



Alcohol use by suicide victims in the city of Sao Paulo, Brazil, 2011–2015

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ABSTRACT

Excessive alcohol consumption is a serious public health issue, because drunkenness affects critical judgment and self-control which could trigger violent and self-harm behavior, with thus a potential association between alcohol consumption and suicide deaths. The objective of the present study was to assess the association between alcohol consumption and suicide deaths in the city of Sao Paulo, Brazil, from 2011 to 2015, and its relationship with socio-demographic characteristics of the victims and the circumstances of the suicide. A cross-sectional retrospective study was conducted by collection of data from 1,700 suicide victims subjected to examination of blood alcohol concentration (BAC) from toxicology reports from the Institute of Legal Medicine of the State of Sao Paulo, Brazil. Alcohol was detected in blood samples of 30.2% of the victims and mean BAC levels were 1.73 ± 0.08 g/L. The mean age of the victims was 39.90 ± 0.75 years. The majority of the victims were male (74.6%) and the prevalence of positive BAC was higher amongst men (34.7%) than women (17.1%), $p < 0.05$. The majority of the victims were white skinned (64.7%), but there was a higher proportion of victims with positive BAC among mulatto and black individuals, $p < 0.05$. Hanging was the most prevalent suicide method in the sample (48.7%) and amongst men (55.4%), but amongst women it was jumping from a height (35%), $p < 0.05$.

1. Introduction

Suicide refers to all causes of death triggered by the action of the victim against him or herself, with awareness of the likely outcome.¹ It is a leading cause of violent death worldwide and one of the four leading causes of death among individuals between 15 and 44 years old,² making it a public health issue.³

The worldwide suicide rates may be influenced by cultural, regional and socio-demographic factors^{2,4} and suicide may be related to several predisposing factors, such as domestic problems, unemployment, poverty, financial difficulties, previous suicide attempts, family history, stressful life events, chronic diseases, psychiatric conditions – particularly depression and substance abuse/dependence on alcohol and drugs.^{5–9}

There are some studies in Brazil on suicide mortality. Lovisi et al. (2009) observed that the overall rate of suicide in Brazil, from 1980 to 2006, increased from 4.4 to 5.7 deaths per 100,000 inhabitants, representing an increase of 29.5%, with prevalence of male victims (77.3%). The most employed suicide methods were: hanging (47.2%), injury by firearms (18.7%) and intentional self-poisoning (14.3%).¹⁰

Alcohol is a licit psychoactive, easily available and low cost drug, making it one of the most consumed substances worldwide.¹¹ Excessive

alcohol consumption and/or abuse of other drugs are closely linked to suicide deaths,¹² as drunkenness can affect critical judgment and self-control and trigger suicidal behavior. It is well recognized that individuals with a history of psychoactive substances abuse are over-represented in mortality statistics.^{13–15}

Studies in European and North American countries indicate the association between alcohol consumption and suicide, despite the socio-cultural differences.¹⁶ In Sweden, it was observed that 34% of suicide victims had consumed alcohol before death, with mean BAC levels of 1.32 ± 0.89 g/L, wherein 71% of the victims were males and 29% females.¹⁷ In Germany, it was found that 32% of suicide attempts were after acute ingestion of alcohol.¹⁸ In Finland, 36% of suicide victims were found with positive BAC, and a positive BAC was observed twice more often in men than in women.¹⁹ In the United States, 24% of suicide victims had BAC greater than 0.8 g/L,²⁰ and the prevalence of alcohol consumption among suicide victims in the state of New Mexico was 44.3%, with mean BAC levels of 1.98 ± 0.88 g/L.²¹ In a study conducted in the United Kingdom, from 1988 to 1995, 45% of suicide victims had positive BAC.¹⁵ In Ireland, from 2001 to 2002, 55.5% of suicide victims had consumed alcohol before committing suicide, with mean BAC levels of 1.6 g/L.²² In Australia, 41% of suicide victims had positive BAC and, among these, 44% were men and 27% women, and it

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was observed that the prevalence of alcohol differed according to the suicide method.²³

Brazil has a high prevalence of alcohol consumption and dependence.²⁴ According to the “I National inquiry about alcohol consumption patterns in Brazilian population”, 45% of adults who drink alcohol reported they have or have had at least one injury related to the use/abuse of alcohol.²⁵

Carlini-Cotrim et al. (1998) found that 36.2% of suicide victims in the metropolitan region of Sao Paulo, Brazil, in 1994 had a positive BAC; the majority of the victims was male (77%) and belonged to the age group 20–39 years (44%).²⁶ Ponce et al. (2008) found that 37.1% of men and 20.1% of women suicide victims had positive BAC in the State of Sao Paulo, Brazil, in 2005; with prevalence of male victims (76.4%) and prevalence of age group 20–49 years (68%). In this study, hanging was the most prevalent suicide method (39.8%).²⁷ Sinagawa et al. (2008) reported that 32.1% of suicide victims had positive BAC, with mean BAC levels of 1.6 g/L, in Sao Paulo, Brazil, in 2006.²⁸ Zerbini et al. (2012) found that 37.5% of suicide victims by hanging had positive BAC in Sao Paulo city, Brazil, in 2007; the mean BAC levels was 1.80 ± 0.90 g/L, with prevalence of male victims (84.2%), prevalence of age group 15–44 years (67.4%) and mean age of 38 years.²⁹

The results of these studies support the hypothesis that people have more suicidal thoughts and behavior when they consume alcohol,³⁰ because there was a dose-response relationship: the higher the alcohol consumption, the greater the prevalence of suicidal behaviors.³¹ Furthermore, it was also noted that the reduction of alcohol consumption in some countries was associated with a decrease in the number of suicides, while in others, high alcohol consumption was associated with high suicide rates.^{32,33}

Despite the considerable prevalence of suicides and other violent deaths in Brazil, there is a lack of studies that allow an epidemiological approach to support possible public health policies on this issue. Similarly, there is little information and epidemiological data on alcohol consumption in Brazil that show its association with suicide mortality in order to be included in preventive strategies aiming to reduce mortality from suicide. Premature death generates repercussions with economic and social consequences, and the identification of individuals at high risk of committing suicide is the major challenge for health professionals.¹¹

2. Objective

The objective of this study was to analyze the association between alcohol consumption and suicide deaths in the city of Sao Paulo, from 2011 to 2015, as well as its relationship with socio-demographic characteristics of the victims and the circumstances of the suicide: gender, age, ethnicity, suicide method, and blood alcohol concentration (BAC).

3. Methods

A cross-sectional retrospective study was conducted by analyzing the secondary data of suicide victims from the city of Sao Paulo, Brazil, from 2011 to 2015. Data were reviewed from the Institute of Legal Medicine of the State of Sao Paulo and the State Criminal Information System (INFOCRIM). Cases that were marked as solved suicides, after criminal investigation, were selected. The inclusion criteria was only suicide victims subjected to examination of BAC (n = 1700).

Data consisted of information of suicide victims on gender, age, ethnicity, suicide method and BAC. The suicide method was classified according to the mode or instrument that caused death, such as: hanging, jumping from a height, self poisoning (prescription drugs, drugs of abuse, carbon monoxide, pesticides, among others), injury by firearms, injury by sharp weapons, running over (motor or rail vehicle) and other fatal self-harm methods (drowning, fire, electricity and others). It should be noted that for those methods in which accidental

death would be possible (self poisoning, running over, etc), only cases that were concluded as suicide were included in this sample.

Blood collection was performed by the medical examiner at the time of the post mortem examination, usually from 6 to 12 h after death. The BAC analysis were performed by headspace gas chromatography and considered positive for blood samples with concentrations equal or higher than 0.2 g/L (grams of alcohol per liter of blood).³⁴ Above this limit set, BAC levels were divided into six categories for analysis: 0.2–0.5 g/L; 0.6–1.5 g/L; 1.6–2.5 g/L; 2.6–3.5 g/L; 3.6–4.5 g/L; above 4.5 g/L.

Data were collected using a standardized form. A descriptive analysis was conducted, using frequency measures, means and standard deviations with 95% confidence interval. All mean blood alcohol concentrations (BAC) refer only to the victims with positive BAC.

Statistical differences between groups for the study variables were evaluated by Chi-square Test, Student's t-Test, Fisher's Exact Test and ANOVA Test. Differences with p < 0.05 were considered statistically significant.

4. Results

This study examined data from 1700 suicide victims subjected to examination of blood alcohol concentration (BAC).

Table 1 presents socio-demographic information, BAC levels as positive and negative and suicide methods. In the sample studied, 30.24% (514 cases) of the victims had a positive BAC, and the BAC results ranged from 0.3 g/L to 5.6 g/L, with mean BAC levels of 1.73 ± 0.08 g/L. The mean age of the sample was 39.90 ± 0.75 years (n = 1700).

Suicide victims were predominantly males (74.59%, 1268 cases). The prevalence of positive BAC was greater amongst men (34.70%, 440 cases) than women (17.13%, 74 cases), p < 0.05. Mean BAC levels in

Table 1
Description of suicide victims by socio-demographic characteristics, blood alcohol concentration results and suicide method.

	All (1,700)		Positive (514)		Negative (1,186)	
	n	%	n	%	n	%
Gender						
Male	1268	74,59	440	34,70	828	65,30
Female	432	25,41	74	17,13	358	82,87
Total	1700	100	514	30,24	1186	69,76
Age (years)						
< 15	10	0,59	0	0	10	100
15-24	258	15,18	60	23,26	198	76,74
25-34	488	28,71	183	37,50	305	62,50
35-44	346	20,35	133	38,44	213	61,56
45-54	297	17,47	85	28,62	212	71,38
55-64	161	9,47	35	21,74	126	78,26
65-74	86	5,06	12	13,95	74	86,05
75-84	39	2,29	5	12,82	34	87,18
> 85	15	0,88	1	6,67	14	93,33
Total	1700	100	514	30,24	1186	69,76
Ethnicity						
White	1099	64,65	288	26,21	811	73,79
Mulatto	474	27,88	192	40,51	282	59,49
Black	77	4,53	26	33,77	51	66,23
Asian	34	2,00	3	8,82	31	91,18
Unknown	16	0,94	5	31,25	11	68,75
Total	1700	100	514	30,24	1186	69,76
Suicide method						
Hanging	827	48,65	324	39,18	503	60,82
Jumping from a height	355	20,88	68	19,15	287	80,85
Self poisoning	298	17,53	56	18,79	242	81,21
Firearms	136	8,00	44	32,35	92	67,65
Sharp weapons	29	1,70	9	31,03	20	68,97
Running over	44	2,59	10	22,73	34	77,27
Other	11	0,65	3	27,27	8	72,73
Total	1700	100	514	30,24	1186	69,76

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