BRIEF COMMUNICATION

Suicidal behavior among substance users: data from the Second Brazilian National Alcohol and Drug Survey (II BNADS)

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Objective: To investigate the prevalence rates of suicidal ideation (SI) and suicide attempts (SA) and their association with substance use in a nationally representative sample of Brazilians.

Methods: The Second Brazilian National Alcohol and Drug Survey (II BNADS) is a household cross-sectional survey that investigated the consumption of psychotropic drugs and associated risk factors. This national probability sample survey used a multistage cluster design to select 4,607 participants aged 14 or older and had a total response rate of 77%. Illegal drug use, SI and SA were obtained by confidential self-report assessment.

Results: SI and SA were reported by 9.9 and 5.4% of the sample, respectively. This prevalence was 20.8 and 12.4% among individuals with alcohol use disorders (AUD), 31.5 and 16.5% among cannabis users and 40.0 and 20.8% among cocaine users. After adjusting for demographic characteristics, tobacco use, family history of suicide and depression, both SI and SA were positively associated with AUD, cannabis and cocaine use.

Conclusion: AUD, cannabis and cocaine use were significantly associated with SI and SA, even after the adjustments. Public health initiatives targeting suicide prevention should consider including assessment and management of substance misuse, and therapeutic approaches to substance misuse should include assessment of suicidality.

Keywords: Suicidal ideation; suicide attempts; substance abuse; alcohol misuse

Introduction

Suicide is the second leading cause of death among young and middle-aged adults worldwide and is a public health priority for the World Health Organization.[1] It is estimated that 800,000 people take their own lives every year worldwide, and low-and middle-income countries, with 75% of all cases, bear the brunt of this problem. The first epidemiological report about suicide in Brazil was announced in September 2017 and showed that an increase in the suicide rate had occurred between 2011 and 2015.[2] Understanding which risk and protective factors interact in suicide behavior and how they do so can provide valuable information for the development of effective prevention programs.

Suicide is a complex behavior that probably results from an interaction between biological factors, including genetic predisposition, and a myriad of environmental and psychosocial variables.[3] Besides common mental disorders, substance use disorders (SUD) might be the most well-known and studied factor associated with suicidal behaviors.[4,5]

This study aimed to investigate the prevalence rates of suicidal ideation (SI) and suicide attempts (SA) and their association with substance use in a nationally representative sample of Brazilians.

Methods

Sampling and procedures

The Second Brazilian National Alcohol and Drug Survey (II BNADS) was conducted between November 2011 and March 2012. A multistage cluster sampling procedure was used to select 4,607 individuals aged 14 years or older from the Brazilian household population, including an oversample of 1,157 adolescents. The overall response rate was 77%. Details about the survey's methodology

can be seen elsewhere.[6] The final sample included in the present analysis was 4,225 individuals.

Ethics

This research protocol was approved by the ethics committee of the Universidade Federal de São Paulo and by the National Commission of Ethics in Research (61909615.0.0000.5505). All subjects provided written informed consent prior to enrollment.

Measurements

The present analysis focused on sociodemographic characteristics, history of SI and SA, data on substance use and the presence of major depressive disorder. To guarantee confidentiality, all questions about illicit substances and suicidality were privately self-reported by the participants, collected at the end of the interview in sealed envelopes and immediately placed in sealed bags in their presence.

Sociodemographic variables

All the main variables were assessed: gender, age, marital status, years of education and religion.

Suicidal behavior

Suicidal behavior was investigated with three yes/no questions: "Have you ever thought about taking your own life?"; "Have you ever tried to take your own life"; "Has someone in your family have ever committed suicide?"

Substance use

Cannabis and cocaine use were investigated with two yes/no questions: "Have you used cocaine in the last 12 months?" and "Have you used cannabis in the last 12 months?"

DSM-5 alcohol use disorder (AUD) was assessed with the Brazilian version of the Composite International Diagnostic Interview (CIDI 2.1).[7] Although the II BNADS predates the DSM-5, the questionnaire covered the eleven AUD criteria included in the DSM-5. For the purposes of this analysis, the presence of 2 or more criteria in the past 12 months was considered a positive diagnosis of AUD.

Depressive symptoms

Depressive symptoms were assessed using the validated Brazilian version of the 20-item Center for Epidemiological Studies Depression Scale (CES-D). This scale, which measures the patient's experience of depressive symptomatology during the past week, was developed from items appearing in longer, well-validated depression scales. It was validated in Brazil with a cut-off point of 16.[8] The total score (0 to 80) was calculated by summing the responses after reversing the positive effect items and was included as an index in multivariate models.

Statistical analysis

STATA version 13 was used for all statistical analyses.[9] Given the multistage stratified sampling design, post-stratification weighting was used in all analyses to account for differing selection probabilities at each stage and for non-responses. "Svy" commands were used for all prevalence and association estimates. Associations with SI and SA were calculated using Poisson regression analysis with robust variance and adjusted for sociodemographic variables, depressive symptoms, and family history of suicide. All variables were mutually adjusted.

Results

Sample characteristics and descriptive analysis

A history of SI and SA was reported by 9.9 and 5.4% of the sample, respectively, with prevalences of 20.8 and 12.4% among participants with AUD, 31.5 and 16.5% among cannabis users and 40.0 and 20.8% among cocaine users, respectively. The prevalence rate of family history of suicide was 3%, and over 25% of the participants reported depressive symptomatology. Regarding substance use, 15.4% of the sample were tobacco smokers; the DSM-5 AUD rate was 8.6%. Cannabis and cocaine use in the last year were reported at less than 5 and 2%, respectively. It should be pointed out that all cocaine users were polydrug users.

SI, SA and sociodemographic characteristics

A history of SI and SA was significantly associated with female gender, a family history of suicide, and major depression. Regarding religious beliefs, although Catholicism was the most prevalent religion (Table 1), a complementary analysis was performed in which religion was transformed into a binary variable (yes/no), and the results indicated that it was a protective factor against SA (prevalence ratio [PR] = 0.7; 95% confidence interval [95%CI] 0.49-0.98). Compared to being in a relationship, being single, widowed or divorced was a risk factor for SI only.

Association between history of SI and SA with substance use

After adjusting for all sociodemographic variables, depressive symptoms, tobacco use and family history of suicide, we found significant associations between AUD (PR = 2.3; 95%CI 1.7-3.1), cannabis (PR = 3.5; 95%CI 2.5-5.0) and cocaine use (PR = 4.3; 95%CI 2.9-6.3), and history of SI. A history of SA was also associated with AUD (PR = 2.6; 95%CI: 1.8-3.9), cannabis use (PR = 3.4; 95%CI 1.9-6.1) and cocaine use (PR = 4.2; 95%CI 2.2-7.8).

Discussion

The SI and SA prevalence rates among this nationwide sample of Brazilians were 9.9 and 5.4%, respectively. These rates were higher than previously reported global lifetime prevalence rates for SI and SA (9.2 and 2.7%,

Table 1 Sample characteristics, suicidal ideation and suicide attempt prevalence rates, and the association between sample characteristics and history of suicidal ideation and suicide attempts (n=4,225)

Variable	Total sample (n=4,225)	History of suicidal ideation		History of suicide attempt	
		n (%)	PR (95%CI)	n (%)	PR (95%CI)
Total	**100%**	**418 (9.9)**		**223 (5.4)**	
Sex					
Male	1,884 (47.4)	139 (8.0)	1.00	60 (3.8)	1.00
Female	2,341 (52.7)	279 (11.7)	**1.5 (1.2-1.8)**	163 (6.8)	**1.8 (1.3-2.6)**
Age (in years)					
< 18	1,026 (9.0)	96 (8.6)	1.00	43 (4.3)	1.00
18-35	1,349 (39.3)	146 (10.3)	1.2 (0.9-1.6)	27 (6.2)	1.7 (0.9-2.2)
36-59	1,259 (37.0)	148 (11.3)	1.3 (1.0-1.8)	23 (6.2)	1.1 (0.6-2.1)
60 or more	591 (14.7)	28 (6.4)	0.7 (0.4-1.3)	10 (1.8)	0.8 (0.4-1.6)
Years of education					
< 3 years	489 (15.0)	38 (10.2)	1.00	19 (4.5)	1.00
3-8 years	1,412 (31.1)	166 (12.0)	1.2 (0.8-1.8)	95 (7.5)	1.7 (1.0-2.9)
9-12 years	1,524 (29.6)	141 (9.0)	0.9 (0.6-1.4)	75 (5.1)	1.1 (0.6-2.1)
13 or more	800 (24.3)	73 (8.3)	0.8 (0.5-1.3)	34 (3.4)	0.8 (0.4-1.6)
Marital status					
Married	1,964 (57.2)	177 (8.9)	1.00	103 (4.9)	1.00
Single	1,723 (31.6)	184 (11.2)	**1.3 (1.0-1.6)**	88 (5.6)	1.2 (0.8-1.7)
Widower, divorced	538 (11.2)	57 (11.9)	**1.3 (1.0-1.9)**	32 (5.4)	1.2 (0.8-1.9)
Religion					
Catholic	2,645 (63.4)	195 (7.5)	1.00	100 (4.1)	1.00
Evangelical	1,023 (23.8)	129 (13.1)	**1.7 (1.4-2.2)**	69 (7.4)	**1.8 (1.3-2.6)**
Other	144 (3.2)	22 (15.0)	**2.0 (1.2-3.2)**	11 (7.5)	**1.8 (1.0-3.4)**
None	413 (9.6)	71 (16.2)	**2.1 (1.6-2.9)**	43 (8.6)	**2.1 (1.4-3.2)**
Family history of suicide					
No	4,008 (97.0)	387 (9.7)	1.00	203 (5.3)	1.00
Yes	122 (3.0)	26 (20.3)	**2.1 (1.3-3.3)**	19 (15.6)	**2.4 (1.3-4.4)**
Major depression					
No	3,031 (74.1)	203 (6.5)	1.00	102 (3.4)	1.00
Yes	1,101 (25.9)	212 (20.4)	**3.1 (2.4-4.0)**	120 (11.5)	**3.4 (2.5-4.7)**
Smoker					
No	3,660 (84.5)	307 (8.1)	1.00	151 (4.1)	1.00
Yes	565 (15.4)	111 (19.8)	**2.4 (1.9-3.2)**	72 (12.2)	**3.0 (2.2-4.0)**
Alcohol use disorder (DSM-5)*					
No	3,918 (91.4)	349 (8.9)	1.00	179 (4.7)	1.00
Yes	307 (8.6)	69 (20.8)	**2.3 (1.7-3.1)**	44 (12.4)	**2.6 (1.8-3.9)**
Cannabis use*					
No	3,873 (97.3)	386 (9.5)	1.00	187 (4.8)	1.00
Yes	99 (2.7)	32 (31.5)	**3.5 (2.5-5.0)**	16 (16.5)	**3.4 (1.9-6.1)**
Cocaine use*					
No	3,990 (98.1)	379 (9.4)	1.00	199 (4.9)	1.00
Yes	60 (1.9)	23 (40.0)	**4.3 (2.9-6.3)**	13 (20.8)	**4.2 (2.2-7.8)**

95%CI = 95% confidence interval; PR = prevalence ratio.
* Adjusted for sociodemographic characteristics, tobacco use, family history of suicide and depressive symptoms. All variables were mutually adjusted.
Bold font indicates statistically significant associations.

respectively) in a cross-sectional study with data from 17 countries.[10] The proximity between lifetime frequency of SI and SA is noteworthy since it diverges from the literature. Possible explanations for this include the way the questions were formulated in the survey, the exclusion of suicidal planning, and the use of the sealed envelope method to research suicidal behavior. Very few studies have investigated suicidality in Brazil and, to our knowledge, this is the first time that SI and SA have been assessed anonymously and confidentially in a representative sample of the Brazilian population.

Variables such as the presence of depressive symptoms, some personality traits, and specific stressors can act as a common trigger for both substance abuse and suicidal behavior.[11] Confirming previous results in the literature,[12] a history of SI and SA were significantly

associated with female gender, a family history of suicide, and depression. We also found strong positive associations between AUD, cannabis and cocaine use and a history of SI and SA. The relationship between substance abuse and suicidality has been previously recognized in the literature, mainly under the assumption that alcohol and/or other drug misuse (including stimulants such as cocaine), can be triggers for suicidal thoughts and suicidal behaviour[13] through pharmacological mechanisms that increase impulsivity and decrease risk perception. A recent literature review about cannabis use and suicidality highlighted the connection between chronic heavy use of cannabis with both SI and SA.[14] However, an inverse relationship between them has also been previously identified, and when suicidal behavior precedes substance misuse, it is usually associated with some mental disorder.[15] Therefore, the relationship between substance use and suicidal behavior appears to be reciprocal and multidirectional, and depression may be associated with both variables.

Our findings pave the way for more evidence-based and efficient prevention initiatives, since they highlight the importance of suicide prevention strategies among substance users, regardless of depressive symptoms. Furthermore, it seems that approaching SI as associated with mental disorders, such as substance abuse or depression, is critical to avoid SA.[10]

Certain limitations should be taken into considerations when interpreting the results of this study. Since this is a cross-sectional analysis we cannot establish causality. The sample size was a limitation for investigating data on illicit substance consumption (prevalence rates lower than 5%), which weakened the power of the multivariate analysis.

In conclusion, although Brazil has considerable rates of AUD and illicit drug use,[6] there is a lack of data regarding the association between substance misuse and suicidality in the country. Our findings should underscore the need to address suicidality in SUD treatment. In addition, public policy on suicide prevention should necessarily target SUD prevention and intervention to prevent other negative outcomes.

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Disclosure

The authors report no conflicts of interest.

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