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Characterization of hospitalizations due to external causes in the public health system, Brazil, 2011

Caracterização das internações hospitalares por causas externas no sistema público de saúde, Brasil, 2011

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ABSTRACT: The aim of this work is to describe the characteristics of hospital admissions owing to external causes in the public health system in Brazil in 2011. Data from the Hospital Information System of the Unified Health System (SIH/SUS) were analyzed to obtain the frequency, coefficient of hospitalization, and hospital morbidity indicators. Of the 973,015 admissions, falls (38.4%) predominated, followed by traffic accidents (15.8%). The estimated coefficient of hospitalization owing to external causes increased with the age, and it was higher in male patients and in the midwest region of the country. The average stay was higher in hospitalizations for traffic accidents (6.1 days) and assaults (6.0 days), while the hospital mortality rate reached higher values in hospitalizations for assaults (4.7%) and self-harms (4.0%). It is evident from the knowledge of the characteristics described the usefulness of hospital morbidity data for planning care actions and prevention of the external causes.

Keywords: External causes. Accidents. Violence. Morbidity. Hospitalization. Descriptive epidemiology.

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RESUMO: Com o objetivo de descrever as características das internações hospitalares por causas externas no sistema público de saúde do Brasil em 2011, analisaram-se dados do Sistema de Informações Hospitalares do Sistema Único de Saúde (SIH/SUS) para obter frequência, coeficiente de internação e indicadores de morbidade hospitalar. Das 973.015 internações, predominaram internações por quedas (38,4%) e acidentes de transporte terrestre (15,8%). A estimativa do coeficiente de internação hospitalar por causas externas revelou-se crescente com a idade, mais elevada no sexo masculino e na Região Centro-Oeste do país. A permanência média foi maior nas internações por acidentes de transporte terrestre (6,1 dias) e agressões (6,0 dias), enquanto a letalidade hospitalar atingiu maiores valores nas internações por agressões (4,7%) e lesões autoprovocadas (4,0%). Evidencia-se, a partir do conhecimento das características descritas, a utilidade dos dados de morbidade hospitalar para o planejamento de ações assistenciais e de prevenção das causas externas.

Palavras-chave: Causas externas. Acidentes. Violência. Morbidade. Hospitalização. Epidemiologia descritiva.

INTRODUCTION

External causes of morbidity and mortality include accidents and violence that cause some kind of injury, whether physical or mental, and that may or may not have death as a result[1]. Accidents (road traffic crashes, drowning, poisoning, falls, and burns) are unintentional and avoidable events, causing physical and emotional injuries, which may occur in domestic or social environments such as work, school, sports, and leisure[1]. Violence, especially manifested by assaults, homicides, and suicides, is the use of physical force or power, as a threaten or real, against oneself, another person, or a group or community, which either results in or has any possibility of resulting in injury, death, psychological harm, developmental disabilities, or privation[2].

These events are responsible for the death of five million people worldwide each year (~9% of global mortality), which presents a major challenge for the health sector, particularly in developing countries[3]. Despite being one of the main causes of mortality, external causes are also responsible for the hospitalization of millions of people. Depending on the severity of the injuries, many of those who survive accidents and acts of violence continue to experience temporary or permanent sequelae[4].

Despite the evidence of decline for some specific causes, homicide and traffic-related injuries account for nearly two-thirds of deaths owing to external causes in Brazil[5]. In 2010, 143,256 Brazilians died because of accidents and violence (12.5% of all deaths in the country), of which the victims of homicide were 36.5%, and that of road traffic accidents (RTAs) were 29.9%. In the same year, 929,893 hospital admissions were authorized by injuries owing to external causes, accounting for 8.2% of hospitalizations financed by the Public Health System (SUS), at a cost of 940.5 million reais (8.7% of total admissions paid by SUS)[7].

The profile of mortality owing to external causes of the Brazilian population has been extensively studied by researches addressing the epidemiological characteristics of the victims, the

magnitude and the tendency of these diseases, and the data quality. Such analyzes use the data provided by the Mortality Information System (SIM), which provides, in the death certificate (DC), information that is systematically analyzed and widely disseminated to the intervention planning[8].

However, there are still a few studies concerning the epidemiological pattern of hospitalizations resulting from external causes in Brazil. The epidemiological analysis of hospitalizations imposes itself as a major challenge to public health[9]. Even still underutilized in epidemiological analysis and restricted to services funded by SUS, the data from the Hospital Information System of the Unified Health System (SIH/SUS) have been gradually employed in analyzes that go beyond the financial scope and examine the epidemiological behavior of hospital morbidity, including the external causes[10,11].

The SIH/SUS provides, from the hospital authorization form (AIH), demographic and clinical data, allowing the description of morbidity and the hospital mortality rate within the services by Unified Health System (SUS). It is estimated that the coverage of the system reaches approximately 70% of hospital admissions in the country, with variations between regions and states in Brazil, based on the percentage of the user population of private health plans[12].

While the nonfatal events are more common than the outcomes captured by the mortality records, it becomes essential to know the epidemiological aspects of hospitalizations owing to the external causes in order to support the planning of actions for preventing this practice. Hence, the aim of this article was to characterize hospital admissions owing to the external causes in SUS in Brazil, in 2011.

METHODS

This is a descriptive study whose population comprised all hospitalizations owing to external causes, conducted in the services of SUS in 2011. The data were obtained from HIS/SUS and were made available by the Secretary of Health Surveillance of the Ministry of Health through the electronic portal of the SUS Department of Information Technology (DATASUS).

The records selected had a secondary diagnosis, which corresponded to one of the codes of chapter XX of the International Statistical Classification of Diseases and Related Health Problems-Tenth Revision (ICD-10)[13], according to the following groupings:

- road traffic accidents- (RTC; V01–V89)—pedestrians (V01–V09), cyclists (V10–V19), motorcyclists (V20–V39), vehicle occupants (V40–V79), and other RTCs (V80–V89);
- falls (00–W19)—at the same level (W00–W03, W18), from one level to another (W04–W17), and unspecified (W19);
- other accidents (V90–V99, W20–X59);
- attacks and legal interventions—homicides (X85–Y09, Y35–Y36), assault by firearms (X93–X95), assault by sharp instruments (X99), and other means (X85–X92, X96–X98, Y00–Y09, Y35–Y36);
- intentionally self-harm—suicides (X60–X84);

- event of undetermined intent (Y10–Y34); and
- other external causes (Y40–Y98).

Hospitalizations coded only with the nature of the injury (S00–S99, T00–T98 of Chapter XIX) were included in the group of "other external causes," to avoid underestimation of total hospitalizations owing to external causes.

Population data were collected on the basis of the Census 2000 and 2010 of the Brazilian Institute of Geography and Statistics (IBGE), available on the website of DATASUS, using the arithmetic interpolation calculation method to estimate the resident population in the year 2011. The descriptive variables were: gender (male and female); age (≤ 9, 10 – 19, 20 – 39, 40 – 59, and ≥ 60 years); race/skin color (white, black, black and brown, yellow, and indigenous); the geographic region of residence (north, northeast, southeast, south, and midwest).

The estimator of the coefficient of hospitalization per 100,000 inhabitants was calculated from the ratio between the number of hospitalizations owing to external causes paid by SUS, according to the place of residence (numerator) and the resident population (denominator). Thus, as the AIH uses the event (hospitalization) as a registration and reporting unit, the indicator built was an event number ratio (hospitalizations owing to external causes) divided by the resident population. Hence, this indicator does not express risk but allows to know the magnitude of the subject matter, here restricted to admissions that were paid by SUS. In addition, the indicators of average stay (total days of hospitalization/total number of admissions in the period) and hospital mortality (number of admissions that were discharged by death × 100/total number of admissions in the period) were calculated.

The TabWin 3.5 program was used to import the tabulations made in the DATASUS website, and Microsoft Excel 2010 was used to calculate the hospitalization coefficients, average stay, hospital mortality, and coefficients ratio.

The project was approved by the Research Ethics Committee of the Technology Sciences School of Piauí (NOVAFAPI) under the Opinion no. 137.435, from November 1, 2012.

RESULTS

A total of 973,015 hospitalizations owing to external causes in hospital services linked to SUS in Brazil in 2011 were recorded. With regard to sociodemographic characteristics, most patients were men (70.4%), aged 20–39 years (36.9%), whites (33.5%), and with a large participation of residents in the southeast (41.9%), which held 42.1% of the population in 2011. Most hospitalizations were because of accidental causes, represented by falls (38.4%) and RTAs (15.8%); however, the admissions for violence presented the lowest frequencies: aggression (5.1%) and self-harm (0.9%). The other external causes, including other accidents and events of undetermined intent, accounted for 39.9% of admissions. The distribution of different causes of hospitalization on the basis of variables such as sex, age, race/skin color, and geographic region of residence is shown in Table 1.

Table 1. Number and proportion of hospitalizations due to external causes according to specific causes, sex, age, race/skin color and geographic region of residence. Brazil, 2011.

Characteristics	Specific causes											
	All external causes		Falls		Road traffic accidents		Assaults		Self-harm		Other external causes*	
	n	%	n	%	n	%	n	%	n	%	n	%
Total	973.015	100.0	373.359	38.4	153.632	15.8	49.269	5.1	8.645	0.9	388.110	39.9
Sex												
Male (M)	684.994	70.4	246.421	36.0	120.487	17.6	40.360	5.9	5.087	0.7	272.639	39.8
Female (F)	288.021	29.6	126.938	44.1	33.145	11.5	8.909	3.1	3.558	1.2	115.471	40.1
Ratio M/F	2.4		1.9		3.6		4.5		1.4		2.4	
Age (years)												
≤ 9	87.447	9.0	37.007	42.3	7.989	9.1	2.066	2.4	498	0.6	39.887	45.6
10 – 19	133.509	13.7	48.501	36.3	23.971	18.0	7.405	5.5	1.113	0.8	52.519	39.3
20 – 39	358.865	36.9	111.560	31.1	76.698	21.4	25.935	7.2	3.943	1.1	140.729	39.2
40 – 59	230.601	23.7	91.351	39.6	32.972	14.3	10.127	4.4	2.493	1.1	93.658	40.6
≥ 60	162.593	16.7	84.940	52.2	12.002	7.4	3.736	2.3	598	0.4	61.317	37.7
Race/skin color												
White	325.731	33.5	152.005	46.7	49.987	15.3	9.556	2.9	3.087	0.9	111.096	34.1
Black**	260.323	26.8	88.228	33.9	41.281	15.9	13.653	5.2	2.838	1.1	114.323	43.9
Yellow	4.284	0.4	1.997	46.6	476	11.1	136	3.2	36	0.8	1.639	38.3
Indigenous	1.134	0.1	439	38.7	74	6.5	52	4.6	2	0.2	567	50.0
No information	381.543	39.2	130.690	34.3	61.814	16.2	25.872	6.8	2.682	0.7	160.485	42.1
Geographic region												
North	83.938	8.6	13.541	16.1	8.589	10.2	5.083	6.1	625	0.7	56.100	66.8
Northeast	229.740	23.6	73.286	31.9	40.105	17.5	16.288	7.1	1.375	0.6	98.686	43.0
Southeast	407.364	41.9	176.502	43.3	71.414	17.5	18.284	4.5	5.236	1.3	135.928	33.4
South	162.486	16.7	76.512	47.1	18.964	11.7	4.488	2.8	768	0.5	61.754	38.0
MidWest	89.487	9.2	33.518	37.5	14.560	16.3	5.126	5.7	641	0.7	35.642	39.8

*Includes events of undetermined intent; **Include race/skin color black and brown.
Source: Ministry of Health, Hospital Information System of the Unified Health System.

Regarding the distribution of hospitalizations owing to external causes according to specific causes and sex of patients, RTAs (17.6%) and assaults (5.9%) showed a higher proportion of admissions among men compared with women (11.5 and 3.2%, respectively). For women, the proportion of admissions for falls (44.1%) and self-harm (1.2%) exceeded the value observed among men. In absolute terms, the number of admissions was higher in male patients for all cases, eventually being 3.6 to 4.5 times the number of hospitalizations among women by RTAs and assaults, respectively. Hospitalizations for accidents involving male cyclists and motorcyclists were 4.4 and 5.3 times, respectively, the number observed in female subjects. Among hospitalizations for assaults, the frequency of events involving firearms between male victims was 10.6 times that observed among female patients (Table 2).

The estimated coefficient of hospitalization owing to external causes in Brazil in 2011 was 504.3 admissions per 100,000 inhabitants, showing a great variation of sex, age, and the type of cause. The highest rates were observed for hospital admissions owing to injuries from falls (193.5/100,000 inhabitants) and RTAs (79.6/100,000 inhabitants.), followed by admissions for assault (25.5/100,000 inhabitants) and self-harm (4.5/100,000 inhabitants.). In all causes and in all age groups, the rates were higher in male patients, except in hospitalizations owing to falls in the age group of 60 years or older. The hospital indicators of falls proved to increase with age, reaching a value of 433.8 admissions per 100,000 women aged 60 years or older. The highest coefficient of hospitalization for RTAs was observed among men aged 20 to 39 years (198.6/100,000 inhabitants) and women aged 20 to 39 years (40.1/100,000 inhabitants) and 60 years or older (41.0/100,000 inhabitants.). The highest rate of hospitalization for assault was observed among men aged 20 to 39 years (69.8/100,000 inhabitants) and women aged 20 to 39 years and 60 years or older. The hospital indicators for self-harm reached its maximum values among men aged 40 to 59 years (7.6/100,000 inhabitants) and women aged 20 to 39 years (4.9/100,000 inhabitants). The hospitalization rate owing to external causes was higher in the midwest region, except for hospitalizations from falls and self-harm, whose indicator was higher in the south and southeast, respectively (Table 3).

The average stay of hospitalizations owing to external causes was 5.2 days, ranging from 4.1 days for admissions for self-harm to 6.1 days for admissions because of RTAs. The duration of hospitalization was higher among male patients, except in hospitalizations from falls, and presented directly proportional evolution to the increasing age of patients, ranging from 3.4 days for children up to 9 years old to 6.8 days for patients aged 60 years or older. The hospital mortality was 2.5% for the total of hospitalizations owing to external causes, wherein the assaults (4.7%) and self-harm (4.0%) showed the highest values. The mortality rate was higher in male patients, except for admissions for falls, and directly proportional to the increasing age of patients (Table 4).

Falls of the same level and from a level to another resulted in hospitalizations with an average duration of 4.7 and 5.4 days, respectively, and lethality of 2.2%. Among the hospitalizations owing to RTAs, victims of trampling (pedestrians) and vehicle occupants demanded

a greater length of hospital stay (average stay = 6.4 days), with the highest fatality rates (4.6% and 5.1%, respectively). Hospitalizations for injuries resulting from firearms lasted on an average 7.3 days, resulting in hospital mortality of 9.5%, the highest among the specific causes of hospitalization (Table 5).

Table 2. Number and proportion of hospitalizations due to external causes according to sex and specific causes. Brazil, 2011.

Specific causes	Total		Male (M)		Female (F)		Ratio M/F
	n	%	n	%	n	%	
Total of external causes	973.015	100.0	684.994	100.0	288.021	100.0	2.4
Falls	373.359	38.4	246.421	36.0	126.938	44.1	1.9
Road traffic accidents	153.632	15.8	120.487	17.6	33.145	11.5	3.6
Other accidents	268.200	27.6	193.094	28.2	75.106	26.1	2.6
Assaults	49.269	5.1	40.360	5.9	8.909	3.1	4.5
Self-harm	8.645	0.9	5.087	0.7	3.558	1.2	1.4
Undetermined intention	47.322	4.9	33.469	4.9	13.853	4.8	2.4
Other external causes	72.588	7.5	46.076	6.7	26.512	9.2	1.7
Falls	373.359	100.0	246.421	100.0	126.938	100.0	1.9
Same level	128.087	34.3	79.531	32.3	48.556	38.3	1.6
One level to another	59.290	15.9	41.168	16.7	18.122	14.3	2.3
Unspecified	185.982	49.8	125.722	51.0	60.260	47.5	2.1
Road traffic accidents	153.632	100.0	120.487	100.0	33.145	100.0	3.6
Pedestrians	37.577	24.5	26.035	21.6	11.542	34.8	2.3
Cyclists	9.291	6.0	7.563	6.3	1.728	5.2	4.4
Motorcyclists	77.595	50.5	65.215	54.1	12.380	37.4	5.3
Vehicle occupants	17.053	11.1	12.404	10.3	4.649	14.0	2.7
Others	12.116	7.9	9.270	7.7	2.846	8.6	3.3
Assaults	49.269	100.0	40.360	100.0	8.909	100.0	4.5
Firearm	12.502	25.4	11.423	28.3	1.079	12.1	10.6
Sharp instrument	11.750	23.8	9.885	24.5	1.865	20.9	5.3
Other means	25.017	50.8	19.052	47.2	5.965	67.0	3.2

Source: Ministry of Health, Hospital Information System of the Unified Health System.

Table 3. Hospitalization coefficient* due to external causes according to specific causes, sex, age, and geographic region of residence. Brazil, 2011.

Characteristics	All external causes	Falls	Road traffic accidents	Assaults	Self-harm
Total	504.3	193.5	79.6	25.5	4.5
≤ 9	308.8	130.7	28.2	7.3	1.8
10 – 19	392.9	142.7	70.5	21.8	3.3
20 – 39	553.7	172.1	118.3	40.0	6.1
40 – 59	517.6	205.1	74.0	22.7	5.6
≥ 60	763.9	399.1	56.4	17.6	2.8
Male	725.5	261.0	127.6	42.7	5.4
≤ 9	385.0	164.9	36.8	9.3	1.9
10 – 19	605.6	226.5	108.6	35.9	2.6
20 – 39	897.6	276.3	198.6	69.8	7.3
40 – 59	763.8	288.9	120.9	38.4	7.6
≥ 60	793.8	355.7	75.6	24.5	4.1
Female	292.3	128.8	33.6	9.0	3.6
≤ 9	229.8	95.2	19.3	5.3	1.6
10 – 19	174.9	56.9	31.5	7.4	3.9
20 – 39	218.4	70.6	40.1	11.0	4.9
40 – 59	291.1	127.9	30.9	8.3	3.8
≥ 60	740.1	433.8	41.0	12.0	1.7
Geographic region					
North	518.4	83.6	53.0	31.4	3.9
Northeast	428.4	136.7	74.8	30.4	2.6
Southeast	501.8	217.4	88.0	22.5	6.4
South	588.4	277.1	68.7	16.3	2.8
Midwest	624.9	234.0	101.7	35.8	4.5

*Hospitalization coefficient for 100,000 inhabitants.
Source: Ministry of Health, Hospital Information System of the Unified Health System

Table 4. Average stay in hospitalizations and mortality due to external causes according to specific causes, sex, and age group. Brazil 2011.

Characteristics	Average stay (days)					Mortality (%)				
	All external causes	Falls	Road traffic accidents	Assaults	Self-harm	All external causes	Falls	Road traffic accidents	Assaults	Self-inflicted lesions
Total	5.2	4.5	6.1	6.0	4.1	2.5	1.9	3.3	4.7	4.0
Sex										
Male (M)	5.3	4.4	6.2	6.1	4.3	2.6	1.9	3.4	5.1	4.7
Female (F)	5.2	4.7	5.9	5.3	3.8	2.4	2.0	3.0	3.2	3.0
Ratio M/F	1.0	0.9	1.1	1.2	1.1	1.1	1.0	1.1	1.6	1.5
Age (years)										
≤ 9	3.4	2.6	4.1	4.3	2.8	0.6	0.3	1.4	1.2	0.8
10 – 19	4.2	3.2	5.4	5.5	3.5	1.3	0.4	2.0	4.3	2.1
20 – 39	5.1	4.1	6.1	6.0	4.0	2.0	1.0	2.7	4.7	3.4
40 – 59	5.7	4.9	6.9	6.3	4.4	2.6	1.8	4.1	5.0	5.3
≥ 60	6.8	6.4	7.3	7.1	5.7	5.7	4.8	9.3	6.7	8.4

Source: Ministry of Health, Hospital Information System of the Unified Health System

Table 5. Average stay in hospitalizations and mortality due to external causes according to specific causes. Brazil 2011.

Specific causes	Average stay (days)	Mortality (%)
Falls	4.5	1.9
Same level	4.7	2.2
One level to another	5.4	2.2
Unspecified	4.2	1.7
Road traffic accidents	6.1	3.3
Pedestrians	6.4	4.6
Cyclists	5.0	2.2
Motorcyclists	6.1	2.3
Vehicle occupants	6.4	5.1
Others	6.1	4.3
Assaults	6.0	4.7
Firearm	7.3	9.5
Sharp instrument	5.0	3.0
Other means	5.8	3.1

Source: Ministry of Health, Hospital Information System of the Unified Health System

DISCUSSION

The characteristics of hospital admissions owing to external causes in Brazil, in 2011, revealed the concentration of admissions of male patients and young adults. The estimated hospitalization rate was higher in male patients and proved to grow with the increasing age of victims. The preponderance of male patients in virtually all types of external causes of hospitalization draws attention to the gender relations involved in the society in which patients are inserted, resulting in an uneven distribution of admissions. These aspects, combined with the influence of behavioral differences and lifestyle for men and women, are proven by studies that also point to the predominance of men and young adults among hospital admissions owing to external causes in Brazil[6,14-16].

Falls occupied the first position among the hospitalizations owing to external causes, with a greater impact in the elderly, in which the estimated hospitalization rate among women exceeded that observed among men. Several studies have pointed out the elderly as the most vulnerable to the occurrence of falls[17]. In Campinas (SP), a survey to assess the profile of elderly trauma victims treated at emergency services found that most patients were women, aged 70 to 74 years, with a higher incidence of falls of their own height[18]. A research carried out in a neighborhood of Fortaleza (CE) found that the occurrence of falls among the elderly people was related to inadequate domestic environment, with emphasis on slippery surfaces, resulting in fractures and need of hospitalization in one-third of seniors, who reported a fall episode[19].

RTAs are ranked as the second most frequent cause of hospitalizations owing to external incidental causes. The hospital indicators by road accidents among men were 3.8 times that seen among women. Traffic accidents are a global public health problem, especially in developing countries. In the last two decades, there has been an increase in deaths and hospitalizations owing to traffic accidents, especially when it comes to accidents involving motorcyclists, because such events disproportionately affect young men. The importance of motorcyclists to the current standard of mortality and morbidity from road accidents was demonstrated when Marín-León et al.[20] analyzed the tendency of occurrence of traffic accidents between 1995 and 2008 in the city of Campinas (SP). During this period, the motorcycle fleet grew 241%. Motorcyclists were responsible for the greatest run over coefficients (66.7 victims/1,000 accidents) and accidents resulting in death (4 deaths/1,000 accidents). Men revealed a much superior risk of facing death in traffic accidents compared with women. Another analysis conducted in the city of Maringá (PR) has estimated the average risk of hospitalization from traffic accidents in 19.4/100 victims (673 admissions), identifying pedestrians, cyclists, and motorcyclists as categories of victims with a higher risk of hospitalization.

The results of this analysis are consistent with the description of the profile of the traffic accidents patients treated at the emergency room at Goiânia (GO), among which predominated male, young (mean age 19.88 years; standard deviation of 2.7 years) victims and motorcycle occupants (67%)[22]. Factors such as the recent

economic changes in Latin American countries, the rapid increase in motorization coefficients, and the high availability of motorcycles as means of transport, associated with failure in policies of public transport and supervision of drivers, contribute to the growing number of accidents involving motorcycles[23]. Faced with this tragic scenario, it is necessary to implement effective measures to prevent such accidents and, consequently, contribute to the reduction of hospitalizations and deaths caused by them. Education measures are needed for the most vulnerable groups, encouraging the use of security and surveillance equipment that prioritize the periods of increased occurrence of accidents[22,24].

Assaults are considered one of the most impactful causes of death among the external causes but had a limited participation in the panorama of hospitalizations. The low frequency of admissions for assaults in the number of deaths from the same cause would be explained by its high fatality at the scene and the underreporting in the hospital, either because of the patient's fear of revealing the assault or by a lack of interest/fear of health professionals that would collect and record such information[25]. Although the impact of the attacks is a greater cause of mortality, hospital admissions from these causes must be analyzed carefully. Hospitalizations for assaults accounted for about 5% of cases owing to external causes in Brazil and showed the behavior similar to that seen in mortality from these causes: a predominance of young male victims[14]. However, women also appear in the list of victims of assault. In a study conducted at the Emergency Hospital of Porto Alegre (RS), the hospital's profile for abuse of women found that most cases were young people aged 18 to 29 years, with a predominance of assault by firearm[26].

Another important component of morbidity owing to external causes refers to self-harm, which, while presenting the lowest frequencies, should be considered before the persistence of this type of occurrence. Admission coefficients were higher among men in all ages, especially for the group of 20 to 59 years. Among women, the group of 20 to 39 years presented the highest rate of hospitalization for this type of injury. It should be noted that the difference in the coefficient of hospitalization for self-harm among elderly men was 2.4 times that observed among the elderly women. This result can be corroborated by the study of Minayo et al.[27], which showed a significant increase in mortality from suicide in Brazil, especially in the male population aged older than 60 years.

In a research conducted in a referral hospital with admissions of victims owing to external causes in the city of São José dos Campos (SP), Melione and Mello-Jorge[25] found an average length of stay similar to that found in this study. However, the average time for hospitalizations because of falls in that city was twice the estimated on the basis of Brazil numbers, which can be explained by the quality of information from hospital records, which show a wide variation among the various establishments that provide data to the HIS/SUS, or the profile of hospitalized clientele in that city.

In describing the mortality rate, the severity of injuries owing to external causes that required hospitalization can be indirectly identified. Thus, the most serious injuries resulted from assaults, especially those involving a firearm, attempted suicides, and RTAs, especially

when the victim was a vehicle occupant or pedestrian. This is because attempts to murder and suicide involve more lethal means, reducing the chance of victims survival[28,29].

In the case of RTAs, the factors that contribute to the high mortality rate among pedestrians are a great exposure of the body surface, lack of protective equipment, and vulnerability to the weight of the vehicle involved in the accident. For the occupants of vehicles, there is a lack of use of safety belt, exposure to throws, and movement during collision. The age difference of the victims according to types of road accidents should also be considered, because the mortality rate is higher among the elderly people. The speed of the vehicles involved is also a key element in determining the severity of injuries among pedestrians and occupants[20,30]. It is noteworthy that male victims' mortality is evident when observing the higher mortality in admissions of male victims of assault and self-harm injuries. This aspect is proven in several studies that point to a higher incidence of fatal injuries among men, whether they are victims of homicides[31] or self-harm[27].

CONCLUSION

This study contributes to the knowledge of the characterization of hospital morbidity owing to external causes in public health services in Brazil, offering a more comprehensive understanding of these issues, as it complements widely known information on mortality [32].

However, it is necessary to clarify some limitations of the SIH/SUS that can influence the results presented in this study. Given the diversity of services distributed in the country, it is likely that the following situations occur:

- poor performance in the reliability of clinical data when compared with hospital records[25];
- underreporting of hospitalizations owing to external causes because of distortions in relation to identifying the causes of injuries[10]. Thus, the high proportion of admissions with the variable race/skin color unfilled (~39%) and the existence of hospitalizations owing to external causes of undetermined intent (~5%) illustrate some of the aspects to be improved in order to characterize more reliably the population served and the procedures performed.

Another point to be considered is the system's coverage, which is capable of recording approximately 70 to 90% of hospital admissions that occur in Brazil, varying according to the user portion of health plans in the different regions of the country[33,34]. Thus, it is suggested to conduct studies that show the hospitalization rate owing to external causes corrected by identifying the proportion of users of private health services and plans. Hence, it would be possible to estimate the hospitalization coefficient for all inhabitants.

Finally, despite the aforementioned limitations, the SIH/SUS holds a strong potential for epidemiological analysis, providing an essential tool for defining policies and programs, decision-making, and evaluation of results, as it identifies priority groups to develop specific strategies of prevention and assistance to external causes. However, it is necessary to invest in improvements in data quality, especially regarding the coding of the cause of admission. In addition, it should encourage analysis and dissemination of data from this system and boost the development of new studies and monitoring of hospital morbidity owing to external causes.

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