

Propensity of Mortality from External Causes in the State Piauí, Brazil 2001-2012

ORIGINAL

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Abstract

Objective: To analyze the trend of mortality from external causes in the State of Piauí from 2001 to 2012.

Method: Descriptive, exploratory and quantitative study. The System databases used were Mortality Information of the Ministry of Health, available on the website of the Department of the Unified Health System Information.

Results: There were 19,725 deaths, highlighting the male (82.8%), aged 20-39 years (46.3%), marital status: single (51%), of brown ethnicity (66.2%), and education from 4 to 7 years (26.3%). The men, aged 20 to 29 years (29.7%). The women, aged 60 and over (25.5%). The standardized mortality rate increased (74.6/100 000 inhabitants) in 2012.

Conclusion: External causes affecting especially the younger population. Transport accidents and assaults accounted for the main specific causes of death. It is necessary to develop educational activities for greater emphasis on reducing mortality and more effective public policies.

Keywords

External Causes; Mortality; Declaration of Death; Accidents; Violence.

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Introduction

The World Health Organization (WHO) classifies external causes such as unintentional injuries (assaults, homicides, suicides, deprivation or

negligence) and unintentional injuries (traffic accidents, drowning, falls, burns, among others), which occupy prominent growing place among the causes of morbidity and mortality in the world [1].

Mortality from external causes behaves differently in WHO member countries. In Brazil, most of the proportion of deaths is caused by the traffic connected homicides. In the rest of the world, the majority of deaths (51%) is given by suicides and (11%) are the result of wars and civil conflicts. Another important data on the epidemiological profile is that, in Brazil, homicides have been prominent causes of morbidity and mortality, since the year 1980 to 2007, representing the proportion of 12.5% of deaths, especially among young men (15 to 24 years) [2].

The state of Piauí, according to the Map of Violence 2011 revealed that, in 2008, external causes were responsible for most of youth deaths (15 to 24), victims of traffic accidents, reaching 25.5% of the proportion of deaths. In older population (0-14 years and 25 and over) the numbers reach only 1.2% of the proportion of deaths. This study also shows that the planning of capital for death rate and traffic accidents in the total population of Teresina was 27.4 per 100,000 inhabitants, occupying the 14th position in 1998 and 46.1 per 100 thousand inhabitants in 2008, rising to 5th place. For this reason, this study aimed to analyze the trend in mortality from external causes in the State of Piauí, in the period 2001-2012 [3].

Method

This is a descriptive and exploratory research with a quantitative approach. The banks of the Mortality Information System data were used (MIS) of the Ministry of Health, available on the website of the Department of the Unified Health System (DATASUS) on deaths from external causes of residents in the state of Piauí occurred in from 2001 to 2012. Data collection was performed from the query to Microsoft Office Excel spreadsheets, in September

of 2015. We selected all deaths in Piauí whose causes were ruled in one of the chapter XX codes of the International Classification of Diseases - 10th Revision - (ICD-10) [4].

The data was imported and saved in groups: Transport accidents (V01-V99); other external causes of accidental injury (W00-X59); Suicides/intentional self-harm (X60-X84); Assaults (X85-Y09); undetermined action events (Y10-Y34); and the remaining deaths (Y35-Y98). The following variables related to death were considered in this study: gender, age, marital status, race/color, education; municipalities headquarters of grouped health macro-regions in this way: Parnaíba, Teresina, Floriano, Picos, São Raimundo Nonato, Bom Jesus; external causes: transport accidents, accident injuries, suicide, aggression, events of undetermined intent; ages 0-19 years old, 20-29 years, 30 to 39, 40 to 49 years, 60 years and over, compared to females and males.

Data was entered and analyzed using the "SPSS version 18.0 application. To seek the association of the deaths from external causes with variables related to gender and age, we used chi-square test with the corresponding value of p.

The mortality rate was standardized as standard considering the Brazilian population, according to the Census of the Brazilian Institute of Geography and Statistics (IBGE) 2010, calculated per 100 thousand inhabitants. The ethical and legal aspects were targeted by Resolution No. 466/125.

Once it was based on a public domain database, available at DATASUS, from the death certificate (DO) without data identification, the study was exempt from examination by the Research Ethics Committee and signing of the Informed consent Form (ICF).

Results

In the period 2001-2012, there were 19,725 residents of deaths in Piauí due to external causes, highlighting the male (82.8%), female (17.1%) and ignored (0.1%). Regarding the age group, the 20-

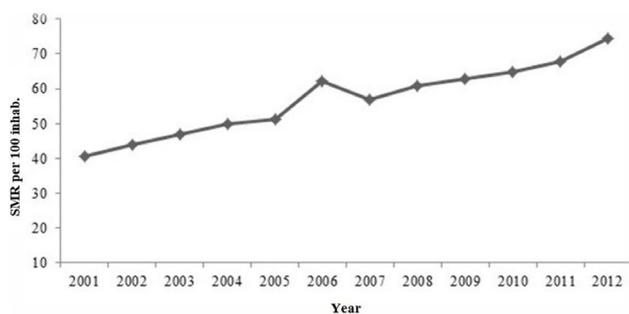
39 years (46.3%) had a higher proportion and the lowest proportion 0-9 years (3.9%). According to the marital status of the victims, there was a higher frequency of deaths in the single population (51%) and married (32.8%). Regarding the variable race/color, a higher frequency was observed in brown ethnicity (66.2%). According to the education observed in the majority of victims studied from 4 to 7 years (26.3%), followed by victims with 1 to 3 years (25.2%) in the study (Table 1).

As Figure 1 shows, there was a growing increase in the standardized mortality rate due to external causes from 2001 to 2012 in Piauí, with 40.5/100,000 inhabitants in 2001 to 74.6 deaths per 100,000

Table 1. Profile of deaths from external causes, according to sociodemographic characteristics of residents in Piauí, 2001-2012.

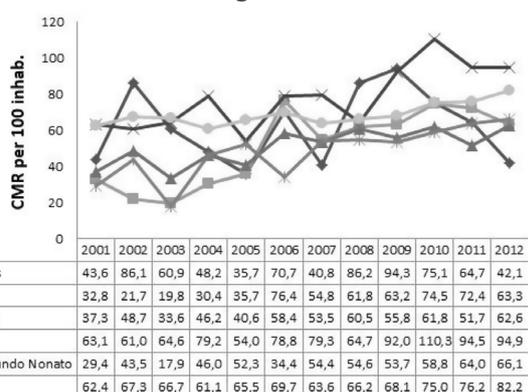
Variables	N	%
Gender		
Male	16324	82.8
Female	3380	17.1
Ignored	21	0.1
Age group (years)		
0-9	763	3.9
10-19	2444	12.4
20-39	9137	46.3
40-59	4461	22.6
60 or more	2855	14.5
Marital Status		
Single	10059	51.0
Married	6468	32.8
Widow	862	4.4
Legally Separated	346	1.8
Other	616	3.1
Ignored	1374	7.0
Ethnicity/color		
Caucasian	3515	17.8
Black	1822	9.2
Yellow	76	0.4
Brown	13065	66.2
Indigenous	15	0.1
Ignored	1232	6.2
Education		
None	3192	16.2
1 to 3 years	4979	25.2
4 to 7 years	5197	26.3
8 to 11 years	2734	13.9
12 years and more	874	4.4
Ignored	2749	13.9

Figure 1: Standardized mortality rate (SMR) by external causes of residents in Piauí, 2001-2012.



Source: MIS/MS/DATASUS.

Figure 2: Crude Mortality rate (CMR) for external causes of residents in Piauí, according to the municipal headquarters of the health macro-regions, 2001-2012



Source: MIS/MS/DATASUS.

inhabitants in 2012, with a peak 62.3/100 000 in cases of deaths in 2006.

According to Figure 2, the host cities of the macro health regions that stood out were the peaks of municipalities, Bom Jesus and Teresina. The city of Picos, in seven years, had the highest rates, and in 2001 a 63.1 rate per 100 000 inhabitants and for the year 2012 to 94.9 per 100 thousand inhabitants,

with a peak of 110.3 per 100 000 inhabitants in 2010. Bom Jesus comes second, with a 86.1 rate per 100 thousand inhabitants in 2002 to 94.3 per 100,000 inhabitants in 2009. Teresina stood out in two years in 2003 to 66.7 per 100 thousand inhabitants and in 2005, with 65.5 per 100 thousand inhabitants.

Regarding Specific Mortality Rate (SMR) by external causes, according to the ICD-10 group, in the twentieth chapter, we observed that the highest recorded rate was to transport accidents, which in 2001 was 14/100 thousand to 36/100 thousand cases per 100 thousand inhabitants in 2012, followed by assaults with 9/100 to 17/100 thousand inhabitants in 2012 (Figure 3).

According to Table 2, males had a higher mortality from external causes in the age group 20

to 29 years (29.7%), followed by the age group between 40 to 50 years (23.5%). The lowest rate was in the age group of 60 and over (12.2%). In women, the highest rates were in the age group 60 years and over (25.5%), followed by the age group 0-19 years (23.1%). The lowest rate was in the age group 30 to 39 years (13.8%), with a significance of $p < 0.001$.

Discussion

The survey results, showed an increased risk of death from external causes in men living in the state of Piauí, over the 11 years of the series studied between 2001-2012.

These figures confirm the trend of increased risk of death from these causes among men. A study in the city of Colider, Mato Grosso, 2001-2008, on mortality from external causes, revealed that the male was featured, with a ratio of 76.77% and women 23.3% [6].

Another time series of research (1999-2008) held in Minas Gerais, registered a male mortality rate of 82.7/100 thousand inhabitants in 1999 to 95.7/100 thousand inhabitants in 2008, resulting in an increase of 15.7% in the risk of death from external causes in men. Another study conducted in Brazilian capitals, analysis of mortality showed that from 1977 to 1991 there was a 40% increase in the mortality rate, with the most marked increase in males 47.2/100 thousand inhabitants than in females 15, 7/100 thousand inhabitants [7].

In referring to these figures, the researchers are unanimous in stating that men become more exposed and vulnerable to the risks of being involved in violent events, as they experience the tensions and anxieties generated by a constantly threatened identity and that needs to be strengthened by reaffirming, virile and aggressive behavior. These behaviors make them targets of violence [8-9].

In terms of age, the results reflect the lower proportion of the number of deaths in childhood (0-9

Figure 3: Specific Mortality Rate (SMR) for external causes of residents in Piauí, according to ICD-10 group, Chapter XX, 2001-2012

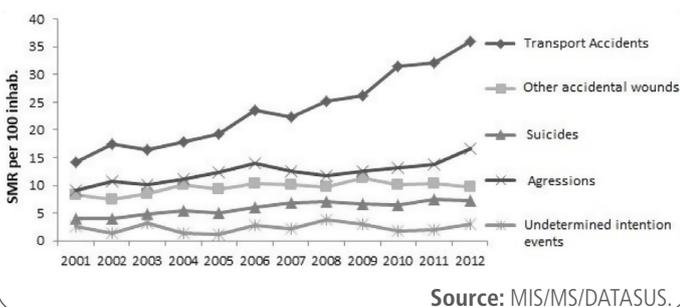


Table 2. Distribution of gender and age for deaths from external causes in Piauí, in the period 2001-2012.

Age Group	Male		Female		p*
	N	%	N	%	
Years					
0 to 19	2427	14.9	778	23.1	23.1
20 to 29	4838	29.7	627	18.6	18.6
30 to 39	3202	19.7	466	13.8	13.8
40 to 59	3818	23.5	643	19.1	19.1
60 and more	1993	12.2	861	25.5	25.5

Source: MIS/MS/DATASUS. *: Chi-Square Tests.

years), adolescence (10-19 years) and seniors (60 and over). A study in Maranhão obtained partially different results to those found in this work, as the trends of external causes from 1980 to 1999 showed that the highest mortality rates were in the age group of 70 years and more, while the lowest were in the age range 0-9 years, revealing a peak in 1988 with 219.4 per 100 thousand inhabitants, and in the following years, a decrease in deaths due to external causes) [10-11].

Regarding marital status, the results showed a higher proportion of deaths in the single population groups. Research done at the Tubarão municipality, state of Santa Catarina, in 2009, showed a total of 155 deaths, including 86 single and 69 married, resulting in a mortality rate of 40.3/100,000 inhabitants without partner and 32, 4/100 inhabitants with partner. The lower mortality rates among those who are married is probably because they have a greater concern for their safety, as they are responsible for families, which leads them to have safer behaviors [12].

The greater proportion of deaths in the variable ethnicity/color study refers to brown (66.2%). Unlike another study, done in São Mateus, in the state of Espírito Santo, from 1999 to 2008, which showed that the brown and black ethnic groups have the highest mortality rates, including the brown ethnicity 40.59/100,000 inhabitants in 1999 to 144.04/100 000 inhabitants in 2008, and the black race 50.15/100,000 inhabitants in 1999 to 145/100 thousand inhabitants in 2008. The researchers say these numbers come from the neglect of public policies for this population as these are in financial situation of inequality, given the discrimination, which makes them more susceptible to death from external causes [13].

Discrepant results were found in a study conducted in the city of Colider, Mato Grosso, in the period 2002-2008, which showed that the highest rates of race/color in the years studied resulted in white, with 57.2/100,000 inhabitants and brown with 33.8/100,000 inhabitants. This result is due to the

fact that the population of Mato Grosso have been settled by Southerners descendants of Italian and European predominant white ethnicity [6].

Concerning the distribution of schooling, the results showed that most students victims attended to the elementary school, while for higher education this number was greatly reduced. This study is similar to that performed in Cuiaba, the state capital of Mato Grosso in 2003, which showed that most of the victims was in the study situation of 4 to 7 years (41.5%), followed by 1 to 3 years (26.1%), and over 12 years (7.2%). Scholars confirm that little schooling, more than income and race, is related negatively to the increase in death rates from external causes. Reaffirming the devastating potential of social inequality to people's lives, influencing all social classes [14-15].

Regarding the mortality rate of deaths from external causes, the study showed an increasing trend in the 11 years studied. A similar study from 1999 to 2008 trends, external causes in the micro region of São Mateus, city of the Espírito Santo, showed an upward line with 10 years of research, revealing a coefficient of 76.45/100,000 inhabitants in 1999 to 118 21/100,000 inhabitants in 2008, resulting in an average of the coefficients of 95.61/100,000 inhabitants. The growth of these mortality rates due to multiple factors such as inequality, lack of justice, bribery, impunity and decreased valuation of life. [13]

In this respect, other authors reveal that the social determinants of health behave in two ways, both influencing the health problems, such as the risk factors for violence 16-20.

The numbers shown in **Figure 2**, referring to the host cities of Piauí health macro-regions, showed that the city of Picos had extremely oscillating coefficients throughout the series studied, but the last three years it has remained ahead, coming in 2010 110.3/100 000 inhabitants. In 2012, the rate was 94.9/100 inhabitants, leaving the capital, Teresina, second with a rate of 62.4/100,000 inhabitants in 2001 to 82.2/100 000 inhabitants in the year 201 217.

Although peaks have, according to the 2010 Census, Finally, a population of 73.414, corresponding to only 9% of the population of Teresina, ie a quantitative population so small in relation to the capital still has high mortality rates.

A study of mortality from external causes in São Paulo, in 2005, showed that the Regional Health Directors (RHDs) had four geographical regions with higher rates than the state of São Paulo, which were: Registro 99.7/100 thousand inhabitants, Osasco 77.9/100,000 inhabitants, Franco da Rocha 73.9/100,000 inhabitants and Santos 69.1/100,000 inhabitants. In the Registration of the macroregion there was no decrease in their rate in relation to other regions and also has the risk of death from traffic accidents two times more than the homicides. [18]

Recent work ensures that growth in mortality rates in inner cities is multivariate, ranging from omission of the authorities in these cities, precariousness of policing service to the intensification of policing in urban centers, forcing the migration of criminals toward cities less protected. [19]

Regarding mortality rates for specific causes, shown in **Figure 3**, there was the period 2001-2012, a progressive increase in mortality in the state of Piauí, especially traffic accidents and assaults. These results are similar to that observed in a study on mortality from external causes in the states of Minas Gerais and Maranhão. The risk behavior for traffic accidents is produced in part by the pressure exerted by the group, the immaturity, the feeling of omnipotence, coupled with excess alcohol, high speed, lax laws and driver imprudence [7/10/20].

Scholars point out that in relation to the deaths by land accident, they could be prevented with increased enforcement of traffic laws, mainly on drunk driving [3].

On the other hand, in relation to aggression, a gradual increase in rates is noticed, according to the temporal analysis, possibly influenced by the effect of the difficult living conditions and frustration of

basic needs of individuals associated with involvement in illegal activities such as trafficking, the use of illicit drugs and access to weapons. The issue that guides involvement with drug use and trafficking has increased the discussion by several authors, who point out as extremely important for urgent measures, including, increase in the supply of job opportunities, improvement and strengthening of family ties and a positive outlook for the future [21].

The events of undetermined causes showed oscillating values over the years studied. The precarious way that external causes are categorized in information systems contributes to the increasing bias in the coding of deaths and increase in filling errors of the death certificate (DC). Understanding the differences in the types of deaths can subsidize the construction rules to reclassify the underlying cause of death [22-23].

The percentage of unknown causes of death and/or indeterminate related to the absence of root cause, information on this determines that violent events are classified as indeterminate, which feed information systems, making it impossible to know the epidemiology of mortality from external causes. In short, the proportion of ill-defined causes is a bad recording quality indicator [24].

In regards to the analysis of **Table 2**, with double variables, the results presented show the high magnitude in the percentage of male mortality (29.7%) due to external causes among adults, specifically the age group 20 to 29 years in the state of Piauí findings are similar to other studies in Minas Gerais, São Paulo and Brasilia. This shows that the group of external causes has reached adults in more working age in relation to the social production, resulting in higher costs to health services, deserving special attention of the authorities to be set up as a public health problem [20].

The high mortality rate among the elderly should be noted (subjects 60 years and over) age groups who occupied the second place for the group of causes studied reaching higher percentages in fe-

males (25.5%). It also emphasizes that the chi-square test was significant. These data are totally discrepant to those found in the literature on mortality from external causes in the elderly, in which males and the elderly are the most affected. The authors also ensure that the mortality rates are very close to those found among adolescents and adults, but the causes are different. In the case of the elderly, the unintended component is predominant. This suggests the need to hold another individualized study of the numbers here found [25].

Conclusion

It can be said that external causes are a major cause of death in Piauí, affecting especially the younger segments of the population. Traffic accidents were responsible for the high mortality rates, followed by assaults, showing that the increase in violence and risky behavior in traffic contributed to the steady growth of mortality rates in the state. Therefore it is necessary to develop educational and intersectoral actions with greater emphasis on reducing mortality from external causes.

However, other sectors should be involved in this process and should act accordingly and early in the development of more effective public policies to ensure greater survival of this population and to encourage research that can trace, even better, your health profile, especially in the state of Piauí, which has few studies about the external causes.

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