Journal of Nursing
Revista de Enfermagem
UFPE On Line
ISSN: 1981-8963

ORIGINAL ARTICLE

TREND OF MORTALITY FROM EXTERNAL CAUSES IN ELDERLY

TENDÊNCIA DA MORTALIDADE POR CAUSAS EXTERNAS EM IDOSOS

TENDENCIA DE MORTALIDAD POR CAUSAS EXTERNAS EN LOS ANCIANOS

Érica Assunção Carmo[1], Tuany Santos Souza[2], Adriana Alves Nery[3], Alba Benemérita Alves Vilela[4], Ismar Eduardo Martins Filho[5]

ABSTRACT

Objectives: to analyze the temporal evolution of mortality due to external causes in the elderly in Brazil, and to identify the evolutionary differences between the Brazilian macro regions. ***Method:*** a study with data from the Mortality Information System, referring to mortality from external causes in the elderly in Brazil, from 1996 to 2013. A trend analysis of mortality coefficients was performed using polynomial regression models. ***Results:*** 264,276 deaths from external causes involving elderly people in Brazil, were identified, 66.3% of whom were men; 41.1% with 60 to 69 years; 33.4% resulted from transportation accidents, followed by falls (28.6%). Deaths due to transportation accidents and homicides predominated among young adults, while, due to falls, in long-lived elderly women. There was a significant upward trend for the general coefficient, and for the North, Northeast and Center-West macro-regions. ***Conclusion:*** there was an increasing tendency of mortality due to external causes in the elderly in Brazil, and in different Brazilian regions. ***Descriptors*:** External Causes; Mortality; Elderly; Temporal Distribution.

RESUMO

***Objetivos*:** analisar a evolução temporal da mortalidade por causas externas em idosos no Brasil e identificar as diferenças evolutivas entre as macrorregiões brasileiras. ***Método*:** estudo com dados do Sistema de Informação sobre Mortalidade, referentes à mortalidade por causas externas em idosos no Brasil, no período de 1996 a 2013. Verificou-se análise de tendência dos coeficientes de mortalidade por meio de modelos de regressão polinomial. ***Resultados*:** identificaram-se 264.276 óbitos por causas externas envolvendo idosos no Brasil, sendo 66,3% homens; 41,1% com 60 a 69 anos; 33,4% decorreram de acidentes de transporte, seguidos pelas quedas (28,6%). Os óbitos por acidentes de transporte e homicídios predominaram entre idosos jovens, enquanto que, por quedas, sobressaíram em idosas longevas. Verificou-se tendência crescente significativa para o coeficiente geral e para os das macrorregiões Norte, Nordeste e Centro-Oeste. ***Conclusão*:** constatou-se tendência crescente da mortalidade por causas externas em idosos no Brasil e em diferentes regiões brasileiras. ***Descritores*:** Causas Externas; Mortalidade; Idosos; Distribuição Temporal.

RESUMEN

Objetivos: analizar la evolución temporal de la mortalidad por causas externas en personas de edad en Brasil y para identificar las diferencias evolutivas entre las macrorregiones brasileñas. ***Método:*** estudio con datos del Sistema de Información de Mortalidad, con respecto a la mortalidad por causas externas en personas de edad en Brasil, en el período de 1996-2013. Se determinó el análisis de tendencia de los coeficientes de mortalidad por medio de modelos de regresión polinomial. ***Resultados:*** se identificó 264.276 muertes por causas externas envolviendo personas mayores en Brasil, siendo el 66.3% de los hombres; 41.1% con 60 a 69 años; 33,4% resultaron de accidentes de transporte, seguidos por caídas (28.6%). Las muertes por accidentes de transporte y asesinatos prevalecieron entre los jóvenes mayores, mientras que, hemos visto caídas, en ancianos por la longevidad. Se verificó una tendencia creciente significativa para el General y el coeficiente de macrorregiones en el norte, noreste y medio-oeste. ***Conclusión***: se encontró tendencia creciente de la mortalidad por causas externas en personas de edad en Brasil y en diferentes regiones brasileñas. ***Descriptores*:** Causas Externas; Mortalidad; Ancianos; Distribución Temporal.

[1]Nurse, Master's Student, Post-Graduate Program in Nursing and Health, State University of Southwest Bahia/UESB. Jequié (BA), Brazil. E-mail: eacarmo20@gmail.com; [2]Pharmaceuticist, Master's Student, Post-Graduate Program in Nursing and Health, State University of Southwest Bahia/UESB. Jequié (BA), Brazil. E-mail: tuanysouza.s@hotmail.com; [3]Nurse, Professor, PhD, Post-Graduate Program in Nursing and Health, State University of Southwest Bahia/UESB. Jequié (BA), Brazil. E-mail: aanery@gmail.com; [4]Nurse, Professor, PhD, Post-Graduate Program in Nursing and Health, State University of Southwest Bahia/UESB. Jequié (BA), Brazil. E-mail: albavilela@gmail.com; [5]Odontologist, Professor, PhD, Post-Graduate Program in Nursing and Health, State University of Southwest Bahia/UESB. Jequié (BA), Brazil. E-mail: iemfilho@uesb.edu.br

INTRODUCTION

The increase in the number of elderly individuals in the population, inherent in the phenomenon of the demographic transition evidenced in the last decades, has been happening all over the world. Parallel to this, the epidemiological transition proposes the greater emergence of disabilities and a greater burden of chronic-degenerative diseases, which, associated with socioeconomic and public health factors, corroborates with the changes in the morbidity and mortality profile of the population.[1]

At the same time, the increase in the occurrence of certain health problems, including accidents and violence, has been the subject of concern and discussion among researchers and Health professionals.[2] The World Health Organization (WHO) , for the purposes of statistical comparability between countries, classifies accidents and violence as "external causes".[3] In the Brazilian scenario, the occurrence of deaths caused by external causes has increased considerably, which causes major changes in the demographic and epidemiological profile of the population, where it is not only a question of health, but also social.[4]

From the epidemiological point of view, to know the health situation of a population, the mortality profile is considered one of the most relevant information for this purpose.[5] In this sense, in Brazil, in 2010, among the large cause of death groups, external causes were the third cause of death among the general population and the seventh cause of death among the elderly.[4]

It is noticed that, with the advancement of age, vulnerability to external causes, especially falls and traffic accidents, especially trampling, is becoming larger and may result in varying degrees of injury, changes in functional capacity and even death, [6]. However, it is noted that the occurrence of trauma and injury is not an inevitable consequence of age, since the fundamental premise of public health, that external causes can be predictable and therefore avoidable in all ages.

Considering the increase in the physiological vulnerability inherent in senescence that, can certainly, contribute to higher rates of morbidity and mortality due to external causes, associated with a combination of factors that include difficulties and incapacities in the elderly, [4] it is necessary to know the epidemiological characteristics of mortality for these causes in this age group.

Although the occurrence of aggravations related to external causes in the elderly is a public health problem, it is observed that there is still a shortage of studies that address the subject, mainly, that portray, the evolution of the mortality in this population segment, a predominance of studies focusing on young, economically active population being evidenced.

In view of this, it should be pointed out that this study is of salutary relevance, which can contribute to the direction of policies that serve as a subsidy for planning and management of preventive actions, which reduce morbi-mortality due to external causes among the elderly, with an improvement of the health conditions and quality of life of this population.

In this sense, this study has as objectives:

- To analyze the temporal evolution of mortality due to external causes in the elderly in Brazil.
- To Identify the evolutionary differences between the Brazilian macro-regions.

METHOD

Epidemiological and ecological study of a temporal series that describes the temporal evolution of mortality due to external causes in the elderly in Brazil and in the different macro regions of Brazil.

The data from the study consisted of the total number of deaths from external causes involving individuals aged ≥60 years, residents of Brazil, obtained from the Ministry of Health's Mortality Information System (MIS), available at the Information Department of the Unified Health System (DATASUS) for the period 1996 to 2013.

The study period was determined by the years covered by the current International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10), chapter XX classifying the external causes of morbidity and mortality. It was also sought to include in the study, the year corresponding to the publication of the main health policies that address the theme: National Policy for the Reduction of Morbidity and Mortality by Accidents and Violence (PNRMAV) (2001) 7 and the National Policy on Elderly Health).[8]

The variables analyzed in the study were: gender (male, female); age group (60 to 69 years, 70 to 79 years, 80 years or more); the Brazilian macro-regions (North, Northeast, Southeast, South and Central West); and ICD-

10 categories corresponding to the main external causes, grouped in this study, such as: Land Transportation Accidents (LTA) (V01 to V89); Falls (W00 to W19); Suicides / intentional self-harm (X60 to X84); Homicides / aggressions (X85 to Y09) and other causes of accidents (W20 to X59), which includes drownings, burns, accidents involving contact with animals, among other external causes of accidental injuries.

For the analysis of the temporal evolution, the mortality coefficients, obtained from the division of the number of external causes of death in individuals aged 60 years or more by the population of this age group resident in Brazil and the Brazilian macro regions, were calculated, being 100 thousand inhabitants. In order to eliminate / minimize the effect of the difference in age composition among populations, the coefficients were adjusted by age group, using the direct method, using the Brazilian elderly population of 2010 as a reference. Population data, the basis for calculating the coefficients, were made available by the Brazilian Institute of Geography and Statistics (IBGE), from the DATASUS website.

Subsequently, a trend analysis was carried out by estimating the polynomial regression models, for which the coefficients of mortality were considered as dependent variables (Y) and the years of the historical series, as independent variables (X). The independent variable was centralized by the midpoint of the series (X-2004), in order to avoid serial autocorrelation between the terms of the regression equation.

In the modeling, first order models (Y = ß0 + ß1X), 2nd (Y = ß0 + ß1X + ß2X2), 3rd (Y = ß0 + ß1X + ß2X2 + ß3X3) and exponential (Y = eß0 + ß1X) that ß0 is the average coefficient of the period and ß1 is the annual average increment. The best criteria were: better function, according to the dispersion diagram; better adjustment, by residue analysis (normality of errors and homoscedasticity); higher statistical significance and higher coefficient of determination (R2). The level of statistical significance adopted was 5%.

For the tabulation, descriptive analysis, calculation of the coefficients and construction of figures, we used the program Microsoft Office Excel, version 2010, and for trend analysis, the SPSS program (Statiscal Package for the Social Sciences), version 21.0. Because it is a secondary domain, available in the public domain, available via the Internet, the submittal and approval of the Research Ethics Committee was not necessary.

RESULTS

In the period under investigation, 264,276 deaths from external causes were identified in the elderly in Brazil, of which 66.3% were male and 41.1% were from the 60-69 age group.

Regarding the type of external causes, it was evidenced that 33.4% of the deaths were caused by LTA, followed by falls, that represented 28.6% of the cases. As shown in table 1, the analysis stratified by sex and age group showed differences in the distribution of deaths among the groups evaluated. In the elderly males, LTA and falls remained the main causes of death, with 36.5% and 21.7%, respectively, while, in females, falls had the highest proportion of cases, with 42.3% , Followed by LTA, with 27.3%.

Table 1. Distribution of deaths due to external causes in the elderly, according to ICD-10 categories, according to sex and age group. Brazil, 1996 - 2013.

External Cause Type	Gender**				Age Group					
	Male		Female		60 to 69 years		70 to 79 years		80 years or more	
	n	%	n	%	n	%	n	%	n	%
LTA	63847	36.5	24405	27.4	45469	41.9	29604	37.0	13200	17.4
Falls	37972	21.7	37668	42.3	14911	13.7	21037	26.3	39703	52.4
Other Accidents	29605	16.9	18669	20.9	17337	16.0	14433	18.1	16524	21.9
Suicide	17879	10.2	4059	4.6	11907	11.0	6905	8.6	3129	4.1
Homicide	25813	14.7	4294	4.8	18960	17.4	7988	10.0	3169	4.2
Total	175.116	100	89.095	100	108.584	100	79.967	100	75.725	100

* International Statistical Classification of Diseases and Related Health Problems-10th revision
** Ignored cases were excluded.
Source: MS / SVS / DATASUS / SIM.

As for the age group, it was found that in the age groups of 60 to 69 years and 70 to 79 years, the LTA also stood out, representing 41.9% and 37% of the deaths, respectively. However, the second leading cause of death differs between these groups, with homicides / aggressions ranging from 60 to 69 years (17.4%), and falls from 70 to 79 years (26.3%). Already in the group of 80 years or more, 52.4% of deaths were caused by falls, followed by other accidental causes, with 21.9%.

The temporal evolution of the adjusted coefficient of mortality due to external causes in the elderly in Brazil and the Brazilian

macro-regions is presented in table 2 and Figure 1.

Table 2. Number of deaths and adjusted coefficients * (per 100,000 inhabitants) of the mortality due to external causes in the elderly in Brazil and the Brazilian macro-regions. Brazil, 1996 - 2013.

	Macrorregions											
	Brasil		North		Northeast		Southeast		South		Midwest	
Year	Num. of Deaths	Adjusted Coeficient	Num. of Deaths	Adjusted Coeficient	Num. of Deaths	Adjusted Coeficient	Num. of Deaths	Adjusted Coeficient	Num. of Deaths	Adjusted Coeficient	Num. of Deaths	Adjusted Coeficient
1996	11332	94.2	397	71.1	2218	63.6	6062	111.2	1935	102.1	720	123.2
1997	11540	94.9	408	71.4	2267	64.3	6084	110.8	2073	108.3	708	117.8
1998	10991	89.7	440	75.9	2226	62.6	5543	100.3	2035	105.9	747	123.8
1999	11142	89.9	420	70.8	2243	62.6	5723	102.2	2046	104.5	710	118.2
2000	10708	75.0	469	67.9	2233	55.3	5100	78.0	2044	92.2	862	117.6
2001	11197	77.3	513	72.1	2238	54.6	5317	80.2	2191	96.8	938	125.6
2002	11226	76.6	504	69.2	2382	57.7	4995	74.3	2349	103.7	996	131.1
2003	12085	81.7	556	75.1	2530	60.7	5612	82.8	2338	102.2	1049	136.6
2004	12935	86.7	607	80.4	2712	64.5	5963	87.5	2503	108.6	1150	148.5
2005	13597	89.1	678	86.6	3115	72.5	6119	87.3	2514	106.7	1171	148.9
2006	14710	95.6	723	90.7	3324	76.6	6879	97.8	2604	109.8	1180	147.8
2007	15257	84.0	686	75.5	3544	74.8	6931	80.9	2882	98.3	1214	118.3
2008	16654	88.7	879	94.3	3710	75.5	7607	86.3	3022	99.4	1436	133.3
2009	16959	87.1	864	90.0	3800	75.3	7779	84.8	3021	95.5	1495	132.7
2010	19584	95.1	992	93.4	4520	81.3	8988	94.3	3349	104.0	1735	147.7
2011	20289	97.8	1029	95.7	4722	84.2	9274	96.7	3547	109.7	1717	143.3
2012	21495	102.9	1133	104.1	5035	89.2	9739	100.8	3681	113.1	1907	158.2
2013	22575	103.6	1135	106.4	5444	100.4	10071	96.5	3938	109.2	1987	156.4

* Coefficients adjusted by the Brazilian population of the year 2010.
Source: MS / SVS / DATASUS / SIM; IBGE.

It can be seen that, in the analyzed period, the coefficient of mortality due to external causes in the elderly in the country ranged from 94.2/100 thousand inhabitants to 103.6/100 thousand inhabitants, corresponding to an increase of 10.0%. In relation to the macro-regions, it was observed that the North, Northeast and Center-West showed a growth of this coefficient, from 49.6% (71.1/ 100 thousand inhabitants in 1996 to 106.4/100 thousand inhabitants in 2013); 57.9% (63.6%/100 thousand inhabitants in 1996 to 100.4/100 thousand inhabitants in 2013) and 26.9% (123.2/100 thousand inhabitants in 1996 to 156.4/100 thousand inhabitants in 2013), respectively. In the South, the coefficient was stable during the analyzed period, ranging from 102.1/100 thousand inhabitants (1996) to 109.2/100 thousand inhabitants (2013), with a peak in 2012 (113.1/100 thousand inhabitants). On the other hand, in the Southeast, there was a decline of 13.2% in the coefficient, which went from 111.2/100 thousand inhabitants in 1996 to 96.5/100 thousand inhabitants in 2013.

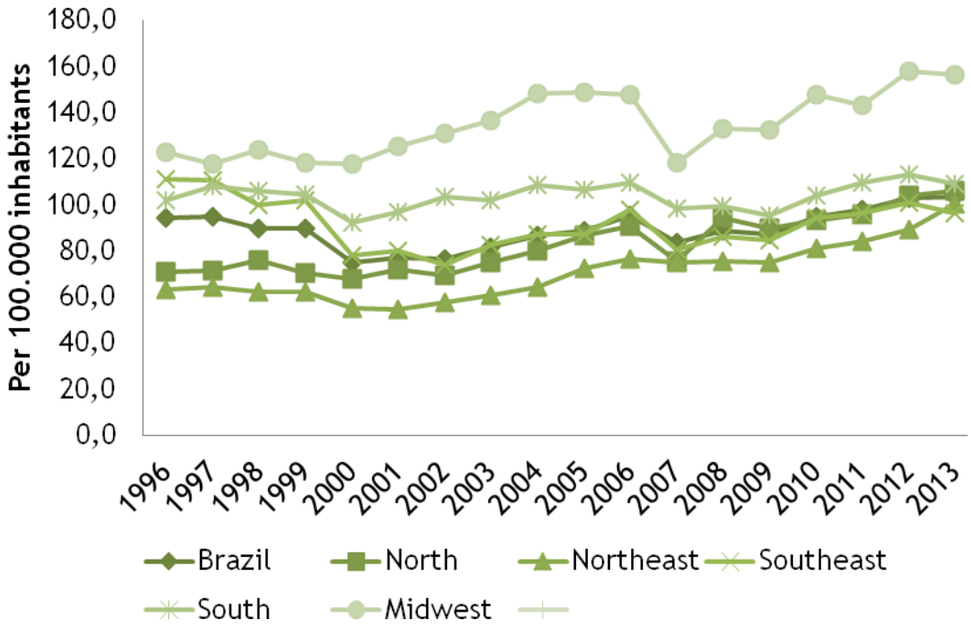

Figure 1. Evolution of adjusted coefficients * of mortality due to external causes in the elderly in Brazil and in the Brazilian macro-regions. Brazil, 1996 to 2013.
Source: MS / SVS / DATASUS / SIM; IBGE.
*Coefficients adjusted by age group by direct method.

As shown in table 3, the trend analysis, showed an increasing and significant trend for the coefficient of mortality due to external causes in the elderly in Brazil (R^2 = 0.71, p = <0.001), as well as for the North macro-regions (R^2 = 0.85, p = <0.001), Northeast (R^2 = 0.91, p = <0.001) and Center West (R^2 = 0.56, p = <0.001). In the Southeast, there was a decreasing and significant trend (R^2 = 0.59, p = 0.001), while, in the South, the coefficients remained stable, and no statistically significant trend was observed (R^2 = 0.19, p = 0.378) on the models tested.

Table 3. Results of the trend analysis of adjusted coefficients of mortality from external causes in the elderly in Brazil and the Brazilian macro-regions. Brazil 1996 - 2013.

	Model**	R^{2***}	Value of p****	Tendency
General*				
Brazil	$Y= 82.6 + 1.23X + 0.25X^2 - 0.01X^3$	0.71	<0.001	Crescent
Macroregions*				
North	$Y= 78.1 + 2.27X + 0.14X^2 - 0.01X^3$	0.87	<0.001	Crescent
Northeast	$Y= 64.2 + 2.25X + 0.22X^2 - 0.01X^3$	0.91	<0.001	Crescent
Southeast	$Y= 83.1 - 0.69X + 0.33X^2$	0.59	0.001	Decrescent
South	$Y=101.8 - 0.01x + 0.01x^2 + 0.004x^3$	0.19	0.378	Stationary
Midwest	$Y= 133.9 + 1.96X$	0.56	<0.001	Crescent

Source: MS / SVS / DATASUS / SIM; IBGE.
Notes: The power of X indicates the order of the final model's polynomial.
* Coefficients adjusted by age group by direct method.
** Model: Y = Death rate per suicide per 100 thousand inhabitants; X = year - 2004.
*** R2 = Coefficient of Determination.
**** p-value of Test F.

DISCUSSION

In this study, it was found that, in the Brazilian elderly population, the external causes of death, mainly of the young, male, with LTA and falls being the main causes of death.

In the literature, gender is considered a risk factor for death among the elderly, with men often being more susceptible than women.[9] In this study, specifically, the highest proportion of male deaths can be explained by the main cause of death, The LTA, which, commonly, affects the male population.[10-2] Reinforcing this justification, is the highest frequency of deaths in the age group of 60 to 69 years, this finding, indicates that in Brazil, the elderly still presents characteristics of the young adult population , such as independence and autonomy, which guarantees him an active life, considering that these elderly people are probably still in the labor market, and therefore more exposed to accidents.[6,14]

The highest proportion of deaths in the age group of 60 to 69 years (41.1%), diverge from the results found in specific localities of the country, such as in the States of Paraná[4] and Minas Gerais,[13] where elderly people (80 years or older) were the main victims of external

causes. This difference may be related to the increasing life expectancy of the elderly population and, consequently, the increase of the participation of the elderly in the composition of the population of the places where the research was carried out, as well as the type of external causes analyzed, taking into account since this population segment is more vulnerable to falls and other accidental causes.[15]

Regarding the distribution of deaths, according to ICD-10 categories, it was evidenced that among the external causes analyzed, the elderly, in Brazil, die mainly from LTA (33.4%), followed by falls, that represented 28.6% % of cases. These findings corroborate those found in a micro-region in the State of São Paulo, where LTA accounted for 45.6% of deaths due to external causes in the elderly.[16]

In addition, a study carried out by WHO to assess the global impact of transport accidents found that the age group of 60 years or older had higher mortality rates among the analyzed groups, and 193,000 people were recorded for this age group transit.[17] In this context, the elderly person's vulnerability to traffic accidents, especially, road traffic accidents[10], can result in varying degrees of injury, including extreme cases leading to the death, above all, of young people and male elderly.

As a consequence, falls were the second cause of death in the elderly in Brazil, which, in the analyzed period mainly affected the elderly, aged 80 years or older, similar to the results found in municipalities in the Brazilian Southwest region11 And in a time series study15, in which higher mortality rates were indicated for falls in the female elderly, aged ≥80 years.

Also, a study carried out in the South of the country points to high mortality coefficients due to higher motor vehicle fatalities in males, followed by falls and other transport accidents, whereas, for the elderly the coefficients of mortality due to external causes were higher for falls, followed by road accidents.

It is noted that falls comprise one of the most relevant intercurrences involving the elderly. In addition to being related to several intrinsic and extrinsic factors, this event presents as a sign of the onset of functional capacity decline, which can result from small abrasions to various fractures , head injuries and hip fractures, the latter being, often the cause of death.[18]

In this study, homicides/aggressions in the elderly were more frequent in males, representing the second external cause of death among 60-69 year olds, similar to findings from another study, which showed the following accidents, homicides, as the main external causes of death among the elderly, especially males.[14]

In Brazil, studies that estimate the prevalence of violence against the elderly or that describe the epidemiological aspects of these cases are still scarce. According to data from the National Survey of Household Sample Surveys (PNAD), conducted in 2008, the prevalence of violence against the elderly was 1.4%, regardless of type.[19] In 2009, the estimated death risk for homicide among Elderly people in Brazil was 9.9 per 100 thousand elderly, and the risk for the elderly (19/100 thousand) was seven times higher than for the elderly (2.7/100 thousand).[20]

Regarding the temporal evolution, the results of this study show an increasing and significant tendency for the coefficient of mortality due to external causes in the elderly in Brazil, showing a growth of 10% in the analyzed period (94.2/100 thousand inhabitants to 103, 6/100 thousand inhabitants). Similarity was observed in a region of sub-Saharan Africa, whose coefficient for those aged ≥45 years was recorded in 98.7/100 thousand inhabitants, between the years 2000 to 2012, being observed the increase in the coefficient with advancing age, especially in males.[22]

The relevance of geographical location, age, gender, socioeconomic conditions, geopolitical structure, among other factors, are the main determinants of the causes of mortality due to external causes.[22] In this sense, the WHO estimates that more than 5,1 million deaths are attributable to injuries and violence per year, and that 90% of these deaths occur in low- and middle-income countries.[22,23] Nevertheless, the importance of external causes in the mortality profile of these countries is often neglected ,either because of the high number of deaths due to other causes or due to a lack of reliable data.[23]

In the Brazilian scenario, in turn, we highlight the increasing and significant trend of the mortality of the elderly due to external causes in the North, Northeast and Central West macro-regions, differently from the Southeast, that presented a decreasing trend, and from the South, where the coefficients remained during the period analyzed. This disparity between macro-regions is possibly attributed to the differences in the

socioeconomic characteristics of these localities, since there has already been described in the literature, a greater occurrence of accidents and violence in the poorest, low-educated and living in precarious conditions. [24] This fact was also discussed in a study on the trend of male mortality from external causes in the Brazilian macro-regions, in which results similar to this study were found.[25]

According to data from the Atlas of Human Development in Brazil, 25% of Brazilian municipalities are in the "low development" range, and the Northeast has 61.3% of the municipalities with "low human development" and, in the North, 40.1% of the cities are in this classification[26], a fact that may justify the growing tendency for mortality from external causes in the elderly in these regions. On the other hand, in the South and Southeast macro-regions, the lowest illiteracy and social inequality rates[25] are recorded, in addition to concentrating most of the Brazilian municipalities with "high human development", being 64.7% and 52.2%, respectively .[26]

In this perspective, a study on the geographical and social inequalities in access to health services in Brazil indicates that access to such services increases according to the socioeconomic development of the region. Thus, people living in the South and Southeast are more likely to use Health services compared to other macro-regions, a condition that may favor and explain the decreasing trend of mortality due to external causes in the elderly in the Southeast, since these individuals have access to an early medical care, and consequently, the chances of progressing to death are reduced.[24]

In view of the above, and considering the relevance of external causes in the field of public health, it was evidenced that some measures were implemented with the purpose of reducing morbidity and mortality from these diseases in Brazil. In 2005, the National Policy for the Reduction of Morbidity and Mortality by Accidents and Violence was established[7], which establishes guidelines and institutional responsibilities considered essential in addressing issues related to the prevention of these diseases in the country, through the establishment of articulation processes with different social segments.

In addition, in 2006, the Ministry of Health implemented, the Violence and Accident Surveillance System (VIVA) [27], in order to make it possible to obtain data and disseminate information on violence and accidents, and thereby contribute to knowledge of the magnitude of these events in Brazil. In the health field of the elderly, this system aims to meet the requirements of Law no. 10.741 / 200328, recently amended by Law No. 12,461 / 201129, which makes it obligatory to notify suspected or confirmed cases of violence against the elderly person for all health services, whether public or private. However, it is known that, although violence against the elderly is widespread and widespread in the country, most cases do not reach health services, becoming naturalized in the family context and in forms of social neglect and public policies.[30]

It is necessary to implement policies and programs that improve the health, participation and safety of the elderly, among which the National Policy on the Health of the Elderly[8], which, in the context of external causes, brings, in its guidelines the importance of carrying out preventive actions for home and public accidents, such as falls and getting run over, as well as to combat domestic and institutional violence against the elderly.

The limitations of this study include the use of secondary data obtained from the MIS that, due to incompleteness and /or failure to complete death declarations, may lead to underreporting, which may compromise the reliability and accuracy of the data. However, even presenting such a gap, MIS shows itself to be a potential tool for time trend studies, since it is official data, which, among other attributions, directs actions and the elaboration of public policies.

Adding, to the limitations, the paucity of studies on mortality from external causes in older people conducted in other countries, for purposes of comparison with the data found, since studies on external causes still prioritize younger age groups and/or specific causes such as falls and some other types of accidents.

In spite of this, the aspects evidenced in this study highlight the magnitude of the problem of mortality due to external causes in the elderly, while emphasizing the challenges of public management for the control and prevention of the phenomenon.

CONCLUSION

In this study, LTAs and falls were among the leading causes of death in the Brazilian elderly population. In the stratified analysis, according to gender and age group, it was observed that the deaths due to LTA and homicides/aggressions predominated among the younger and males, whereas the deaths

caused death, especially of the elderly, of the age group of 80 years or more.

As for the temporal evolution, there was an increasing and significant trend for the coefficient of mortality due to external causes in the elderly in Brazil, as well as for the North, Northeast and Center-West macro-regions, while, in the Southeast, there was a decline for this coefficient.

These results corroborate a reflection on the fragility of the elderly and the unpreparedness of the population in face of the aging process and its characteristics, demonstrating the need for inter-sectoral articulation in order to develop strategies that help reduce the socioeconomic and cultural determinants that favor the occurrence of these deaths.

REFERENCES

1. Oliveira TC, Medeiros WR, Lima KC. Diferenciais de mortalidade por causas nas faixas etárias limítrofes de idosos. Rev Bras Geriatr Gerontol [Internet]. 2015 [cited 2016 June 02];18(1):85-94. Available from: http://www.scielo.br/pdf/rbgg/v18n1/1809-9823-rbgg-18-01-00085.pdf.

2. Sousa-Muñoz RL, Ronconi DE, Dantas GC, Lucena DMS, Silva IBA. Impacto de multimorbidade sobre mortalidade em idosos: estudo de coorte pós-hospitalização. Rev Bras Geriatr Gerontol [Internet]. 2013 [cited 2016 June 02];16(3):579-89. Available from: http://www.scielo.br/pdf/rbgg/v16n3/v16n3a15.pdf.

3. Organização Mundial da Saúde. CID-10: Classificação Estatística Internacional de Doenças e Problemas Relacionados à Saúde: décima revisão: versão 2008: volume 1. São Paulo: Edusp; 2000.

4. Freire GA, Nardi EFR, Santos LMR, Sawada NO. Mortalidade Por Causas Externas em Idosos no Paraná, Brasil de 2001-2010. UNOPAR Cient Ciênc Biol Saúde [Internet]. 2013 [cited 2016 June 02];15(2):161-7. Available from: http://www.pgsskroton.com.br/seer/index.php/JHealthSci/article/view/744/713.

5. Silva VL, Albuquerque MFPM, Cesse EAP, Luna CF. Perfil de mortalidade do idoso: análise da evolução temporal em uma capital do Nordeste brasileiro de 1996 a 2007. Rev Bras Geriatr Gerontol [Internet]. 2012 [cited 2016 June 02];15(3):433-41. Available from: http://www.scielo.br/pdf/rbgg/v15n3/v15n3a05.pdf.

6. Mathias TAF, Jorge MHPM, Andrade OG. Morbimortalidade por causas externas na população idosa residente em município da região sul do Brasil. Rev latinoam enferm (Online) [Internet]. 2006 [cited 2016 June 02];14(1):17-24. Available from: http://www.scielo.br/pdf/rlae/v14n1/v14n1a03.pdf.

7. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde, Departamento de Análise de Situação de Saúde. Política Nacional de Redução da Morbimortalidade por Acidentes e Violências: Portaria MS/GM n.º 737 de 16/5/01, publicada no DOU n.º 96 seção 1E de 18/5/01. 2nd. ed. [Internet]. Brasília: Ministério da Saúde; 2005 [cited 2016 June 02]. Available from: http://www.prefeitura.sp.gov.br/cidade/secretarias/upload/portaria737_1254487650.pdf

8. Ministério da Saúde (BR). Portaria nº 2.528, de 19 de outubro de 2006. Aprova a Política Nacional de Saúde da Pessoa Idosa [Internet[. Brasília: Ministério da Saúde; 2006 [cited 2016 June 02]. Available from: http://www.saudeidoso.icict.fiocruz.br/pdf/PoliticaNacionaldeSaudedaPessoaIdosa.pdf

9. Braz M. A construção da subjetividade masculina sobre a saúde do homem: reflexão bioética sobre justiça distributiva. Ciênc saúde coletiva [Internet]. 2005 [cited 2016 June 02];10(1):97-104. Available from: http://www.scielo.br/pdf/csc/v10n1/a10v10n1.pdf.

10. Souza MFM, Malta DC, Conceição GMS, Silva MMA, Gazal-Carvalho C, Morais Neto OL. Análise descritiva e de tendência de acidentes de transporte terrestre para políticas sociais no Brasil. Epidemiol Serv Saúde [Internet]. 2007 Mar [cited 2016 June 02];16(1):33-44. Available from: http://scielo.iec.pa.gov.br/pdf/ess/v16n1/v16n1a04.pdf

11. Telarolli Júnior R, Loffredo LCM. Mortalidade de idosos em município do Sudeste brasileiro de 2006 a 2011. Ciênc saúde coletiva [Internet]. 2014 [cited 2016 June 02];19(3):975-84. Available from: http://www.scielosp.org/pdf/csc/v19n3/1413-8123-csc-19-03-00975.pdf.

12. Arreola-Rissa C, Santos-Guzmán J, Esquivel-Guzmán A, Mock CN. Traffic related deaths in Nuevo Leon, Mexico: causes and associated factors. Salud Publica Mex [Internet]. 2008 [cited 2016 June 02];50(supl I):48-54. Available from: http://www.scielosp.org/pdf/spm/v50s1/a08v50s1.pdf.

13. Gomes LMX, Barbosa TLA, Caldeira AP. Mortalidade por causas externas em idosos em Minas Gerais, Brasil. Esc Anna Nery [Internet]. 2010 [cited 2016 June 02];14(4):779-86. Available from: http://www.scielo.br/pdf/ean/v14n4/v14n4a18.pdf.

14. Souza RKT, Soares DFPP, Mathias TAF, Andrade OG, Santana RG. Idosos vítimas de acidentes de trânsito: aspectos epidemiológicos e impacto na sua vida cotidiana. Acta sci, Health sci [Internet]. 2003 [cited 2016 June 02];25(1):19-25. Available from: http://periodicos.uem.br/ojs/index.php/ActaSciHealthSci/article/view/2247 .

15. Antes DL, Schneider IJC, D'Orsi E. Mortalidade por queda em idosos: estudo de série temporal. Rev Bras Geriatr Gerontol [Internet]. 2015 [cited 2016 June 02];18(4):769-78. Available from: http://www.scielo.br/pdf/rbgg/v18n4/pt_1809-9823-rbgg-18-04-00769.pdf.

16. Gonsaga RAT, Rimoli CF, Pires EA, Zogheib FS, Fujino MVT, Cunha MB. Evaluation of the mortality due to external causes. Rev Col Bras Cir [Internet]. 2012 [cited 2016 June 02];39(4):263-7. Available from: http://www.scielo.br/pdf/rcbc/v39n4/en_04.pdf.

17. Organización Mundial de la Salud. Informe mundial sobre prevención de los traumatismos causados por el transito [Internet]. Ginebra: OMS; 2004 [cited 2016 June 02]. Available from: http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/es

18. Sociedade Brasileira de Geriatria e Gerontologia. Quedas em idosos: prevenção [Internet]. Rio de Janeiro: AMB:CFM; 2008. [cited 2016 June 02]. Available from: http://sbgg.org.br/wp-content/uploads/2014/10/queda-idosos.pdf.

19. Ministério do Planejamento, Orçamento e Gestão (BR), Instituto Brasileiro de Geografia e Estatística. Um panorama da Saúde no Brasil - Acesso e Utilização de Serviços, Condições de Saúde e Fatores de Risco e Proteção à Saúde 2008 [Internet]. Rio de Janeiro: IBGE; 2010 [cited 2016 June 02]. Available from: http://www.ibge.gov.br/home/estatistica/populacao/panorama_saude_brasil_2003_2008/

20. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde. Saúde Brasil 2010: uma análise da situação de saúde e de evidências selecionadas de impacto de ações de vigilância em saúde. [Internet]. Brasília: Ministério da Saúde; 2011 [cited 2016 June 02]. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/saude_brasil_2010.pdf

21. Chasimpha S, McLean E, Chihana M, Kachiwanda L, Koole O, Tafatatha T, et al. Patterns and risk factors for deaths from external causes in rural Malawi over 10 years: a prospective population-based study. BMC Public Health [Internet]. 2015 Oct [cited 2016 June 02]; 15(1036): 2-9. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4599750/pdf/12889_2015_Article_2323.pdf.

22. Organização Mundial de Saúde. Estatísticas da Saúde Mundial de 2014. Geneva: OMS; 2014.

23. Organização Mundial de Saúde. Violência, lesões e deficiência: relatório bienal 2010-2011. Geneva: OMS; 2012.

24. Travassos C, Oliveira EXG, Viacava F. Desigualdades Geográficas e Sociais no Acesso aos Serviços de Saúde no Brasil: 1998 e 2003. Ciênc saúde coletiva [Internet]. 2006 [cited 2016 June 02]; 11(4): 975-86. Available from: http://www.scielo.br/pdf/csc/v11n4/32334.pdf.

25. Valença Neto PF, Siqueira BPJ, Nery AA, Casotti CA. Trend of male mortality from external causes. Rev enferm UFPE online [Internet]. 2015 [cited 2016 June 02]; 9(5):7877-86. Available from: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/7016/pdf_7821

26. Organização das Nações Unidas. Programa das Nações Unidas para o desenvolvimento no Brasil. Atlas do desenvolvimento humano no Brasil. Brasília: Casa das Nações Unidas no Brasil; 2013. [cited 2016 June 02]. Available from: http://www.pnud.org.br/arquivos/idhm-brasileiro-atlas-2013.pdf

27. Ministério da Saúde (BR), Portaria nº 1356, de 23 de junho de 2006. Institui incentivo aos estados, ao Distrito Federal e aos municípios para a Vigilância de Acidentes e Violências em Serviços Sentinela, com recursos da Secretaria de Vigilância em Saúde (SVS) [Internet]. Brasília: Ministério da Saúde; 2006 [cited 2016 June 02]. Available from: http://www.saude.sp.gov.br/resources/cve-centro-de-vigilancia-epidemiologica/areas-de-vigilancia/doencas-cronicas-nao-transmissiveis/observatorio-promocao-a-saude/portarias/portaria_gm1356_2006.pdf

28. Câmara dos Deputados (BR), Lei nº 10.741, de 1º de outubro de 2003. Dispõe sobre o Estatuto do Idoso e dá outras providências [Internet]. Brasília: Câmara dos Deputados; 2003 [cited 2016 June 02]. Available from: http://www2.camara.leg.br/legin/fed/lei/2003/lei-10741-1-outubro-2003-497511-normaatualizada-pl.pdf

29. Presidência da República (BR), Casa Civil, Subchefia para Assuntos Jurídicos. Lei nº12.461, de 26 de julho de 2011. Altera a Lei no 10.741, de 10 de outubro de 2003, para estabelecer a notificação compulsória dos atos

de violência praticados contra o idoso atendido em serviço de saúde [Internet]. Brasília: Ministério da Saúde; 2011 [cited 2016 June 02]. Available from: http://www.saude.mg.gov.br/images/documentos/lei%2012.461,%20de%2026%20de%20julho%20de%202011.pdf

30. Minayo MCS, Souza ER. Violência sob o olhar da saúde: a infrapolítica da contemporaneidade brasileira. Rio de Janeiro: Fiocruz; 2003.

Submission: 2016/07/27
Accepted: 2016/12/20
Publishing: 2017/01/15

Corresponding Address

Érica Assunção Carmo
Universidade Estadual do Sudoeste da Bahia
Programa de Pós-Graduação em Enfermagem e Saúde
Av. José Moreira Sobrinho, s/n
Bairro Jequiezinho
CEP: 45206-190 – Jequié (BA), Brazil