Epidemiological aspects of suicide in Rio Grande do Sul, Brazil

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Suicide. Statistics numeric data.
Mortality rate. Mortality.

Abstract

Objective
To describe epidemiological aspects of suicide mortality in a 10-year time series.
Methods
Suicide deaths reported in the state of Rio Grande do Sul (RS), Brazil, were put together as historical time series based on data from the Ministry of Health Mortality Reporting System for the period 1980 to1999. Suicides were grouped according to the WHO criteria and analyzed using standard demographic variables.
Results
Suicide rates (proportional mortality and mortality rates) in RS during the study period were the highest in Brazil. The standardized rates grew from around 9 per 100,000 in the 1980s to 11 per 100,000 in 1999. This increase in mortality was attributed mainly to male mortality rates that grew from 14 per 100,000 to the current 20 per 100,000. The male:female ratio increased from 3 to 5. The highest ratios were seen among the elderly although this ratio has been increasing in young adults as well. Widows, widowers and farmers/fishers had the highest mortality rates.
Conclusions
The study highlights suicide as a collective health problem in RS and shows aspects that could contribute to preventive action.

INTRODUCTION

Suicide is a complex phenomenon investigated in several scientific fields through complementary at times antagonistic approaches. Psychiatry has generally considered suicide as an individual phenomenon while social sciences, based on Durkheim[6] (1982) classic descriptions, has regarded it as a collective behavior.

Researchers[10] point out to the occurrence of suicide cultures where self-destructive behaviors associated to the so-called "toxic existence" proliferate.

In the last decades scientific output on the subject of suicide has taken on a prevailing technical-realistic approach. Following this path, the majority of studies have sought to identify risk factors, which has implied in separating suicide into multiple variables at biological, psychological, and social levels. Apparently, these studies have not been able to produce any changes in the increasing suicide trends seen in many countries.

Suicide could be defined as a human act of interrupting one's own life.[12] By this definition, it is implied that the term suicide can only be applicable in case of death or in circumstances where the causal outcome is death and the agent deliberately intended to produce death.

Underreporting of suicide mortality varies in dif-

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ferent regions and cultures since suicide is a taboo topic in most societies.[9]

Suicide-related factors include previous attempts, affective disorders, social withdrawal, family history, voicing of one's intentions and several demographic and socioeconomic variables.[22] In Canada, risk groups for suicide comprise Native peoples, youngsters, elderly, prisoners, homosexuals and individuals with family history of suicide. To that it is associated cases of drug addiction, stressing life events and terminal disease.[24] Five situations are currently described as most relevant in suicidal behavior: 1) increase prevalence of depressive disorders; 2) increasing abuse of psychoactive drugs; 3) psychobiological changes such as early puberty; 4) increasing social stressors; 5) change in accepted patterns of suicidal behavior and increasing availability of suicidal models.[5] Mental disturbances and addictions co-occur in 90% of suicides reported in Europe and the US.[18]

Researchers have postulated the association between alcohol consumption and suicide based on the assumption that suicide rates are inversely associated to social integration and that alcohol abuse produces social disapproval and gradual deterioration of social links. Besides the indirect association of alcohol consumption and suicide through social disintegration, some researchers have pointed out a direct relationship between alcohol consumption and suicide claiming that the individual's reduced self-control would act as a trigger to a previous predisposition for self-destructive behavior.[19]

In Brazil, though underestimated, suicide deaths are low when compared to other deaths. But these have increased mostly among male young adults. Mello Jorge[16] (2000) seems it as concerning issue, especially because there were no methodological changes in suicide reporting and data collection.

Regarding socioeconomic status, suicide is found among individuals at extremes: those less privileged and those well-off.[11] Besides, a lowering in socioeconomic status is also associated to suicide.

Divorce, women becoming part of the labor force, economical variables and unemployment were also described as risk factors for suicide.[3,14]

Rio Grande do Sul (RS) is the Brazilian state that historically has showed the highest suicide rates. This fact has been instigating investigators from different fields, especially those working in social sciences and health. They have pointed out ethnic background and culture, social instability, and even the local climate as potential intervening factors.

The present study was designed to investigate high suicide mortality in some tobacco producing regions of RS. This is part of a large ecological study, "Toxic agricultural pesticides and other risk factors for suicide in RS," that aims at ascertaining the association between exposure to toxic agricultural pesticides and suicide mortality rates.[2]

The study aims at describing epidemiological aspects of suicide in RS. A historical time series was carried out from 1980 to 1999, highlighting descriptive aspects of suicide found in death certificates.

METHODS

A descriptive study was carried out to describe aspects of suicide mortality in RS. Suicide mortality rates and proportional mortality were obtained from statistical mortality data of the Ministry of Health National Unified System Department of Information Technology (Datasus).* Population data were obtained from the Brazilian Statistical Institute (IBGE) website.** Denominators used for estimating rates according to occupation were obtained from the National Survey of Community-Dwelling Samples (PNAD-2001) data. They were also used in estimating approximate rates as data were not available from previous population censuses.***

The Ninth Review of International Disease Classification (IDC-9) – three digits for the period between 1980 and 1995 including coded categories between E950 and E959 –, was used for estimating the number of suicides. The Tenth Review of International Disease Classification (IDC-10) was used for the period between 1996 and 1999 including X60 to X84 and Y87 categories.

Historical time series were created for the period 1980 to 1999. Rates were standardized based on the standard population provided by the World Health Organization (WHO).[1] The standard population comprises less children and more older adults aged more than 70 years, thus balancing the excess weight given to children in a previous estimate known as "Segi's standard population".[1] Creating a new standard world population was needed mainly because of an increase in the old age group.

*Data from the Internet, http://www.saude.gov.br/datasus
**Data from the Internet, http://www.ibge.gov.br
***Data from the Internet, http://www.ibge.gov.br/trabalho and rendimento/PNAD2001

Table 1 – Suicide deaths and crude and standardized mortality rates by sex and total (IDC-9 e IDC-10). Rio Grande do Sul, RS, Brazil. 1980-99.

Year	Male			Female			Total		
	Deaths	Mortality rate		Deaths	Mortality rate		Deaths	Mortality rates	
		Observed	Standardized		Observed	Standardized		Observed	Standardized
1980	459	11.9	14.0	183	4.7	4.7	642	8.3	9.5
1981	467	12.0	14.0	170	4.3	4.7	637	8.1	9.2
1982	481	12.1	14.7	156	3.9	4.2	637	8.0	9.2
1983	610	15.2	18.5	183	4.5	5.9	793	9.7	11.5
1984	595	14.6	17.3	181	4.3	4.2	776	9.4	10.7
1985	596	14.4	17.0	178	4.2	4.6	774	9.2	10.5
1986	571	13.6	16.4	185	4.3	4.6	756	8.9	10.1
1987	561	13.2	16.0	168	3.8	4.1	729	8.4	9.7
1988	556	12.9	15.1	186	4.2	4.4	742	8.5	9.5
1989	557	12.7	14.6	158	3.5	3.8	715	8.0	8.9
1990	523	11.8	13.6	180	3.9	4.2	703	7.8	8.6
1991	601	13.4	15.6	192	4.1	4.4	793	8.7	9.7
1992	658	14.5	16.1	162	3.5	3.6	820	8.9	9.6
1993	601	13.0	14.9	146	3.1	3.2	747	8.0	8.7
1994	669	14.3	16.3	165	3.4	3.5	834	8.8	9.6
1995	753	16.0	18.3	203	4.2	4.5	956	10.0	11.1
1996	737	15.6	16.7	216	4.4	4.4	953	9.9	10.2
1997	807	16.8	18.6	190	3.8	3.9	998	10.2	10.9
1998	874	18.0	19.5	215	4.3	4.3	1089	11.0	11.5
1999	889	18.1	20.2	204	4.0	4.1	1093	11.0	11.7

IDC: International Disease Classification

Data analysis was conducted using the Ministry of Health TabWin software program.[17] The following suicide mortality rates in RS were calculated: total mortality rates according to sex, age group, occupation, schooling, marital status and means of suicide. Schooling data were not presented here due to their low quality; more than 50% were classified as "unknown". Linear regression analysis of standardized mortality rates was carried out using Statistical Package of Social Sciences (SPSS), version 10.0.

RESULTS

The highest suicide rates were found in the southern region of Brazil, more specifically in RS (mean of 10.2 suicides per 100,000 inhabitants for the period 1980 to 1999). During the 20-year-period comprised in the study, the southern states of Santa Catarina and Paraná had mean rates of 7.9 and 7.1 per 100,000, respectively, while the national mean for the period was 4.3 deaths per 100,000. RS ranked first in suicide mortality in all and every year comprised in the time series. Suicide proportional mortality was also estimated for every Brazilian state as a way of controlling for distortions caused by regional differences in the Mortality Data System reliability. Similarly to mortality rates, suicide proportional mortality in RS showed the highest rates in Brazil. It is worth noting that, often seen as taboo, suicide deaths could be reported as an "unknown" external cause of death leading to underreporting.

Table 1 shows crude and standardized suicide mortality rates in RS in an historical time series from 1980 to 1999. Standardized mortality rates for both sexes grew from 9.5 in 1980 to 11.7 per 100,000 in 1999. There was an increase in standardized rates for males from 14.0 in 1980 to 20.2 per 100,000 in 1999, while female rates ranged from 3.2 to 4.7 per 100,000 in the same period. Male/female ratio in-

Figure 1 – Standardized suicide rates by sex in Rio Grande do Sul, 1980-1999.

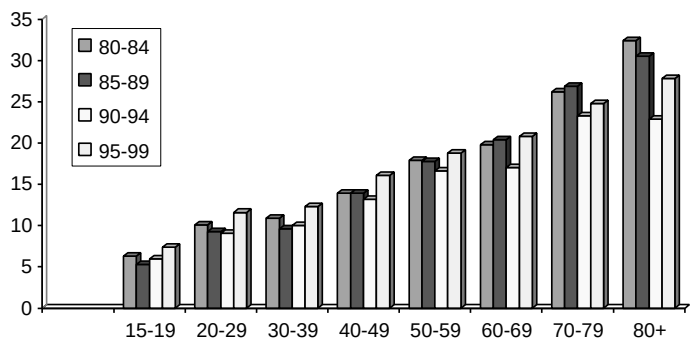

Figure 2 – Suicide mortality rates according to age groups, Rio Frande do Sul, 1980-84, 1985-89, 1990-94 and 1995-99.

Table 2 – Suicide deaths and proportional mortality in Rio Grande do Sul according to demographic characteristics (marital status and occupation), 1990-98.

Marital status	N	%	Rate**	Occupation	N	%	Rate**
Single	2,672	33.9	7.4	Technical-scientific	218	2.9	5.7
Married	3,631	46.1	11.4	Public service	33	0.5	*
Widow	606	7.7	13.7	Managerial job	353	4.8	5.9
Separated	260	3.3	7.1	Business	391	5.3	8.1
Other	96	1.2	–	Services	382	5.2	8.2
Unknown	610	7.7	–	Industry	.1862	25.5	8.7
				Farming/fishing	1,923	26.3	16.3
				Not classified	2,142	29.3	–
Total	7,875	100.0	–	Total	7,304	100.0	–

*Populations not available
**Rates per 100,000

creased from 3 in 1980 to 5 per 100,000 by the end of the study period. The temporal trend showed a sudden increase in 1983, an overall reduction between 1984 and 93 and a subsequent increase up to date.

Regression lines drew from standardized mortality rates revealed an ascending trend for suicide among males and a slightly descending trend for suicide among females (Figure 1).

Rates according to age groups had a gradual increase as age advanced (Figure 2). The highest rates were seen among elderly aged more than 70 years. However, younger age groups showed increased rates in the recent years, mostly in the last five years, which could indicate a trend toward juvenilization of suicide.

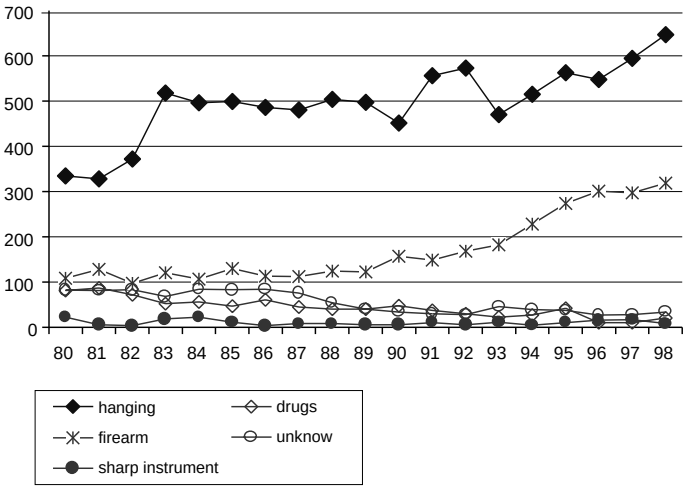

Figure 3 - Frequency by means of suicide, Rio Grande do Sul, 1980-98.

Table 2 show suicide deaths, proportional mortality and mortality rates according to marital status and occupation for the period between 1990 and 1998.

Higher suicide rates were seen among married people but the highest rates were found among widows. Separated and single people had the lowest rates. The risk almost tripled among those working in farming and fishing activities, i. e., 16.3 per 100,000 compared to 5.7 per 100,000 among technical-scientific workforce. Rate standardization in Table 2 was not conducted because no census data were available.

The most common means of committing suicide was hanging (62.5%), followed by firearms (21.5%) and unknown (6.9%) (Figure 3). These three categories added up to 90% of reported cases. It is worth stressing that the relative increase of hanging and firearm use, as well as reduction of unknown means, could probably indicate easier access to arms and improvement of the mortality data system. Hanging was also the means of choice by farmers.

DISCUSSION

RS showed the highest suicide rates – both mortality rates and proportional mortality – in Brazil during the study period. Mello Jorge[16] (2000) pointed out that despite suicide mortality rates in Brazil are knowingly underestimated, increasing rates are seen among young male adults. This is concerning since this trend cannot be explained by any methodological changes in either reporting or data collection.

An overview of 31 WHO countries[4] reporting suicide reveals varying suicide mortality among countries and both high and low rates are seen in almost all continents – Americas, Asia, and Europe. According to mortality classification criteria, rates below 5 per 100,000 are considered low; those ranging from 5 to 15 are viewed as moderate; those between 15 and 30 as high, and those above 30, very high.[4] By this classification, suicide mortality rates in RS can be considered moderate in the general population but, among males, they are classified as high with an increasing trend.

A well-documented aspect of suicide epidemiol-

ogy is male:female ratio, which is higher than 3:1 in many countries but has remained stable over the years in almost all countries with available data. In the US, increasing financial, individual and social opportunities for women were parallel to lower suicide rates.[11] In India and China, women have high suicide risk.[21]

Lower suicide rates among women have been attributed to lower prevalence of alcohol dependence, religiosity, and accommodating attitudes concerning their social aptitudes and roles. Also, women generally manage to recognize early risks for depression, suicide, and mental disease, and they are used to seeking help during crisis and social support.[23] The fulfillment of maleness involves more suicide-prone behaviors such as competitiveness, impulsiveness and easier access to lethal weapon and fire arms. Failure to fulfill traditional male gender role, i. e., being the family's financial provider, happens to a stressor for men. As part of a patriarchal society, men are more susceptible to financial losses, such as unemployment, impoverishment, and therefore more prone to suicide.[13]

Individuals working in farming and fishing sectors showed higher suicide mortality rates. In the 1990s, Brazil went through an economy crisis, which resulted in increasing unemployment and shift of labor force to different working sectors. Suicide rates according to occupation, using a constant denominator, could have been overestimated given that there could have been a reduction in the total population working in the farming sector recorded in the PNAD/2001. Even so, the authors opted for these estimates because the proportional mortality found for those working in farming came close to 30% of deaths and the estimation of rates, though approximate, provides further epidemiological information on suicide in RS.

Being widowed can be viewed as a life stressor and this life event is related to suicide in several countries. Though it is often associated with age, the effect of both variables –being widowed and age – could not be differentiated in the present analysis. Correlations between suicide, divorce and/or separation have been described by other authors.[8] There might be information bias regarding marital status because higher rates were found among older people who are more likely to become widowed.

Concerning the means of suicide, anthropological studies have showed the central role of hanging in the gaúcho culture.[13] In fact, this means was used in more than 60% of suicides. Leal[13] (1992) studied suicide from an anthropological perspective as an event closely related to the patriarchal "gaúcho" (Latino macho) culture. After investigating suicide in the German-descent rural community of Santo Cristo (RS), Heck[7] (1994) concluded that settlers' problems aggravated following the implementation of a new farming model in the 1970s and 1980s. The advance of the capitalist production system in rural areas led to leasing and loss of small lands and, consequently, mounting debts, land monopoly, migration from rural areas to cities, disintegration of culture and moral values and, ultimately, anomy. However, it is worth stressing the relative increase in firearms use as a suicide means. Some authors have suggested the availability of firearms at home as a precipitating situational factor of suicide.[18]

Suicide mortality rates are known to increase with age but there has been a shift in age groups, suggesting narrower life perspectives to younger populations. In several countries, such as Canada, Sri Lanka, Austria, Finland and Switzerland, suicide among teenagers and young adults has reached epidemic proportions.[4] Other countries, such as Uruguay, in the Americas; Japan, Singapore and Sri Lanka, in Asia; Austria, Belgium, Denmark, France, Germany, Hungary and Sweden, in Europe, have high mortality rates among individuals older than 30 years.[4] By any means, overall rates do not effectively indicate an older age group pattern; for instance, in Finland, there has been described an epidemic pattern of suicide among teenagers but moderate rates in the general population.[4]

In RS, the highest mortality rates according to age group are found among the elderly (older than 70 years). However, there has been an increasing trend among younger age groups, 20 to 59 years old, by the end of 1990s. This could be explained by the fact that younger adults are more likely to get unemployed and suffer the effects of the capitalist production system in rural areas. According to Mattoso[15] (1999), "regardless of the methodology used, current unemployment rates are unprecedented in Brazil". Using IBGE data, he stressed that unemployment rates in six urban areas grew from 3.4% in 1989 to 7.6% in 1998. Thus, high unemployment rates allied to economy instability could have contributed to an increase of suicide mortality rates. Recent studies have depicted a different scenario from that described by Durkheim[6] (1982) in the last century, when she considered suicide part of a collective behavior, minimizing the burden of poverty and underscoring social anomie as a triggering factor. According to Durkheim[6] (1982), anomie reflects a circumstance where new values, habits and ways of life are introduced in societies creating a void – an anomic space – in which people are no longer able to exert any control on their peers, leaving them unattended by themselves and more susceptible to suicide.

Nowadays, poverty is regarded as a likely predispos-

ing condition to suicide, which is associated with unemployment, financial stress, and family instability.[23] Unemployment can directly or indirectly impact on suicide mortality by producing higher levels of anxiety in individuals facing layoffs. In contrast, emotionally compromised individuals are the first to be laid off in times of economy recession[23] and also higher suicide rates are found in unemployed individuals,[3,5] especially in males who are more susceptible to financial adversities. Thus, an increase in suicide rates could suggest an aggravation caused by economic policies inflicted on working population, especially to those most susceptible – younger or older individuals, emotionally weakened and with poor job qualifications. The RS has the highest suicide rates in Brazil especially among farmers because the region was one of the first farming work fronts to be eliminated. When suicide occurs mostly in an age, ethnic, or occupational group or in geographically isolated groups, one should question whether this finding would be working as a barometer of the pressure subjected to a society. High suicide mortality among farmers could be reflecting these populations' poor living conditions – mounting debts, land monopoly, migration and anomie – or severe occupational exposure to toxic agricultural pesticides that could cause depression triggered by neuroendocrine mechanisms.[2,22 and 27]

Suicide as an object of theoretical thinking is an entity opposed to highly restrictive classifications. Identification and follow-up of suicide events could bring significant insights for its prevention in the general population.

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