ORIGINAL ARTICLE

Social anxiety symptoms in alcohol-dependent outpatients: prevalence, severity and predictors

Sintomas de ansiedade social em alcoolistas em tratamento ambulatorial: prevalência, gravidade e preditores

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ABSTRACT

Objectives: High rates of comorbidity between social anxiety disorder (SAD) and alcohol use disorders have been reported, but the predictors of this comorbidity are poorly known and most studies involve primary SAD samples. The aims were to estimate the prevalence and severity of SAD symptoms among alcohol-dependent patients and to investigate sociodemographic and clinical factors associated with SAD comorbidity, including suicidal behaviors. **Methods:** A cross-sectional study with 53 adults who were in treatment for alcohol dependence at a Brazilian public university outpatient service. Assessment instruments: Social Phobia Inventory (SPIN), Short Alcohol Dependence Data and Beck Depression Inventory. Bivariate analyses between the categorical outcome (Probable SAD: SPIN ≥ 19) and explanatory variables were conducted. Correlates of SPIN total and subscales scores (dimensional outcomes) were also investigated. **Results:** The diagnosis and treatment of alcohol dependence occurred, on average, 30 years after the onset of alcohol use and 39.6% of the 53 patients (37 men and 16 women) reported alleviation of social anxiety symptoms with alcohol use. Twenty-four (45.3%) patients presented probable SAD. These patients differed from non-SAD alcohol-dependent individuals by having lower income and higher frequency of depression, suicidal ideation, suicide plans and attempts. The SPIN subscales mostly associated with suicidal behaviors were social inadequacy and social inferiority. **Conclusions:** SAD symptoms are common among help-seeking alcohol-dependent individuals and should be directly investigated and treated, since depression and suicidality are associated with this comorbidity. Prospective studies are needed to assess the impact of SAD treatment on the clinical course of alcohol dependence.

Keywords
Social anxiety disorder, social phobia, alcohol dependence, alcohol use disorders, comorbidity.

RESUMO

Objetivos: Altas taxas de comorbidade têm sido descritas entre o transtorno de ansiedade social (TAS) e os transtornos por uso de álcool, mas os preditores dessa comorbidade são pouco conhecidos, e a maioria dos estudos envolve pacientes com diagnóstico primário de TAS. Os objetivos foram estimar a prevalência e a gravidade de sintomas de TAS em pacientes dependentes de álcool e investigar fatores sociodemográficos e clínicos associados

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à comorbidade com TAS, incluindo risco de suicídio. **Métodos:** Estudo transversal com 53 adultos em tratamento ambulatorial para dependência de álcool num hospital público universitário brasileiro. Instrumentos de avaliação: *Social Phobia Inventory* (SPIN), *Short Alcohol Dependence Data* e *Beck Depression Inventory*. Foram conduzidas análises bivariadas entre o desfecho categorial (provável TAS: SPIN ≥ 19) e as variáveis explanatórias. Correlatos dos escores total e das subescalas da SPIN (desfechos dimensionais) também foram investigados. **Resultados:** O diagnóstico e o tratamento da dependência de álcool ocorreram em média 30 anos após o início do uso de álcool, e 39,6% dos 53 pacientes (37 homens e 16 mulheres) relataram alívio dos sintomas de ansiedade social com o uso de álcool. Vinte e quatro (45,3%) pacientes apresentaram provável TAS. Esses pacientes diferiram dos alcoolistas sem TAS, por terem menor renda, maior frequência de depressão, ideação suicida, planos e tentativas de suicídio. As subescalas da SPIN que mais se associaram com comportamentos suicidas foram inadequação social e inferioridade social. **Conclusões:** Sintomas de TAS são comuns em alcoolistas em tratamento e devem ser diretamente investigados e tratados, já que depressão e suicidalidade associam-se com essa comorbidade. Estudos prospectivos são necessários para investigar o impacto do tratamento do TAS no curso clínico da dependência de álcool.

Palavras-chave
Transtorno de ansiedade social, fobia social, dependência de álcool, transtornos por uso de álcool, comorbidade.

INTRODUCTION

Social anxiety disorder (SAD) is characterized by an excessive fear and avoidance of social situations in which the individual believes his/her performance may be negatively evaluated by others[1]. The mean age of SAD onset is 13 years and, in 75% of the cases, it begins between the ages of eight and 15 years[1]. The prevalence rates of SAD in community studies were estimated in 1.9% (annual) and 2.8% (lifetime)[2], 5.0% (lifetime)[3], 6.8% (annual)[4] and 12.0% (lifetime)[5]. In Brazil, only two epidemiological surveys were conducted, both in São Paulo city, and the annual and lifetime prevalence rates were 2.2%[6] and 3.9%, respectively[7].

Previous studies demonstrated high rates of comorbid alcohol use disorders (AUD) among anxiety disorder patients in general[8-12] and SAD patients in particular[13]. Some individuals with SAD use alcohol recurrently to reduce the anxiety, tension and inhibition they feel in social situations, developing secondary dependence[13,14]. However, the diagnosis of SAD in alcohol-dependent patients may be hampered by its clinical similarity with withdrawal symptoms (*e.g.* anxiety, tremors, sweating, increased heart rate)[8,15] and by the fact that some persons with AUD may develop social anxiety symptoms due to the shame of their behaviors while intoxicated[16]. In anxiety disorders, the comorbidity with AUD has great clinical relevance, as it implies a worse prognosis, including poor treatment response and increased suicide risk[8,17]. To date, only a few studies explored the prevalence of SAD among individuals seeking treatment for alcohol dependence, and the rates described vary from 23% to 35%[15,18-20]. In two studies that included outpatients with alcohol and illicit drugs dependence the prevalence rates of SAD were also high: 31% [21] and 37%[22].

Among patients who seek treatment for AUD, those with SAD present more severe dependence, more depressive episodes, less social support, lower education and worse occupational situation[18,23]. Moreover, SAD comorbidity may have a negative impact on the willingness to participate in addiction treatments – which frequently include group therapies[22] – and also on treatment outcomes[24]. Therefore, if not identified and properly treated, SAD can have a negative impact on the prognosis of alcohol dependence, favouring relapses[8,12]. Although clinically relevant, the literature on prevalence and predictors of SAD comorbidity among alcohol-dependent patients is very scarce. In Brazil, only two studies on this topic were conducted, with hospitalized patients[15,20].

The aims of this study were to estimate the prevalence and severity of SAD symptoms among alcohol-dependent outpatients and to investigate sociodemographic and clinical factors associated with SAD comorbidity, including suicidal behaviors. An additional aim was to evaluate the severity and correlates of specific SAD symptoms in this population.

METHODS

Subjects

A cross-sectional study was conducted with 53 consecutive adult patients (men and women) undergoing outpatient treatment for alcohol dependence at a Brazilian public university hospital (Unesp-FMB). The inclusion criteria were: being 18 years or older, being in outpatient treatment for alcohol dependence – diagnosed according to the DSM-IV criteria[25] – and agreeing to participate in the study, after being fully advised about its objectives and methods. Participants received no financial compensation. There were no refusals and all participants signed an informed consent form. The study was approved by the FMB Research Ethics Committee in May 2013 (protocol number 264.098).

Procedures and assessment instruments

Patients were interviewed between May/2013 and June/2014 by two trained undergraduate medical students (NTY and CML), in the same day of the patients' regular appointment at the outpatient unit. Patients were considered currently abstinent when not using alcohol for at least 30 days, and intoxicated patients were not interviewed. Since most participants had low educational level, the measures were not used as self-report, but as face-to-face interviews. The protocol included a questionnaire on sociodemographic (gender, age, educational level, ethnicity, religion, marital and occupational status and income) and clinical data (age of onset of alcohol use, age at diagnosis and first treatment for alcohol dependence, family history of alcohol dependence, current abstinence, previous relapses and hospitalizations for alcohol dependence, use of tobacco, cannabis and other illicit drugs, alcohol effect on SAD symptoms and suicidal behaviors). The questions on suicidality were adapted from the Clinical Interview Schedule-Revised (CIS-R)[26,27], consisting of direct questions with dichotomous answers (yes/no) asking if the patient had ever thought that life was not worth living, wished to be dead, thought about killing himself/herself, made suicidal plans, attempted suicide or presented current suicidal thoughts. Those who reported current suicidal ideation were evaluated in the same day by the psychiatrist responsible for the alcohol dependence service (RCT). The structured instruments that were applied to the participants by the interviewers are described below:

The Social Phobia Inventory – SPIN[28]: SAD symptoms were assessed using the SPIN, which was translated and adapted into Brazilian Portuguese[29]. The Brazilian version was validated[30] and presents adequate psychometric properties, including good internal consistency and reliability[31,32]. It consists of 17 items that investigate anxiety, physical discomfort and avoidant behaviors in several social situations in the previous week. Each item has a score ranging from 0 to 4 (maximum: 68). The cutoff point of 19 or more indicates the presence of symptoms suggestive of SAD[32,33]. The scale has five subscales, which severity can be assessed separately[22]: social inadequacy (range: 0-16), self-esteem (range: 0-16), physical symptoms (range: 0-16), social inferiority (range: 0-8) and performance when observed by others (range: 0-12). The predictors of SPIN total and subscales scores (quantitative outcomes) were also analyzed.

The Short Alcohol Dependence Data (SADD)[34]: The SADD consists of 15 questions investigating dependence current severity in cases of alcohol use disorder. Each question has four options, defined as: 0 – never, 1 – rarely, 2 – often, 3 – always. The overall score indicates the following classification: 1-9 – mild dependence, 10-19 – moderate dependence, 20-45 – severe dependence[34-36]. The adopted cutoff score for moderate or severe dependence was 10.

Beck Depression Inventory (BDI)[37]: The BDI consists of 21 items that assess depressive symptoms in the previous week, and the severity ranges from zero to three (maximum: 63). The following cutoff points are recommended: < 10 – no depression; 10-18 – mild depression; 19-29 – moderate depression and 30-63 – severe depression[37]. The cutoff point of 19 or more was considered indicative of (moderate or severe) depression.

Data analysis

The STATA 12.0 software[38] was used in all statistical analyses. Initially, a descriptive analysis of all explanatory variables was conducted, to estimate absolute and relative frequencies of the categorical variables and central distribution measures (means and standard deviations, medians and ranges) of the quantitative variables. The outcome was first analyzed as a dichotomous variable (Probable SAD: SPIN score ≥ 19), and the prevalence with 95% confidence interval was estimated. The patients were then divided into two comparison groups: Probable SAD Group and Non-SAD Group. Bivariate analyses of the associations between the outcome (Probable SAD) and explanatory variables were conducted using the Pearson Chi-square or Fisher's exact tests (categorical variables) and the Student t or Mann-Whitney tests (quantitative variables), as appropriate. The normality of distribution of the quantitative variables was evaluated with the Skewness and Kurtosis test. To estimate the effect sizes of the associations, odds ratios with 95% confidence intervals were calculated for categorical variables and Cohen's D for quantitative variables (values lower than 0.3 generally indicate little effect, 0.3 to 0.5 moderate effect, and above 0.5 relevant effect). Finally, the outcome was analyzed as a quantitative variable (SPIN total score and five subscales scores) in relation to the same explanatory variables, using the Mann-Whitney test for categorical variables and the Spearman's correlation test for quantitative variables. Statistical significance was defined as $p < 0.05$.

RESULTS

Sociodemographic and clinical characteristics of the sample

The mean age of the 53 patients was 49.6 (SD 12.01) years old, 37 (69.8%) were males and 16 (30.2%) females. Most patients (71.2%; n = 39) were Caucasian, 60.4% were married or cohabiting, 67.9% were Catholic (only one patient had no religion) and 50.9% were currently working. The mean number of years of formal education was 8.43 (4.4) and 64.8% had low educational level, i.e., less than eight years of schooling (Table 1).

The mean age of onset of alcohol use was 16.4 (7.1) years, whereas the mean ages of diagnosis and first treatment for alcohol dependence were 43.8 (11.6) and 44.9 (12.1) years, respectively. Almost all patients were abstinent (no alcohol use for at least 30 days) at the time of interview (94.3%) and re-

Table 1. Sociodemographic characteristics of the sample, according to social anxiety disorder (SAD) comorbidity

Sociodemographic characteristics	Total (n = 53)		SAD (n = 24)		Non-SAD (n = 29)		p-value	Effect size
Quantitative variables	**Mean (SD)**		**Mean (SD)**		**Mean (SD)**		**p**	**Cohen's D**
Age (years)	49.64 (12.01)		46.16 (9.23)		52.52 (13.38)		0.054[a]	0.52
Income (Brazilian real)	1647 (1875)		814 (514)		2307 (227)		**0.003[b]**	**0.79**
Educational level (years)	8.43 (4.40)		8.12 (4.08)		8.69 (4.70)		0.62[a]	0.12
Categorical variables	**n**	**%**	**n**	**%**	**n**	**%**	**p**	**OR (CI 95%)**
Sex							0.29[c]	
Female	16	30.2	9	56.2	7	43.8		1
Male	37	69.8	15	40.5	22	59.5		0.53 (0.16-1.73)
Ethnicity							0.46[c]	
Caucasian	38	71.7	16	42.1	22	57.9		1
Non-caucasian	15	28.3	08	53.3	07	46.7		1.17 (0.55-2.49)
Marital status							0.78[c]	
With partner	32	60.4	14	43.7	18	56.3		1
No partner	21	39.6	10	47.6	11	52.4		1.17 (0.64-2.12)
Religion							0.17[c]	
Catholic	35	66.0	14	38.9	22	61.1		1
Non-catholic	18	34.0	10	58.8	7	41.2		2.24 (0.69-7.27)
Low educational level*							0.13[c]	
No	19	35.9	6	31.6	13	68.4		1
Yes	34	64.1	18	52.9	16	47.1		2.44 (0.75-7.92)
Currently working							0.13[c]	
Yes	27	50.9	15	55.6	12	44.4		1
No	26	49.1	9	34.6	17	65.5		2.36 (0.78-7.15)

[a] Student t test; [b] Mann-Whitney test; [c] Chi-square test; [d] Fisher's exact test.

SAD: social anxiety disorder; SD: standard deviation.

* Less than 8 years of schooling.

ported family history of alcohol dependence (92.4%), whereas one third reported at least one previous psychiatric hospitalization. The duration of abstinence varied widely, from one week to 10 years (median: 24 weeks). The mean SADD score was 3.52 (5.48) and only five patients (9.4%) presented moderate or severe alcohol dependence at the time of interview. The mean BDI score was 12.3 (11.6) and 12 patients (22.6%) presented moderate or severe depressive symptoms.

Current and previous tobacco smoking was reported by 43.4% and 26.4% of the patients, respectively. Regarding cannabis use, 22.6% reported previous use and all denied current use. Lifetime use of other illicit drugs (excluding cannabis) was reported by 15.1% and only one patient reported current use. While 39.6% of the patients reported a decrease of SAD symptoms with the alcohol use, 47.2% denied any effect and 13.2% reported aggravation. With respect to suicidal behaviors, lifetime thoughts, plans and attempts were described by 58.5%, 41.5% and 39.6%, respectively, and current thoughts by 9.4%.

The prevalence of probable SAD (SPIN score ≥ 19, from now on just called SAD) was 45.3% (95% CI: 31.4 to 59.1%). The SPIN average score was 20.3, ranging from 0 to 68. The mean (SD) total and subscales scores of the SPIN were: social inadequacy 3.94 (4.11), self-esteem 5.62 (5.17), physiological symptoms 4.87 (5.00), social inferiority 0.81 (1.92) and performance when observed by others 5.09 (3.95). Other clinical characteristics are presented in table 2.

Sociodemographic and clinical characteristics of the sample, according to the presence (or absence) of probable social anxiety disorder (SAD)

The only sociodemographic variable that differed significantly between the two study groups was income, in average lower in patients presenting SAD (Table 1). Moderate or severe depression (OR 5.20), suicidal ideation (OR 3.69), suicide plans (OR 5.24) and attempts (OR 4.40) were more frequent in patients with SAD. The mean BDI score (depressive symptoms) was also higher in the group with SAD. The other clinical variables did not differ significantly between the study groups, as presented in table 2.

Table 2. Clinical characteristics of the sample, according to social anxiety disorder (SAD) comorbidity

Clinical characteristics	Total (n = 53)		Probable SAD (n = 24)		Non-SAD (n = 29)		p-value	Effect size
Quantitative variables	**Mean (SD)**		**Mean (SD)**		**Mean (SD)**		**p**	**Cohen's D**
Age onset – Alcohol use	16.41 (7.08)		16.25 (9.36)		16.55 (4.60)		0.20[a]	0.04
Age of diagnosis	43.77 (11.64)		42.41 (8.54)		44.90 (13.74)		0.73[a]	0.21
Age of first treatment	44.87 (12.11)		42.46 (8.60)		46.86 (14.23)		0.30[a]	0.36
BDI score	12.35 (11.67)		18.42 (12.22)		7.34 (8.53)		**< 0.001[a]**	**0.94**
SADD score	3.52 (5.53)		4.67 (7.18)		2.58 (3.52)		0.22[a]	0.37
Categorical variables	**n**	**%**	**n**	**%**	**n**	**%**	**p**	**OR (CI 95%)**
Family history (alcoholism)							0.62[b]	
No	4	7.5	01	25.0	03	75.0		1
Yes	49	92.5	23	46.9	26	53.1		2.65 (0.26-27.32)
Abstinence (current)							1.00[b]	
Yes	50	94.3	23	46.0	27	54.0		1
No	3	5.7	01	33.3	02	66.7		1.70 (0.14-20.0)
Relapse (previous)							0.17[c]	
No	32	60.4	17	53.1	15	46.9		1
Yes	21	39.6	07	33.3	14	66.7		0.44 (0.14-1.38)
Psychiatric hospitalization (previous)							0.38[c]	
No	35	66.0	13	37.1	22	62.9		1
Yes	18	34.0	11	61.1	07	38.9		2.65 (0.82-8.56)
Tobacco use (lifetime)							0.10[c]	
No	16	30.2	10	62.5	06	37.5		1
Yes	37	69.8	14	37.8	23	62.2		0.36 (0.11-1.22)
Illicit drug use (lifetime)							0.50[c]	
No	44	83.0	17	42.5	23	57.5		1
Yes	09	17.0	07	53.8	06	46.2		1.58 (0.49-5.55)
Thought life was not worth living (lifetime)							0.11[b]	
No	13	24.5	03	23.1	10	76.9		1
Yes	40	75.5	21	52.5	19	47.5		3.68 (0.88-15.42)
Desired to be dead (lifetime)							0.08[b]	
No	18	34.0	05	27.8	13	72.2		1
Yes	35	66.0	19	54.3	16	45.7		3.09 (0.90-10.53)
Suicidal thoughts (lifetime)							**0.04[c]**	
No	22	41.5	06	27.3	16	72.7		**1**
Yes	31	58.5	18	58.1	13	41.9		**3.69 (1.14-12.00)**
Suicide plans (lifetime)							**0.02[c]**	
No	31	58.5	09	29.0	22	71.0		**1**
Yes	22	41.5	15	68.2	07	31.8		**5.24 (1.60-17.15)**
Suicide attempts (lifetime)							**0.02[c]**	
No	32	60.4	10	31.2	22	71.0		**1**
Yes	21	39.6	14	66.7	07	31.8		**4.40 (1.36-14.25)**
Suicidal thoughts (current)							0.65[b]	
No	48	90.6	21	43.7	27	56.3		1
Yes	05	9.4	03	60.0	02	40.0		1.92 (0.29-12.61)
Depression (current)							**0.02[b]**	
No (BDI < 19)	41	77.3	15	36.6	26	63.4		**1**
Yes (BDI ≥ 19)	12	22.7	09	75.0	03	25.0		**5.20 (1.22-22.23)**
Moderate/severe dependence (current)								
No (SADD < 10)	48	90.6	22	45.8	26	54.2	1.00[b]	1
Yes (SADD ≥ 10)	05	9.4	02	40.0	03	60.0		0.79 (0.12-5.15)

Significant values in bold. SAD: social anxiety disorder; SD: standard deviation; BDI: Beck Depression Inventory; SADD: Short Alcohol Dependence Data.

[a] Mann-Whitney test; [b] Fisher's exact test; [c] Chi-square test.

Correlates of (general and specific) social anxiety symptoms severity

The overall SAD severity (SPIN total score) was positively associated with (moderate or severe) depression, BDI score and all lifetime suicidal behaviors, and negatively associated with age and income (Table 3). Social inadequacy score was associated with BDI score, suicidal ideation, suicide plans and attempts, and negatively associated with income. The self-esteem subscale was positively associated with BDI score and negatively with income. Physiological symptoms were positively associated with depression, suicide plans and attempts, BDI and SADD scores, and negatively associated with age. Social inferiority was positively associated with lifetime death wishes, suicidal ideation, suicide attempts, BDI and SADD scores, and negatively associated with age. Finally, performance when observed by others was positively associated with thinking that life is not worth living, death wishes, BDI score, and negatively associated with age and income (Table 3).

DISCUSSION

This is the first Brazilian study and one of the few studies in the literature evaluating the prevalence and correlates of SAD symptoms in alcohol-dependent men and women undergoing outpatient treatment for the dependence. The outcome was evaluated using a validated instrument (SPIN) and analyzed both categorically (probable SAD) and dimensionally (severity of social anxiety symptoms). For the first time, the severity and correlates of specific SAD symptoms were investigated in this population. In addition, several explanatory variables were investigated, including suicidal behaviors.

The results indicate that the prevalence of SAD is much higher in individuals with AUD than in the general population[39-41]. The current prevalence was 45.3% (95% CI: 31.4 -59.1%), much higher ($p < 0.001$) than those reported in two Brazilian epidemiological surveys conducted in São Paulo city, with annual rates of 2.2%[6] and 3.9%[7]. In community samples from other countries, the annual prevalence ranges from 1.9% to

Table 3. Associations between total and specific social anxiety symptom scores (SPIN subscales) and explanatory variables

Categorical Variables*	SPIN Total Score	Social Inadequacy	Self-Esteem	Physiological Symptoms	Social Inferiority	Performance when observed
Sex	ns	ns	ns	ns	ns	ns
Hospitalization	ns	ns	ns	ns	ns	ns
Depression (BDI ≥ 19)	**28.5 *vs* 17.9 p = 0.038**	ns	ns	**7.7 *vs* 4.0 p = 0.01**	ns	ns
Thought life was not worth (lifetime)	**22.8 *vs* 12.6 p = 0.044**	ns	ns	ns	ns	**5.7 *vs* 3.1 p = 0.03**
Desired to be dead (lifetime)	**23.8 *vs* 13.7 p = 0.028**	ns	ns	ns	**1.2 *vs* 0.06 p = 0.019**	**5.8 *vs* 3.7 p = 0.046**
Suicidal thoughts (lifetime)	**24.4 *vs* 14.6 p = 0.045**	**5.0 *vs* 2.4 p = 0.02**	ns	ns	**1.3 *vs* 0.14 p = 0.02**	ns
Suicide plans (lifetime)	**26.9 *vs* 15.7 p = 0.02**	**5.5 *vs* 2.8 p = 0.02**	ns	**6.8 *vs* 3.5 p = 0.02**	ns	ns
Suicide attempts (lifetime)	**27.4 *vs* 15.7 p = 0.018**	**5.5 *vs* 2.9 p = 0.03**	ns	**6.7 *vs* 3.7 p = 0.03**	**1.6 *vs* 0.3 p = 0.047**	ns
Suicidal thoughts (current)	ns	ns	ns	ns	ns	ns
Quantitative Variables**	**SPIN Total Score**	**Social Inadequacy**	**Self-Esteem**	**Physiological Symptoms**	**Social Inferiority**	**Performance when observed**
Age (years)	**r = -0.33 p = 0.015**	ns	ns	**r = -0.33 p = 0.016**	**r = -0.28 p = 0.04**	**r = -0.35 p = 0.01**
Income (Brazilian real)	**r = -0.35 p = 0.01**	**r = -0.34 p = 0.01**	**r = -0.35 p = 0.01**	ns	ns	**r = -0.31 p = 0.026**
BDI score	**r = 0.42 p = 0.002**	**r = 0.40 p = 0.003**	**r = 0.29 p = 0.03**	**r = 0.48 p < 0.001**	**r = 0.33 p = 0.017**	**r = 0.27 p = 0.047**
SADD score	ns	ns	ns	**r = 0.27 p = 0.047**	**r = 0.29 p = 0.03**	ns

Significant results in bold.

* Mann Whitney test (mean scores in the 'SAD' group versus 'Non-SAD' group); ** Spearman's correlation test.

BDI: Beck Depression Inventory; SADD: Short Alcohol Dependence Data; ns: non-significant.

6.8%[2,4] and the lifetime prevalence from 2.8% to 12.0%[2,3,5,6]. In studies with hospitalized alcohol-dependent patients, it ranges from 25%[19] to 35%[20]. This difference may be partly explained by methodological issues (*e.g.* diagnostic criteria, assessment instruments) or by the fact that patients attended at a tertiary service may present more comorbidities. According to Buckner *et al.*[13], however, approximately half of alcohol-dependent patients seeking detoxification present moderate or severe social anxiety symptoms.

Since alcohol addiction develops gradually over several years, preceded by a variable period of harmful alcohol use, the delay in treatment seeking is the rule[42]. In this study, the average interval between the beginning of alcohol use and the diagnosis and treatment of alcohol dependence was 30 years. However, the mean ages of onset of alcohol use, and of alcohol dependence diagnosis and treatment did not differ between the study groups. Although the SAD group had a lower mean age (46 *vs*. 52 years old), this difference did not reach statistical significance. Thus, population-based studies are needed to evaluate whether SAD comorbidity affects (decreasing or increasing, anticipating or delaying) treatment seeking for alcohol dependence. Nevertheless, in a sample of substance abusers, those with clinically relevant SAD symptoms were 4-8 times more likely to report that shyness interfered with addiction treatment activities[22]. The group format, which is frequently used in therapeutic programs for alcohol-dependent patients – and used in our service – is an additional barrier for persons with AUD and SAD symptoms to seek or adhere to treatment[22].

Anxiety disorders can be cause or consequence of alcohol dependence and common etiological factors can also be involved, but usually social anxiety symptoms precede alcohol dependence by several years[43-46]. In fact, SAD usually begins in childhood or early adolescence[1] and some individuals may use alcohol as "self-medication" to try to alleviate SAD symptoms and improve sociability[18], gradually becoming dependent[43-50]. Although almost 40% of the patients reported that SAD symptoms decreased with alcohol use, the cross-sectional design does not permit causality inferences. Since anxiety manifestations (*e.g.* tremors, sweating, increased heart rate) are common during alcohol withdrawal syndrome[42], SAD can go even more unnoticed and untreated in this population.

The sample was composed predominantly by male patients (69.8%), as consistently described in community and clinical studies on substance use[2], but men and women did not differ significantly regarding the prevalence of SAD. In fact, the only sociodemographic variable that differed between the two study groups was income, in average lower in patients with SAD. The worse socioeconomic status of patients with SAD may be due to additional difficulties – beyond the effect of alcohol dependence – in adapting to the work environment[23,51].

High tobacco smoking rate was expected[52] and confirmed in the sample as a whole (70%), but the two groups did not differ in this respect. The use of illicit drugs was much less common, but also similar in patients with and without SAD.

Anxiety disorders in general may contribute to the maintenance and relapse of AUD[8,12,45] and comorbidity of AUD can be an indicator of more severe SAD[50,53,54], with more suicidal behaviors[8,55,56]. In anxiety disorders, the co-occurrence of comorbidities, such as depression, is associated with greater severity, disability and poorer treatment response[13,57]. As expected, in this sample, patients with SAD were more likely than non-SAD patients to present moderate or severe depression (37.5% *vs* 10.3%; $p = 0.02$). Likewise, the BDI score was much higher in the SAD group (18.4 *vs* 7.3; $p < 0.001$)[18].

Suicidal behaviors were frequently observed in the total sample, and lifetime suicidal ideation, suicide plans and attempts were more common in alcohol-dependent patients with SAD. Thus, the SAD comorbidity seems to further increase the frequency of suicidal behaviors in these patients[58-63]. Interestingly, Bolton *et al.*[64] conducted a study with 8,098 individuals from the US general population and reported that those who used alcohol as self-medication in an attempt to inhibit SAD symptoms presented increased suicide risk, compared with those who did not drink (23.7% *vs* 6.2%). The co-occurrence of SAD and depressive disorder is common and associated with additional suffering, social dysfunction and suicidal ideation[8,65]. According to Bunevicius *et al.*[66], there is an important relationship between suicidal ideation, excessive alcohol consumption and depressive episodes. The cross-sectional design does not allow conclusions on direction of causality but, as already mentioned, SAD symptoms usually precede not only alcohol harmful use[43-48], but also depressive symptoms[67,68]. Thus, SAD probably represents the beginning of a series of psychopathological manifestations that develop in a causal pathway to suicidal behaviors[69]. In this case, depression and/or alcohol dependence are not confounders, but mediating factors of the association between SAD symptoms and suicidality.

In fact, the association between anxiety symptoms/disorders and suicidality has been consistently described in the literature[56,69-72]. Self-reported anxiety symptoms increased by 2-fold the likelihood of reporting suicidal behaviors among 2,778 psychiatric outpatients[71]. In a systematic review and meta-analysis of 42 observational studies, Kanwar *et al.*[70] concluded that, compared to patients without anxiety, those with anxiety disorders were more likely to have suicidal ideations (OR = 2.89), attempted suicides (OR = 2.47) and completed suicides (OR = 3.34). In an important study by Cougle *et al.* using data from the National Comorbidity Survey Replication, anxiety disorders – including SAD – were independent predictors of suicidal ideation and suicide attempts[56]. Moreover, the role of anxiety symptoms and disorders in the incidence of depression and suicidal behaviors has been

demonstrated in community-based longitudinal studies[69,72]. Notably, a recent review on addiction and suicide[73] emphasizes that suicidality is indeed a relevant problem for people with co-occurring psychiatric disorders (major depression, schizophrenia, PTSD and personality disorders) seeking addiction treatment, but anxiety disorders are not cited. Therefore, more attention should be given by researchers and clinicians to anxiety disorders comorbidity regarding additional suicide risk in patients with substance use disorders.

Since non-fatal suicidal behaviors usually precede more serious and even fatal behaviors[58,74,75], the active investigation of SAD symptoms in this population is an important opportunity for prevention. With regard to suicide risk, health professionals should be particularly careful with alcohol-dependent patients who present more severe symptoms of social inadequacy and social inferiority. Nevertheless, more studies are needed to confirm or refute the importance of specific SAD symptoms to suicide risk in this population.

Limitations

The cross-sectional design does not allow inferences about cause and effect, but just indicates associations between the outcome and explanatory variables. The instruments assessed current psychopathological symptoms and did not include questions on age of onset of the disorders (SAD, depression); only age at onset of alcohol use was investigated. The small sample size probably limited the study power and the sample was not probabilistic. Despite being a validated instrument in our country, the SPIN is not a diagnostic tool, and the SAD diagnosis was determined with its threshold score and not with a clinical diagnostic interview. Likewise, the BDI evaluates depressive symptoms, but it is not a diagnostic instrument. Depressive cognitive biases may have influenced the answers to the SPIN, since BDI and SPIN scores were correlated. Data was collected in a tertiary outpatient service; therefore, the generalization of the results to alcohol-dependent individuals in the community or patients attended at primary or secondary health services should be made with caution. Suicidality is a very complex phenomenon and other relevant risk factors – *e.g.* stressful life events, marital conflicts, family history of suicide, organic diseases and personality disorders – were not investigated.

CONCLUSIONS

The prevalence of symptoms suggestive of SAD among alcohol-dependent outpatients was very high (45.3%), much higher than the prevalence rates reported in community studies. Compared with non-SAD alcohol-dependent patients, patients with SAD had lower income, more frequent and severe depressive symptoms, and more suicidal behaviors. Social inadequacy and social inferiority were the SAD manifestations mostly associated with suicidality in this treatment-seeking sample of alcohol-dependent individuals.

Since SAD symptoms can go unnoticed and negatively impact the clinical course and prognosis of alcohol dependence, it is essential to directly investigate and properly treat these symptoms in clinical samples of alcohol-dependent patients. Community-based studies on the influence of SAD symptoms in help-seeking behaviors for alcohol dependence are warranted.

More clinical studies (with larger samples, other types of services, investigating other independent variables and using prospective designs) are needed to better understand the impact of SAD comorbidity on the alcohol dependence prognosis, including relapses and suicide risk. Intervention studies examining the effect of specific pharmacological and psychotherapeutic strategies for SAD symptoms on the clinical course of alcohol dependence are also much necessary.

INDIVIDUAL CONTRIBUTIONS

Nicoli Tamie Yoshimi – Study planning, data collection, dataset organization, literature review, interpretation of data, first draft and final version of the manuscript.

Luana Moraes Campos – Data collection and dataset organization, preparation of the final version of the manuscript.

Maria Odete Simão – Planning, organization and supervision of data collection, dataset organization.

Ricardo Cezar Torresan – Study design and planning, assistance in literature review, and interpretation of data.

Albina Rodrigues Torres – Study design and planning, statistical analysis, interpretation of data and preparation of the first draft and final version of the manuscript.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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