^2 value that allows a linear regression to explain the variation of the model. Therefore, an attempt must be made to obtain a statistically similar value; various pseudo R^2 values have been proposed. It is important to note that the R^2 assumes nonnegative values (greater than or equal to zero) but never reaches a value of one (in a linear regression, the R^2 takes values between zero and one, and one indicates a perfect fit of the model). Therefore, because the pseudo R^2 shares the same interpretation as the R^2 (part of the variability of the dependent variable − the outcome explained by the regressors − explanatory variables), its value must be assessed with caution (25).

Finally, for the joint assessment of the effects of characteristics on sexual dysfunction symptoms, logistic regression was used. For all of the statistical tests, a significance level of 5% was used (25).

RESULTS

Socio-demographic data

The sample consisted of 105 women, with a mean age of 34.8 years (SD = 12.1), an age range of 18-65 years ($t = -1.41$, $p = 0.16$) and a median age of 31 years (second quartile). The women were predominantly heterosexual (74.3%, n = 78), single (47.6%, n = 50), Caucasian (50.5%, n = 53), and catholic (36.2%, n = 38). They also had a monthly income of up to one minimum wage, and 37.5% (n = 39) had an elementary education, which equates to an average of approximately six to seven years of study.

According to Table 1, the only association observed was between education and sexual dysfunction symptoms 61.1% (n = 22) of the women with sexual dysfunction symptoms had not completed elementary school, whereas 29% (n = 20) of the women with no sexual dysfunction symptoms had not completed elementary school.

The average age of the women with sexual dysfunction symptoms (n = 36) was 37.1 years (SD = 12.0), and the average age of those without sexual dysfunction symptoms (n = 69) was 33.6 years (SD = 12.1). There were no detectable differences between the mean ages for sexual dysfunction symptoms ($t = -1.41$, $p = 0.16$).

Prevalence of sexual dysfunction symptoms

In this sample, the prevalence of sexual dysfunction symptoms was 34.2% (95% CI = [25.3, 44.1]) according to the ASEX.

Affective sex orientation

The subjects were predominantly heterosexual (74.3%, n = 78), followed by bisexual (17.1%, n = 18), and homosexual (8.6%, n = 9). The proportion of exclusively homosexual women was too small in our sample to conduct any meaningful comparative analysis in terms of the prevalence of FSD symptoms in homosexual versus heterosexual women.

Table 1 - Sociodemographic data and sexual dysfunction symptoms (N = 105).

	Total		Sexual Dysfunction Symptoms				OR	95% CI for OR
			Negative		Positive			
	N	%	N	%	N	%		
Affective sex orientation	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Heterosexual	78	74.3%	49	71.0%	29	80.6%	1.0	-
Homosexual	9	8.6%	7	10.1%	2	5.6%	0.48	[0.09; 2.52]
Bisexual	18	17.1%	13	18.8%	5	13.9%	0.65	[0.21; 2.03]
χ^2 = 1.21 (p = 0.5462)								
Marital status	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Single	50	47.6%	33	47.8%	17	47.2%	1.0	-
Separated/Divorced	20	19.0%	13	18.8%	7	19.4%	1.05	[0.35; 3.13]
Married	16	15.2%	10	14.5%	6	16.7%	1.16	[0.36; 3.79]
Stable union	13	12.4%	10	14.5%	3	8.3%	0.58	[0.14; 2.44]
Widow	6	5.7%	3	4.3%	3	8.3%	1.94	[0.34; 10.93]
Fisher test (p = 0.8444)								
Schooling	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Illiterate	2	1.9%	0	0.0%	2	5.6%		
Elementary school	42	40.0%	20	29.0%	22	61.1%	1.0	-
Complete basic education	3	2.9%	2	2.9%	1	2.8%	0.45	[0.04; 5.62]
Incomplete secondary education	13	12.4%	11	15.9%	2	5.6%	0.17	[0.03; 0.93]
Complete secondary education	31	29.5%	27	39.1%	4	11.1%	0.13	[0.04; 0.51]
Incomplete higher education	11	10.5%	7	10.1%	4	11.1%	0.52	[0.13; 2.10]
Complete higher education	3	2.9%	2	2.9%	1	2.8%	0.45	[0.04; 5.62]
Fisher test (p = 0.0011)								
Race	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Caucasian	53	50.5%	36	52.2%	17	47.2%	1.0	-
Latino descendants	37	35.2%	25	36.2%	12	33.3%	1.02	[0.41; 2.51]
Indigenous descents	3	2.9%	1	1.4%	2	5.6%	4.24	[0.34; 52.93]
Asian descendants	1	1.0%	1	1.4%	0	0.0%	0.00	-
African descendants	11	10.5%	6	8.7%	5	13.9%	1.76	[0.46; 6.72]
Fisher test (p = 0.6401)								
Religion	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Catholic	38	36.2%	25	36.2%	13	36.1%	1.0	-
Evangelical	33	31.4%	22	31.9%	11	30.6%	0.96	[0.36; 2.60]
No religion	19	18.1%	11	15.9%	8	22.2%	1.40	[0.45; 4.39]
African religion	5	4.8%	5	7.2%	0	0.0%	0.0	-
Others (e.g., buddhism)	2	1.9%	1	1.4%	1	2.8%	1.92	[0.11; 34.80]
Spiritualist	6	5.7%	3	4.3%	3	8.3%	1.92	[0.33; 11.25]
Atheist	2	1.9%	2	2.9%	0	0.0%	0.0	-
Fisher test (p = 0.5676)								
Employment	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Unemployed	60	57.1%	40	58.0%	20	55.6%	1.0	-
Informal job	19	18.1%	14	20.3%	5	13.9%	0.71	[0.22; 2.29]
Formal job	10	9.5%	7	10.1%	3	8.3%	0.86	[0.20; 3.71]
Social security benefits	8	7.6%	3	4.3%	5	13.9%	3.33	[0.69; 16.02]
Retired	7	6.7%	4	5.8%	3	8.3%	1.5	[0.30; 7.47]
Student	1	1.0%	1	1.4%	0	0.0%	0.00	-
Fisher test (p = 0.5355)							0.0	
Salary range	**104**	**100.0%**	**69**	**100.0%**	**35**	**100.0%**		
Without income	10	9.6%	6	8.7%	4	11.4%	3.0	[0.37; 24.45]
Up to 1 SW	39	37.5%	21	30.4%	18	51.4%	3.86	[0.69; 21.59]
1 to 3 SW	31	29.8%	24	34.8%	7	20.0%	1.31	[0.22; 7.72]
3 to 5 SW	13	12.5%	9	13.0%	4	11.4%	2.0	[0.27; 14.71]
Above 5 SW	11	10.6%	9	13.0%	2	5.7%	1.0	-
Fisher test (p = 0.2228)								

CI = Confidence interval; OR = Odds ratio. Footnote: SW = minimum wage. In Brazil 1 SW = R$ 622/US$330.

Characteristics related to substance abuse/ dependence

In 42.9% (n = 45) of the subjects, crack was the drug of choice, followed by alcohol in 30% (n = 32) of subjects. In addition, 47.6% of this sample presents a substantial level of problems related to drugs according to the DAST-20; 43.8% (n = 46) have a moderate or severe dependence on alcohol according to SADD, and 47.6% (n = 60) have a high or very high level of nicotine dependence according to FTND (Table 2). There were no differences in the mean levels between the ASEX, SADD (p = 0.50), DAST-20 (p = 0.67), and FTND (p = 0.27).

Risk factors

Table 3 presents the final logistic regression model. The coefficients associated with the incomplete high school and high school levels of education were similar (p = 0.78); therefore, these two categories were combined to increase the regression model degrees of freedom due to sample size. The same occurred with the levels of DAST-20; the

Table 2 - Dependence level and sexual dysfunction symptoms (N = 105)

	Total		Sexual Dysfunction Symptoms				ODD RATIO	95% CI for OR
			Negative		Positive			
	N	%	N	%	N	%		
SADD	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Mild dependence	35	33.3	27	39.1%	8	22.2%	1.00	-
Moderate dependence	21	20.0%	11	15.9%	10	27.8%	3.07	[0.91 ; 10.35]
Serious dependence	25	23.8%	14	20.3%	11	30.6%	2.65	[0.84 ; 8.42]
No alcohol abuse/use	24	22.9%	17	24.6%	7	19.4%	1.39	[0.42 ; 4.59]
$\chi2 = 5{,}01$ ($p = 0.1709$)								
DAST20	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
No problem	10	9.5%	4	5.8%	6	16.7%	1.0	-
Low level	4	3.8%	2	2.9%	2	5.6%	0.67	[0.06 ; 7.58]
Moderate level	17	16.2%	11	15.9%	6	16.7%	0.36	[0.07 ; 1.97]
Substantial level	50	47.6%	36	52.2%	14	38.9%	0.26	[0.06 ; 1.12]
Severe level	11	10.5%	9	13.0%	2	5.6%	0.15	[0.02 ; 1.41]
No drug abuse/use	13	12.4%	7	10.1%	6	16.7%	0.57	[0.10 ; 3.20]
Fisher test ($p = 0.2604$)								
DOC	**105**	**100.0%**	**36**	**100.0%**	**69**	**100.0%**		
Crack	45	42.9%	11	30.6%	34	49.3%	1.0	-
Cocaine	25	23.8%	9	25.0%	16	23.2%	1.74	[0.59 ; 5.11]
Marijuana	2	1.9%	1	2.8%	1	1.4%	3.09	[0.17 ; 56.47]
Opioid	1	1.0%	0	0.0%	1	1.4%	-	-
Alcohol	32	30.5%	15	41.7%	17	24.6%	2.73	[1.00 ; 7.46]
Fisher test ($p = 0.2222$)								
FARGESTRON	**105**	**100.0%**	**69**	**100.0%**	**36**	**100.0%**		
Very low	27	25.7%	20	28.9%	7	19.4%	1.0	-
Low	9	8.6%	8	11.6%	1	2.8%	0.36	[0.04 ; 3.60]
Average	11	10.5%	7	10.1%	4	11.1%	1.63	[0.35 ; 7.53]
Elevate	33	31.4%	17	24.6%	16	44.4%	2.69	[0.86 ; 8.40]
Very elevate	17	16.2%	12	17.4%	5	13.9%	1.19	[0.30; 4.68]
No smoking	8	7.6%	5	7.2%	3	8.3%	1.71	[0.31 ; 9.43]
Fisher test ($p = 0.3115$)								

CI = Confidence interval; OR = Odds ratio.

coefficients associated with the low, moderate, substantial and severe levels were similar ($p = 0.71$).

The variable salary and DAST-20, although not significant at the 5% level, were maintained in the sample because they were marginally significant. It can be observed in this table that women who have had secondary education (complete or incomplete) have an 80% reduced chance of presenting dysfunction symptoms compared with women with lower levels of education.

However, women with a high level of nicotine dependence increased their chance of presenting sexual dysfunction symptoms by 2.72 compared with women of other levels of drug dependence. The Hosmer-Lemeshow test ($p = 0.48$) indicated a good adequacy of fit to the model. From the final model, it is possible to use the characteristics of women in terms of education, FTND, DAST-20, and salary to estimate the probability of having FSD symptoms.

Using the ROC curve, we obtained a cut-off of 0.31 in probability, which was associated with a sensitivity of 82.9% and specificity of 68.1%. Hence, if all of the women with a probability greater than 0.31 are classified as having sexual dysfunction symptoms, the model classifies 82.9% of women who truly have positive sexual dysfunction symptoms. In addition, among the women who do not have

Table 3 - Risk factors associated with female sexual dysfunction.

	Standard Error	Odds ratio	IC95%	*p*-value
Schooling				
High school incomplete/complete	0.54	0.20	[0.07; 0.56]	0.0025
Other levels of education	-	1.00		-
Salary range				
Up to 1 SW	0.48	2.54	[0.99; 6.52]	0.0519
Others	-	1.00		-
Fagerström				
Elevate	0.50	2.72	[1.02; 7.28]	0.0455
Others	-	1.00		-
DAST20				
No drug dependence	-	1.00		-
Others levels	0.55	0.36	[0.12; 1.06]	0.0644
Constant	0.51	0.91		0.8483

IC 95% - Confidence interval 95%. SW: minimum wage.

sexual dysfunction symptoms, 68.1% are properly classified as not having sexual dysfunction symptoms. In this study, two pseudo R^2 were obtained. The first was Cox-Snell and had a value of 0.21, and the second was Nagelkerke and had a value of 0.29.

DISCUSSION

Socio-demographic factors, such as age, marital status, income, and education, have been strongly predictive of sexual dysfunction symptoms in women (3,4). In this sample, a significant association between sexual dysfunction symptoms and socio-demographic characteristics was observed only for schooling, which is in agreement with other international studies showing that levels of sexual dysfunction are higher in women with low levels of education (3,4).

In addition to education, another finding that stands out and concurs with other international studies refers to the 2.54 fold increased chance of sexual dysfunction symptoms in women with low income. Women who subsist on a low income comprise a high-risk vulnerable population with limited access to social and health services. In general, this population is also more vulnerable to poverty and higher levels of sexual crime and violence than most other populations investigated in sexual function studies (3). For women addicted to alcohol and drugs, these vulnerabilities may be heightened because the consumption of drugs, especially crack, has been associated with various types of violence and the exchange of sex for drugs in women (18).

The prevalence of 34.2% FSD symptoms in this sample of women with substance-related disorder was common and comparable to other studies reported worldwide, which have reported prevalence rates of FSD symptoms of 12-63% (3,6,10), even in a sample of women with severe psychoactive substance dependence, as determined by the DAST-20, SADD, and FTND scales. Consequently, we expected to find higher sexual dysfunction symptom prevalence rates than in the general population.

Another finding that is in accordance with the current scientific evidence is the association between severe nicotine dependence and sexual dysfunction symptoms, which was almost threefold the odds ratio compared with women of other nicotine dependence levels in our sample (10).

Scientific evidence has suggested that long-term cigarette smoking is an independent risk factor for sexual dysfunction in men (26,27). However, the results of the limited data investigating this relationship in women are diverse, and some of the evidence supports the suggestion that nicotine may be the primary pharmacological agent responsible for genital hemodynamic disturbance, thereby facilitating a cascade of vascular and biochemical events that may obstruct normal sexual arousal responses in women. Controlled experimental studies examining the acute and chronic effects of isolated nicotine intake on female physiological sexual responses are necessary to help clarify the potential role of tobacco in the development and/or maintenance of sexual dysfunction in women (26,27).

Although FSD has been investigated in groups of women with various health problems, such as polycystic ovary syndrome, diabetes, HIV, and breast cancer (28-30), women with substance-related disorder represent a unique underserved and vulnerable population that continues to suffer from low detection rates and limited access to treatment (18).

The strong point of this study is on the recruitment of this special group of women because little focus has been given to the link between these two issues—sexual dysfunction symptoms and alcohol and drug dependence—using validated questionnaires as the assessment measures, especially in Brazil and other Latin American countries, where very few studies have been conducted on this association at alcohol and drug dependence services (31).

This study is limited by its cross-sectional design and the relatively small sample size. Only associations, not causal relationships, can be inferred from cross-sectional studies. A longitudinal study design would allow causality related to the onset of substance use and reported sexual dysfunction symptoms. Beyond that issue, because the recruitment took place at a tertiary service, this sample of women may not be representative of the community because it can be assumed that only the most serious patients receive this type of treatment (18). This sample bias may therefore limit the external validity of these findings.

Another limitation is that psychiatric comorbidities, detox periods, the use of medication, and other medical conditions that might cause sexual dysfunction symptoms were not investigated or controlled; therefore, they might be potential confounding factors (3-5).

Another limitation that should be noted is that the authors have chosen not to examine the individual sexual functions affected and the various explanatory variables, as there are known differences in the etiology of various symptoms of sexual dysfunction, such as those affecting the phases of desire and arousal (3,7). However, future studies may focus on this topic, expanding the scientific evidence on this theme.

The clinical implications of the findings of this study indicate that addressing sexual dysfunction should be part of the recovery process of the recovering addict and should not be marginalized or made invisible in most rehabilitation centers (32). When sexual health and sexual dysfunction are not directly addressed in alcohol and drug treatment centers, they may contribute to treatment failure with relapses and consequently, substantial losses in the life quality of the addict (32). Many patients come to treatment with feelings of guilt and shame related to their sexual behavior when using, which can contribute to relapse and noncompliance if the issue is not addressed (32).

For example, alcohol-dependent women with vaginismus can relapse and use alcohol to cope with their sexual dysfunction, as may other women who use alcohol to achieve sexual excitement or relaxation during sex (32). Therefore, recovery offers an excellent opportunity to identify, prevent, and manage sexual dysfunction symptoms in women with problems related to alcohol and other drugs (31,32).

Future substance abuse population-based and longitudinal studies should be conducted to extend the scientific evidence, including the research on sexual dysfunction and sexual health. It is especially important to study crack smokers because this drug has become a public health problem in many low to middle income countries (33).

In conclusion, FSD symptoms in this sample were common and primarily associated with high levels of nicotine dependence.

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AUTHOR CONTRIBUTIONS

Silva RL contributed to the data collection and preparation of the database. Diehl A contributed data analysis and preparation of the article by writing the same. Laranjeira R contributed overseeing the study, selecting papers on the topic and review the article after it has been finalized.

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