INCIDENCE OF ALCOHOLIC BEVERAGE CONSUMPTION AMONG SUICIDE VICTIMS IN THE BRAZILIAN FEDERAL DISTRICT

INCIDENCIA DE CONSUMO DE BEBIDAS ALCOHÓLICAS EN VÍCTIMAS DE SUICIDIO EN EL DISTRITO FEDERAL

INCIDÊNCIA DE CONSUMO DE BEBIDA ALCOÓLICA ENTRE AS VÍTIMAS DE SUICÍDIO NO DISTRITO FEDERAL

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Abstract
Suicide is motivated by multiple causes, and the abusive consumption of alcoholic beverages can be an important sign that individuals do not have physical and emotional control of themselves. To estimate the incidence of alcohol consumption, immediately before suicide, among people who died in 2018 in the Brazilian Federal District. This is a population-based study, of a descriptive and exploratory nature, of all deaths which occurred in the Brazilian Federal District from January 1 to December 31, 2018. Data were collected from the Mortality Information System and Police reports. The incidence and respective 95% confidence intervals were calculated. This study was approved by the Research Ethics Committee. The incidence of alcohol consumption just before the suicide was 18.6% (CI 95%: 18.56% to 18.62%). Males, blacks, trade workers, those without a partner, young people, and individuals with less than 8 years of study had the highest indicators. There was a greater percentage of alcohol consumption in the fall/winter, at the end of the month, in rural areas, in people who had never attempted suicide before and when the modus operandi was choking or hanging. The consumption of drugs, such as methamphetamine, ecstasy, amphetamine, and cannabis, was observed together with alcoholic beverages. The results of this research signaled an important public health problem, which is the use of alcohol to potentially encourage suicide. Effective public policies to tackle the abusive consumption of alcoholic beverages and suicide are necessary.

Keywords: Suicide; Alcohol Drinking; Incidence.

Resumen
El suicidio está motivado por múltiples causas, y el consumo abusivo de bebidas alcohólicas puede ser una señal importante de que las personas no tienen control físico y emocional de sí mismos. Estimar la incidencia del consumo de alcohol, inmediatamente antes del suicidio, entre las personas que murieron en 2018 en el Distrito Federal de Brasil. Se trata de un estudio poblacional, de carácter descriptivo y exploratorio, de todas las muertes ocurridas en el Distrito Federal de Brasil del 1 de enero al 31 de diciembre de 2018. Los datos se recopilaron del Sistema de Información de Mortalidad y de los informes de la Policía. Se calcularon la incidencia y los respectivos intervalos de confianza del 95%. Este estudio fue aprobado por el Comité de ética de la investigación. La incidencia del consumo de alcohol justo antes del suicidio fue del 18,6% (CI 95%: 18,56% a 18,62%). Los hombres, los negros, los trabajadores

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del comercio, los que no tienen pareja, los jóvenes y los individuos con menos de 8 años de estudio tenían los indicadores más altos. Había un mayor porcentaje de consumo de alcohol en otoño/invierno, a finales de mes, en las zonas rurales, en personas que nunca habían intentado suicidarse antes y cuando el modus operandi se estaba asfixiando o ahorcando. El consumo de drogas, como la metanfetamina, el éxtasis, la anfetamina y el cannabis, se observó junto con las bebidas alcohólicas. Los resultados de esta investigación indicaron un importante problema de salud pública, que es el uso del alcohol para fomentar potencialmente el suicidio. Las políticas públicas eficaces para hacer frente al consumo abusivo de bebidas alcohólicas y el suicidio son

Palabras clave: Suicidio; Consumo de Bebidas Alcohólicas; Incidencia.

Resumo
O suicídio é motivado por múltiplas causas e o consumo abusivo de bebidas alcoólicas pode ser um sinal importante de que os indivíduos não têm controle físico e emocional de si mesmos. Estimar a incidência do consumo de álcool, imediatamente antes do suicídio, entre as pessoas que morreram em 2018 no Distrito Federal. Trata-se de um estudo de base populacional, de caráter descritivo e exploratório, de todos os óbitos ocorridos no Distrito Federal de 1º de janeiro a 31 de dezembro de 2018. Os dados foram coletados do Sistema de Informações sobre Mortalidade e relatórios policiais. Foram calculados os intervalos de confiança de 95%. Este estudo foi aprovado pelo Comitê de Ética em Pesquisa. A incidência de consumo de álcool pouco antes do suicídio foi de 18,6% (IC 95%: 18,56% a 18,62%). Homens, negros, trabalhadores do comércio, aqueles sem parceiro, jovens e indivíduos com menos de 8 anos de estudo apresentaram os maiores indicadores. Houve maior percentual de consumo de álcool no outono/inverno, no final do mês, em áreas rurais, em pessoas que nunca haviam tentado suicídio antes e quando o modus operandi estava engasgando ou pendurado. O consumo de drogas, como metanfetamina, ecstasy, anfetamina e cannabis, foi observado juntamente com bebidas alcoólicas. Os resultados desta pesquisa sinalizaram um importante problema de saúde pública, que é o uso de álcool para potencialmente incentivar o suicídio. São necessárias políticas públicas eficazes para enfrentar o consumo abusivo de bebidas alcoólicas e o suicídio.

Palavras-chave: Suicídio; Consumo de Bebidas Alcoólicas; Incidência

INTRODUCTION

Suicide is a worldwide, complex, and paradoxical phenomenon that is defined as an event in which individuals harms themselves with the intention of dying [1–3]. It is considered to be of multifactorial origin and is related to mental and behavioral disorders[2,4]. There is a feeling of hopelessness in the individual who has suicidal behavior. This fact can often prevent the person from seeking help from the family support network or health services. There are several conditions linked to this act, for example, mental disorders, family history of suicide and abuse of chemical substances [2,5,6].

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Alcohol is one of the most consumed psychoactive substances worldwide; overuse is closely related to suicide attempts and suicide [7–9]. Among the negative consequences are the development of neuropathies, chemical dependence, the triggering of euphoric feelings, pleasure, freedom and exacerbated emotional changes, as well as the reduction of reasoning capacity, loss of clarity and greater impulsivity, leading in some cases to practical actions, such as suicide, in drunken individuals [8–11].

It is estimated which the risk of suicide is approximately ten times higher in people with chemical dependence and four times higher in young women who compulsively consume alcohol. It is worth mentioning that for every ten attempts at self-extermination, more than two are related to the use of alcoholic beverages [8,10,12]. Every 40 seconds, a person is a victim of suicide in the world, and it is the second cause of death among young people aged 15 to 29 years [5,13]. Brazil is among the 10 countries that have the highest suicide rates [2,7,14]. In the Brazilian Federal District, the suicide mortality coefficient ranks fourth among external causes [15].

Although it is known that suicide is motivated by multiple causes, the abusive consumption of alcoholic beverages can be an important sign that individuals do not have physical and emotional control [8,10]. It is known that self-destruction is a preventable condition, and one of the main causes of violent death worldwide, so it is necessary to strengthen strategies aimed at public health and the practice of health professionals in relation to coping with risk factors which can influence the excessive consumption of alcoholic beverages, and consequently assist in the prevention of suicide [2,8,16]. In light of the magnitude of the problem, the study aims to describe the incidence of consumption of alcoholic beverages among people who died by suicide in 2018 in the Brazilian Federal District.

METHOD

Population-based study, of a descriptive and exploratory nature, of all deaths that occurred in the Brazilian Federal District (BFD) from January 1 to

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December 31, 2018. The BFD is divided into 33 administrative regions and has approximately 2,881,854 residents, of which 52.2% are female, and 47.8% are male [17]. The Human Development Index (HDI), registered in the last census of 2010, was 0.824, first place in the national ranking when compared to other states in Brazil [18]. In relation to the Gross Domestic Product (GDP) of the BFD, in 2017, it was 244.683 billion, a result that placed it in the eighth position among the state economies of Brazil [19].

This study was approved by the Research Ethics Committee of the Health Sciences Teaching and Research Foundation, CAAE: 95486818.0.0000.5553, according to Resolutions 466/2012 and 580/2018 of the National Health Council. The Free and Informed Consent Term (ICF) was dispensed with since the information used originated from institutional documents. All deaths from suicides in the Brazilian Federal District that occurred in 2018 were included. The exclusion criterion was individuals without toxicological examination for measuring alcoholic beverage consumption.

All BFD Death Certificates were registered in the Mortality Information System. After this stage, the basic cause of death was investigated by properly trained health professionals from the Health Department of the Brazilian Federal District. The first stage of the investigation was the screening of death certificates, separating ill-defined or inconsistent basic cause deaths from those that needed to be investigated. Then, the investigation of remaining death certificates was carried out using the medical institution's medical records and Police documents (Coroner reports). After this process, the basic cause of death was redefined, recoded, and inserted in the Mortality Information System. After the investigation, data were collected from people who died from suicide. This collection took place in the form of standardized forms conducted by two previously trained researchers.

A standardized form was used for data collection which was composed of sections that covered the following items: 1) Death certificate data, collected from the Mortality Information System, including place of residence, age, sex, skin color, education, professional occupation, and information about the basic cause of death; 2) Data from Police documents: date and time of the suicide, previous attempts, results

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of toxicological exams to assess the presence of licit and illicit drugs and suicide *modus operandi.*

The outcome of the study was the consumption of alcoholic beverages in the moments preceding suicide, measured by a gas chromatography toxicological examination performed by the Legal Medicine Institute. It was defined as positive when the blood alcohol concentration registered ≥ 0.5 g / l, as recommended by the classification of the Brazilian Medical Association and Dubowski [20,21].

The exposures evaluated were socioeconomic-demographic factors, aspects related to the consummation of suicide, and the use of other drugs. The socioeconomic factors analyzed were age group (in years and according to the WHO classification [22]), skin color (non-black and black), sex (female and male), marital status (with and without partner), years of study (<8 years and ≥ 8 years), occupation (students; health workers; security; commerce; civil construction; military; others). Regarding the characteristics of suicide, the variables analyzed were: means used to perform the suicide (firearm; stab; asphyxiation; hanging, being run over, fire, electric shock, projection, drowning and exogenous intoxication), season (autumn/winter; spring/summer), period of the month (beginning 1-10; middle 11-20; end 21-31), died at the place of suicide (yes; no), place of suicide (prison complex, commercial establishment; entertainment establishment; hospital or/and rehabilitation clinic; hotel/motel; residence; public road; rural area; others) and previous suicide attempt (yes or not informed).

Regarding the use of licit and / or illicit drugs, it was analyzed as to whether or not the victim used some drug, which was separated by types: amphetamine, barbiturate, benzodiazepine, buprenorphine, cocaine, phencyclidine, cannabis, ecstasy, methadone, methamphetamine, opioid, and tricyclic antidepressants.

A descriptive analysis was carried out comparing the people who consumed and those who did not consume alcohol before committing suicide. The analysis was performed with relative and absolute frequencies for all categorical variables. In addition, the population confidence interval was calculated for incidence, and a correction factor was applied to the finite population [23,24]. The statistical analysis was processed in the STATA® software, version 15.1, serial number: 401506208261. A

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map was made with the relative frequencies by administrative region, using the QGIS software, version 3.12.3.

RESULTS

In total, 200 suicide deaths were recorded in the Brazilian Federal District in 2018, but in 44 cases, it was not possible to perform the toxicological exam for alcohol. As such, the study was composed of 156 individuals (Figure 1). The incidence of alcoholic beverages uses moments before suicide was 18.6% (CI 95%: 18.56% to 18.62%). It was observed that males, blacks, commerce workers, and people who did not have a partner were those who had the highest percentage for suicide and alcohol consumption. Regarding age, young adults (25-44 years old) were those who most committed suicide, but it was young people (10-24 years old) who most consumed alcoholic beverages. Individuals with less than 8 years of study, even though they have a lower incidence of death by suicide made more use of alcohol during the act (Table 1).

Regarding the means used to carry out the death, there was a higher incidence of alcoholic beverage consumption among people who died by asphyxiation, followed by hanging and firearms. Autumn/winter, in addition to being the season in which there was a higher percentage of suicide mortality, was also the season in which more individuals used alcohol. At the beginning of the month, there was a higher relative frequency of suicide, but it was at the end of the month that there was a higher rate of alcohol consumption. The mortality indicator for people who died in rural areas due to suicide and alcohol consumption was 60.0%. Of the people who died at the suicide site, 18.9% used alcohol. Regarding the history of attempted suicide, the use of alcoholic beverages was more frequent in people who had never tried before, or it did not appear in the police report (Table 1).

The most common drugs that were used concurrently with alcoholic beverages, in decreasing order, are listed below: methamphetamine, ecstasy, amphetamine, cannabis and cocaine (Table 2). When assessing the percentage of alcoholic beverage consumption in the moments prior to suicide by Administrative Region (popularly known as satellite cities), it was observed that Riacho Fundo, Setor

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Complementar de Indústria e Abastecimento (SCIA) and Sudoeste / Octogonal, had the most cases registered, almost 100% of the total (Figure 2).

Figure 1- Flowchart of the selection of the population.

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┌──────────────────────────────────────────┐
│ 200 deaths by suicide registered in       │
│ Mortality Information System after        │
│ investigation                             │
└──────────────────────────────────────────┘
      │
      │          ┌──────────────────────────────────────┐
      │ ────────▶│ Excluded from the study:             │
      │          │ 44 cases without toxicological exam.  │
      │          └──────────────────────────────────────┘
      ▼
┌──────────────────────────────────────────┐
│ 156 suicide deaths assessed in the study  │
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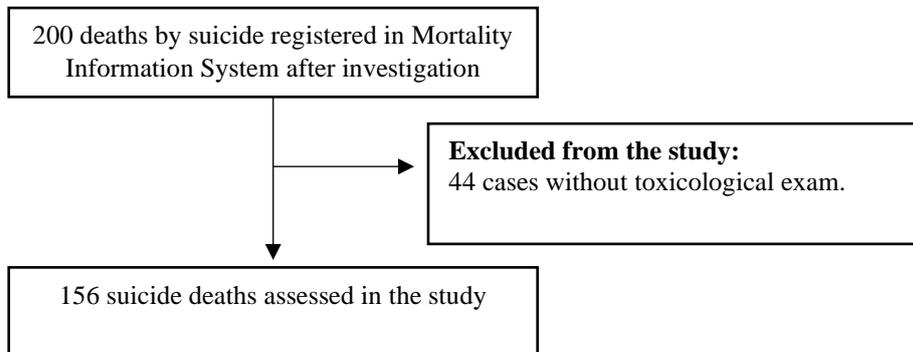
Table 1- Socioeconomic-demographic characteristics and aspects related to the consummation of suicide, according to the use of alcoholic beverages, in the Brazilian Federal District, 2018 (n = 156).

VARIABLES	USED ALCOHOLIC BEVERAGE		DID NOT USE ALCOHOLIC BEVERAGE	
	n	%	n	%
Total	29	18,6	127	81,4
Sex				
Male	21	19,7	86	80,4
Female	8	16,3	41	83,7
Race/skin color				
Black	19	19,0	81	81,0
Non-black	10	17,9	46	82,1
Age				
Young (10-24)	11	26,2	31	73,8
Young Adults (25-44)	14	20,3	55	79,7
Adults (45-59)	2	8,0	23	92,0
Elderly (≥ 60)	2	20,0	18	90,0
Employment status				
Trade	11	36,7	19	63,3
Military	3	27,3	8	72,7
Security	1	20,0	4	80,0
Others	4	13,3	26	86,7
Health	1	9,1	10	90,9
Student	0	0,0	10	100,0
Construction	0	0,0	4	100,0
Schooling level				
< 8 years of study	10	23,3	33	76,7
≥ 8 years of study	19	17,0	93	83,0
Marital status				
Without partner	18	19,3	75	80,7
With partner	11	17,5	52	82,5
Suicide method				

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	n	%	n	%
Asphyxiation	1	33,3	2	66,7
Hanging	22	26,5	61	73,5
Firearm	3	13,0	20	87,0
Exogenous Intoxication	2	7,4	25	92,6
Fall	1	6,7	14	93,3
Sharp object	0	0,0	1	100,0
Run Over	0	0,0	1	100,0
Fire	0	0,0	1	100,0
Electric shock	0	0,0	1	100,0
Drowning	0	0,0	1	100,0
Seasons				
Autumn/winter	19	23,2	64	76,8
Spring / summer	10	13,5	63	86,5
Period of the month (days)				
Beginning (1 to10)	5	8,6	53	91,4
Middle (11 to20)	7	14,3	42	85,7
End (21 to 31)	17	34,7	32	65,3
Died at the scene of the suicide				
Yes	25	18,9	107	81,1
No	3	13,6	19	86,4
Place of death				
Rural área	3	60,0	2	40,0
Others	1	25,0	3	75,0
Hospital / Health Center	1	20,0	4	80,0
Residence	22	18,8	95	81,2
Commercial establishment	1	16,7	5	83,3
Public road	1	7,1	13	92,9
Penitentiary complex	0	0,0	2	100,0
Hotel / motel	0	0,0	3	100,0
Previous suicide attempts				
Yes	4	16,0	21	84,0
No/ Not registered	25	19,1	106	84,9

Note: (*) - Missing data
Source: Prepared by the author based on data from the Mortality Information System and institutional documents from the Police.

Table 2- Consumption of licit and illicit drugs according to the use of alcoholic beverages, in the Brazilian Federal District, 2018 (n = 156).

VARIABLES	USED ALCOHOLIC BEVERAGE		DID NOT USE ALCOHOLIC BEVERAGE	
	n	%	n	%
Amphetamine *23				
Yes	2	33,3	4	66,7
No	24	18,9	103	81,1
Barbituric *24				
Yes	0	0,0	3	100,0
No	23	17,8	106	82,2
Benzodiazepine 1 * 20				
Yes	1	5,0	19	95,0
No	26	22,4	90	77,6
Benzodiazepine 2 * 22				
Yes	1	8,3	11	91,7
No	24	19,7	98	80,3
Cocaine * 2				

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Yes	6	25,0	18	75,0
No	22	16,9	108	83,1
Cannabis *2				
Yes	6	32,3	11	64,7
No	22	16,1	115	83,9
Ecstasy * 21				
Yes	2	33,3	4	66,7
No	24	18,6	105	81,4
Methadone * 26				
Yes	0	0,0	2	100,0
No	23	18,0	105	82,0
Methamphetamine * 24				
Yes	3	37,5	5	62,5
No	21	16,9	103	83,1
Opiate * 25				
Yes	0	0,0	8	100,0
No	24	19,5	99	80,5
Tricyclic antidepressants * 22				
Yes	1	8,3	11	91,7
No	25	20,5	97	79,5

Note: (*) - Missing data
Source: Prepared by the author based on data from the Mortality Information System and institutional documents from the Police.

Figure 2- Map of the Brazilian Federal District with the percentage of alcohol consumption before suicide, by Administrative Region, in 2018

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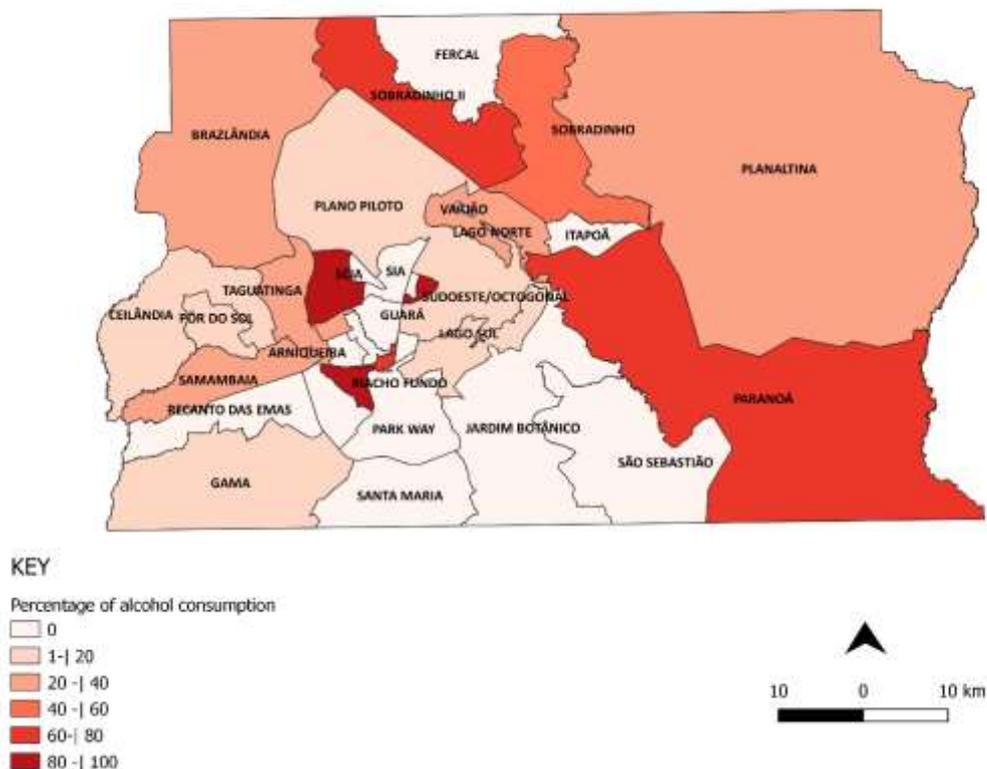
DISCUSSION

The incidence of alcohol consumption immediately before and / or during the suicide was 18.6%. Males, blacks, trade workers, individuals without a partner, young people, and those with less than 8 years of study had the highest indicators. There was a higher percentage of alcoholic beverage consumption in autumn/winter, at the end of the month, occurring in rural areas, in people who never had before attempted suicide, and the *modus operandi* were asphyxiation, hanging and firearms. There was a relatively high frequency of consumption of illicit drugs, such as methamphetamine, ecstasy, amphetamine, and cannabis, along with alcoholic beverages.

The consumption of alcoholic beverages showed a high percentage among suicide victims, according to the results found, which corroborates other studies [25–27] and one systematic review [28]. Due to the power of disinhibition that alcohol generates, due to its toxicological effects on the body, such as increased impulsivity and the false illusion that there will be less suffering at the time of consummation, the victim feels capable of transforming the suicidal idea into action [26,27]. In addition to the disinhibiting potential of alcohol consumption, this effect may be exacerbated if combined with other drugs [29,30]. The use of alcoholic beverages together with illicit drugs was frequent moments before suicide in the Brazilian Federal District, as corroborated in other studies [29,31].

Regarding the method used in suicide, we can see that the consumption of alcoholic beverages contributed to the most violent *modi operandi*, such as choking, hanging, and using a firearm. These mechanisms are the most chosen in relation to the others due to the decrease in the time it takes to die, being means characterized as more effective and lethal [26,32].

Concerning the age group, young people (10-24 years) were those who most consumed alcoholic beverages in the execution of suicide. This data can be explained as being due to a phase of development with many changes, such as biological, emotional, and social, occurring in a fast way, which generates insecurity in many young people, with alcoholic drink becoming a refuge. Consequently, this can lead to loss of clarity and greater impulsiveness, which results in suicide [33–35]. In addition, the greater consumption of alcoholic beverages at this stage is considered a fun

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and acceptable means of social relationship, and studies have shown that young people are the ones who exaggerate the most [11,26].

Those who most consumed alcoholic beverages during suicide were blacks and individuals with less than 8 years of schooling, a fact that may be related to socioeconomic issues, historical factors of the black population, and the execution of less profitable jobs in the population with less education [36–38]. According to some research, lack of money is one of the main causes of depression and suicide [39,40].

Regarding sex, males had a higher frequency of suicide, and higher consumption of alcoholic beverages, moments before the act. A result that corroborates some studies [28,33,41,42], while other research shows that women are more susceptible to committing suicide under the effect of alcoholic beverages [43,44]. A possible explanation for the result found is the stereotype of masculinity imposed by society, where men are not allowed to demonstrate weakness, making it difficult to seek help [45,46].

People without a partner had a higher incidence of suicide with alcohol consumption, a result also found by other studies [47,48]. This behavior can be motivated by the stressors of daily life and aggravated by a lack of psychological support. In contrast, some studies obtained results that disagreed with the data presented [26,49].

Autumn and winter were the seasons in that there was more suicide with the use of alcoholic beverages, which corroborates other studies [50,51]. One of the possible explanations is the lower exposure to daylight during these seasons, which contributes to the worsening of depressive symptoms and, consequently, influences the abusive use of alcohol and the execution of suicide [50].

Among the strengths of this investigation, it should be emphasized that it is a population-based study, thus guaranteeing representativeness for the Brazilian Federal District. In addition, the results found can be generalized for regions with similar characteristics. All deaths that occurred in 2018 were investigated, reducing the likelihood of an underreporting of suicide cases. A standardized form was used by previously trained researchers to reduce possible measurement bias. The use of several official data sources is noteworthy, as it guarantees higher data quality.

Regarding the limitations of this research, there is the possibility of information bias, since the data records, on the databases used, may have been flawed,

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insufficient or inconclusive in relation to the circumstances surrounding the event. Another limiting factor of the investigation was the loss of 22% of the data, due to no toxicological examination. The potential reasons for not performing the exam were: 1) prolonged hospital stay, due to the fact which there may be changes in the alcoholic concentration in the blood; 2) individual found in a state of decomposition since it is not possible to guarantee the quality of the biological material for the examination and; 3) failure to refer victims who died due to external causes for Police investigation. Furthermore, it was not possible to perform a robust analysis of bivariate and multiple regression because of the size of the research population.

The results of this research signaled an important public health problem, which is the use of alcohol to possibly encourage suicide. Through the data found, it is possible to create more assertive strategies for the prevention of suicide, especially for those who consume alcohol. The need for more robust studies to assess risk factors should be emphasized.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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