ORIGINAL ARTICLE

Trends of mortality from ill-defined causes in the Northeast region of Brazil, 1979-2009

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SUMMARY

Objective: This study aimed to analyze the trends of mortality from symptoms, signs and ill-defined causes (SSIDC) in the Northeast region of Brazil, during the period of 1979-2009. **Methods:** The study used secondary data provided by the Mortality Information System SIM/Datasus/Ministry of Health. **Results:** There was a reduction in the proportion of this type of death ($y = -1.3751x + 55.953$ $R^2 = 0.9035$), from 45.7% in 1979 to 8.1% in 2009, as well as according to sex: males ($y = -1.3716x + 54.559$ $R^2 = 0.9197$) and females ($y = -1.3828x + 57.932$ $R^2 = 0.8771$). The proportion of deaths due to ill-defined causes showed a decreasing tendency in all age groups. The highest reduction was observed in the upper and lower age ranges, < 1 and 1 to 4 year and elderly group, namely 60 years old and older. Capitals and countryside also showed a decreasing tendency in proportional mortality due to IDC, ($y = -0.1118x + 9.4275$ $R^2 = 0.3087$) and ($y = -1.7908x + 71.178$ $R^2 = 0.9151$) respectively, but with different temporal patterns. The capital cities had the lower rates since the beginning of the series regardless of the age groups, but the great reduction in rates was observed in the countryside, being 7.1 times higher among adults (20 to 59 years old). **Conclusion:** Decreased trends were observed, but it is necessary to reinforce the actions to improve the capacity of health service assistance and coverage and data registration in order to maintain this trend.

Keywords: Mortality; underlying cause of death; temporal distribution.

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Introduction

The health diagnosis of a community is commonly assessed through morbidity and mortality indicators. The morbidity statistics are considered more adequate to understand the health and disease process in the population[1], especially the incidence measures, as they reflect the dynamics of diseases/health injuries; however, due to the greater difficulty to obtain and analyze this information, the mortality data are used due to their availability and universal coverage. The mortality statistics constitute one of the most valuable sources of information in public health, being useful for the assessment of the population health status, allowing the identification of higher-risk groups, as well as epidemiologically more important causes of death[2,3]. Although criticized from the beginning, the mortality statistics have been and still are the main source of data used to know the epidemiological profile of an area, analyze trends, indicate priorities and evaluate programs, among other objectives[4].

The descriptive studies of mortality are also useful to assess health actions at the different levels of healthcare attention, being also useful to generate hypotheses that can explain the causal determinants associated with diseases.

This type of statistics very often does not reflect the reality from the qualitative (reliability of the information contained in the death certificate and missing information) as well as the quantitative point of view (death coverage)[5] regarding the legal dispositions related to the mandatory death report[6].

Possibly, these problems occur together in regions that are more deficient regarding the structure of health services and assistance, which results in a significant number of deaths that are not certified by a physician, as well as deaths that are attributed to symptoms, signs and ill-defined conditions (SSIDC). High rates of deaths registered as due to ill-defined causes disclose the information precariousness regarding the underlying cause of death, decreasing the potential of using mortality per causes of death, which is one of the best sources of information on mortality[7]. At the mortality analysis of a location, it is undeniable that deaths declared as ill-defined represent an important gap in the knowledge of the distribution of deaths per causes, constituting a considerable obstacle to the rational allocation of health resources based on an epidemiological scenario, considering that they can considerably alter the mortality rates due to specified diseases[8].

On the other hand, it is important to know the occurrence pattern of ill-defined causes, as it indicates the need for restructuring healthcare services provided to the population, as well as perfecting the information collection and recording system.

The distribution of deaths classified as due to ill-defined causes in Brazil is quite irregular and is characterized by substantial variation at the regional scale, with the north-east region having the highest proportions. According to data from the Mortality Information System – SIM/Datasus, 2009[9], in 1980 the Northeast region had 58.4% of the total deaths recorded as due to ill-defined causes, 54.5% in 1990 and 47.8% in 2000. These are considerable figures that compromise the analysis of mortality per causes of death, making it an important question for investigation. The aim of the present study is to evaluate the evolution of proportional mortality due to ill-defined causes and its trends regarding sex and age range in the Northeast region of Brazil, from 1979 to 2009.

Methods

The present is an ecological, exploratory study of multiple groups and temporal series, where it is possible to evaluate the temporal evolution of rates of a disease or another event in different population groups[10,11]. Secondary data were used, which included the total number of deaths that were recorded as due to symptoms, SSIDC, separated by sex (male and female), age range < 1, 1-4; 5-19, corresponding to children and adolescents; 20-59, adults and 60 years and older, elderly individuals and local of residence (capital city or countryside) of individuals living in Northeast region of Brazil from 1979 to 2009. It is noteworthy the fact that the 2009 data are preliminary ones. These deaths are discriminated in chapter XVI of CID 09 and XVIII of CID 10 and were reported to the Ministry of Health through the SIM, Mortality Information System, with the ignored ones being accounted for.

The data on mortality were extracted from MS/SVS/DASIS – Mortality Information System - SIM/Datasus, 2009[9]. During this period, Brazil adopted two ICD classifications – International Classification of Diseases and Health-Related Problems: the 9th, WHO 1978[12], for deaths that occurred from 1979 to 1995; and the 10th, WHO 1995[13], for the deaths that occurred from 1996 to 2009.

Spatial analysis unit

The data spatial analysis unit is the Northeast region, which comprehends a territorial area that covers 1,561,177 km², 18.26% of the total area of the country. The Northeast region includes the states of Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe. Due to the different physical characteristics that can be observed, the region is divided into sub-regions: mid-north, *zona da mata* (forest zone), *agreste* (narrow zone in the states of Paraíba, Pernambuco, Alagoas, Sergipe and Bahia between the coastal forest zone and the semiarid *sertão*) and *sertão* (backlands)[14].

The region has a population of 47,741,711 inhabitants according to demographic census of 2000 (28.1% of the Brazilian population), of which 23,413,914 were males and 24,327,797 were females[15], with a demographic density of 30.54 inhabitants/km²[14]. This region has the largest coastal

zone of the country, 3,338 km of beaches. Due to several disaggregations that occurred in the territory between the years 1980 and 2000, the number of cities and towns successively increased, going from 1,375 cities and towns in 1980 to 1,509 in 1991 and 1,787 in the year 2000. The constant disaggregations have led to an increase of 30% in the total number of cities and towns in this region during the considered period, corresponding, in absolute terms, to 412 new municipal units.

The data analysis calculated the proportional mortality due to general SSIDC and separated by sex and age range. The temporal trend ratio $[(t_1-t_0)/t_0]*100$ was calculated to assess the behavior of proportions between the following periods: 1979-1985, 1985-1990, 1990-1995, 1995-2000, 2000-2005 and 2005-2009. To assess the nature and statistical significance of the trend, the simple linear regression technique was used, in which the time variable expressed in years, entered the model as the independent variable and the variable proportion of deaths due to SSIDC, total and stratified by sex, capital and countryside, were entered as the dependent variables.

The software Tabwin[16], an electronic spreadsheet of public domain made available by Datasus/MS, and R[17], statistical software package of public domain, were used in data handling, analysis and calculations.

Results

A total of 2,222,252 deaths due to ill-defined causes were accounted for in the Northeast region of Brazil between 1979 and 2009, of which 1,031,755 in the 1980s, (46.5%), 734,038 in the 1990s, (33.0%) and 456,459 deaths between 2000 and 2009, corresponding to 20.5% (Table 1). The proportion of deaths due to SSIDC in the total number of deaths registered in this region showed a decreasing

Table 1 – Number and proportion of deaths due to total SSIDC[‡] and according to sex in the Northeast region of Brazil, 1979-2009*

Years	Deaths SSIDC	% deaths SSIDC	% Deaths SSIDC male[1]	% deaths SSIDC female[2]	M/F Ratio
1979	77,321	45.7	44.9	46.8	0.96
1980	94,158	48.6	47.5	50.0	0.95
1981	93,336	47.6	46.4	49.1	0.95
1982	90,105	46.3	45.5	47.3	0.96
1983	100,139	48.0	47.3	48.9	0.97
1984	114,510	50.4	49.7	51.3	0.97
1985	96,829	46.9	46.1	48.2	0.96
1986	97,140	45.6	44.2	47.6	0.93
1987	91,919	45.2	43.5	47.7	0.91
1988	92,479	44.3	42.6	46.7	0.91
1989	83,819	42.2	40.8	44.1	0.93
1990	80,882	42.1	40.6	44.2	0.92
1991	79,618	41.2	39.5	43.8	0.90
1992	78,210	39.7	37.8	42.4	0.89
1993	83,737	40.2	38.2	42.8	0.89
1994	76,301	37.0	35.0	39.8	0.88
1995	70,550	34.4	32.3	37.3	0.86
1996	66,114	32.4	30.1	35.5	0.85
1997	64,517	31.2	29.1	34.1	0.85
1998	66,896	30.5	28.4	33.3	0.85
1999	67,213	30.3	28.5	32.7	0.87
2000	64,850	28.4	26.8	30.6	0.88
2001	65,546	27.5	26.0	29.6	0.88
2002	66,653	26.8	25.3	28.7	0.88
2003	65,488	25.9	24.4	27.8	0.88
2004	60,702	23.7	22.4	25.4	0.88
2005	43,743	17.2	16.1	18.6	0.86
2006	24,275	9.5	9.0	10.2	0.88
2007	21,147	8.1	7.6	8.7	0.88
2008	21,586	7.9	7.6	8.3	0.91
2009	22,469	8.1	7.7	8.5	0.90

Source: MS/SVS/DASIS, Mortality Information System, SIM.
[‡] Symptoms, signs and Ill-defined conditions; [1] % mortality due to SSIDC in male deaths; [2] % mortality due to SSIDC in female deaths; * Data from 2009 are preliminary. National basal situation on 02/02/2011.

trend (y = -1.3751x + 55.953 R² = 0.9035) with small oscillations. It represented 45.7% of deaths in 1979, increasing to 50.4% in 1984, corresponding, in absolute terms, to 114,510 deaths. From 1985 on, a decreasing trend was demonstrated, which extended to the last year of the studied series, remaining at the range of 8.1%, meaning that more than 90% of the deaths that occurred and were registered in this region had the underlying cause of death declared in the last year under analysis. The impact of up to 10% of deaths with an ill-defined cause does not prevent the use of mortality data. This movement corresponded to a global decrease of 82.4%. The proportional mortality due to ill-defined causes in the Northeast region increased 2.6% between 1979 and 1985, decreasing in the subsequent periods to 10.4%, between 1985 and 1990; 18.1%, between 1990 and 1995; 17.5%, between 1995 and 2000; 39.5% between 2000 and 2005 and 0.5% between 2005 and 2009.

The trend decreased in males (y = -1.3716x + 54.559 R² = 0.9197) as well as in females (y = -1.3828x + 57.932 R² = 0.8771). The decrease was intercalated with some periods of increase and from 1993 on, it presented a continuous decrease. It varied in males from 44.9% in 1979 to 7.7% in 2009, a decrease of 82.8%, with a peak of 49,7% in 1984; in females, the proportion of deaths due to this group of causes decreased from 46.8% in 1979 to 8.5% in 2009, corresponding to a decrease of 81.8%, with a peak of 51.3% in 1984. The 1980s had the highest proportions for both sexes, > 40%.

The proportion of deaths per age range was 18.0% in those younger than one year, 4.4% in children aged 1-4 years, 2.1% in adolescents aged 5 to 19 years, increasing to 18.4% in individuals aged 20 to 59 years and reaching 57.1% in the elderly, individuals aged 60 years and older. It is noteworthy the fact that in 24,355 deaths, which corresponds to 1.1% of deaths due to ill-defined causes, the age was not informed in the death certificate. The proportional mortality due to ill-defined causes according to age range shows a decreasing trend in the period at all ranges, as shown in Chart 1. The trend equations showed the following results: in those younger than 1 year (y = -1.8697x + 60.09 R² = 0.9729), in the group age 1-4 years (y = -1.8387x + 65.349 R² = 0.9678), in the group 5-19 years (y = -0.9606x + 33.892 R² = 0.9724), in adults (y = -0.9533x + 38.669 R² = 0,8757) and in the elderly (y = -1.4753x + 64.617 R² = 0.8145). The groups aged < 1 year and 1-4 years and the elderly are the ones that showed the highest proportions in the period and also the highest rates of temporal reduction. (Chart 1)

The distribution of proportional mortality due to ill-defined causes stratified according to capital cities and countryside is shown in Charts 2 and 3. The general trend of proportional mortality due to ill-defined causes decreased (y = -0.1118x + 9.4275 R² = 0.3087). When separated by age range, the group younger than 1 year
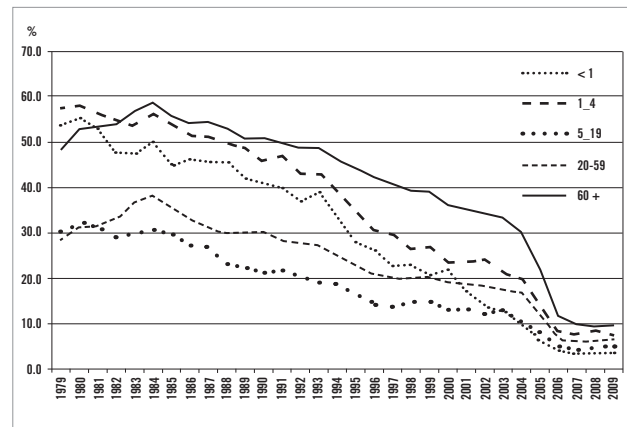

Chart 1 – Proportional mortality due to SSIDC* according to age range in the northeast region of Brazil,1979-2009**
*SSIDC, symptoms, signs and ill-defined conditions
**Data from 2009 are preliminary. National basal situation on 02/02/2011

showed a decrease of 87.6% (from 16.2% to 2.0%). In the group 1 to 4 years, the rates decreased from 14.1% in 1979 to 4.2% in 2009, corresponding to a decrease of 69.9%; in the group 5 to 19 years, the decrease was 48.5%, going from 5.5% to 2.8%. In these two groups, the curves showed a strong variation in the period, with a decreasing trend being observed in both groups from 2002 on. In adults, the rates remained stable with time, going from 4.9% in 1979 to 4.4% in 2009, corresponding to a decrease of 11.6%; in the elderly, the rates decreased from 7.2% to 3.5%, (-52.0%). In adults and the elderly, there was an increase in rates with small oscillations between the start of the series and the year 2002, when the trend was inverted and thus remained until the last year of the series. Overall, only the group younger than 1 year showed a continuous decrease in rate throughout the series; the rates showed oscillations in the other groups. It is worth mentioning that from 2004 on, the rates were below 10% for all ranges.

A decreasing trend was also observed in the countryside (y = -1.7908x + 71.178 R² = 0.9151). A continuous decrease in the proportional mortality due to this group of causes of death was observed in all age ranges. It decreased from 67.9% in 1979 to 3.9% in 2009, (-94.3%), in those younger than 1 year and from 69.4% to 8.1%, (-88.4%) in children aged 1 to 4 years. In adolescents and adults, there was a similar decrease in rates, from 39.6% to 5.6% (-85.8%) and from 39.6% to 7.2% (-81.9%), respectively. In the elderly, the rates decreased from 64.6% in the beginning of the series to 11.2% in 2009, a decrease of 82.7%. High rates were observed in the 1980s, which were > 40%, except in the group of adolescents aged 5 to 19 years, who presented a higher decrease in the subsequent decades and rates < 15% only from 2006 on (Charts 2 and 3).
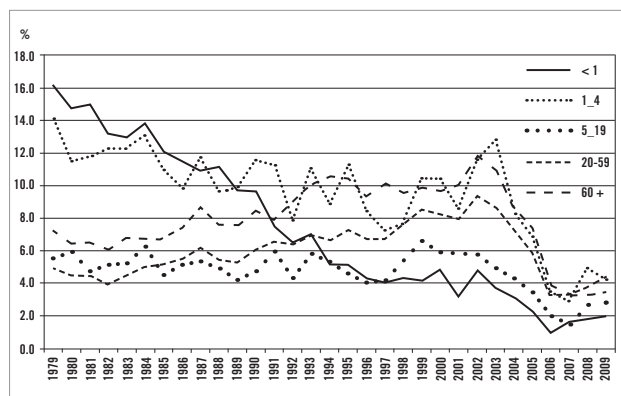
Chart 2 – Proportional mortality due to SSIDC* according to age range in the capital cities of the northeast region of Brazil, 1979-2009**
*SSIDC, symptoms, signs and ill-defined conditions
**Data from 2009 are preliminary. National basal situation on 02/02/2011
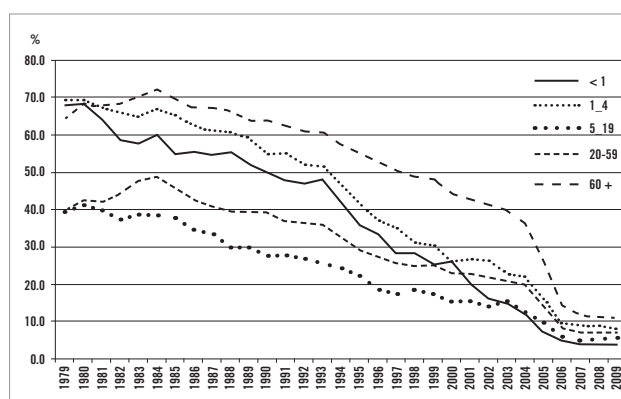

Chart 3 – Proportional mortality due to SSIDC* according to age range in the countryside of the northeast region of Brazil, 1979-2009**
*SSIDC, symptoms, signs and ill-defined conditions
**Data from 2009 are preliminary. National basal situation on 02/02/2011

Discussion

The filling out of the underlying cause of death in the Death Certificate (DC) – official instrument of death registration in the registry offices in the country – is indispensable to construct the profile of mortality per cause of death in a given community. However, sometimes it is not possible to define the underlying cause of death, either due to the absence of medical assistance, or inadequate descriptions and registrations made by physicians, therefore resulting in the case being registered as due to ill-defined cause. When the deaths due to this group of causes are over listed, the other causes of death are overestimated[18], making it difficult to understand the recent behavior of mortality, as well as factors that determine it, decreasing the potential use of statistics of mortality in the health diagnosis of a given population. Moreover, it makes it difficult to analyze the behavior of mortality per causes of death regarding its

structure, levels and trends, and consequently, of the factors that determine it. High proportions of deaths due to ill-defined causes limit the possibilities of using these statistics when planning actions at diverse spatial scales that seek to reduce the impact of the causes of death. Included in this category are the diseases of which intervention actions are known to be effective, such as some intestinal parasitic diseases, of which incidence can be reduced through basic sanitation and malnutrition, which can be controlled through nutritional improvement. It also applies to those diseases that do not have current effective measures to prevent death, but only delay it.

The mortality pattern in Brazil has shown, in the last decades, important changes in age range profile and distribution of causes of death groups, showing a marked decrease in the number of infectious and perinatal deaths in the North and Northeast regions and increase in the chronic-degenerative (cardiovascular and neoplasias) diseases, notably in the richer regions of the country, the South and Southeast regions. These changes occurred in a differentiated way between the regions and even within these regions, evidencing distinct moments in the epidemiological dynamics of the country. It is noteworthy the increase in external causes of death, especially accidents and homicides throughout the country. The dissimilarities are also expressed in the adequacy of information on births and deaths reported by the Ministry of Health. Between the years 2000 and 2002, it was observed that only 5% of the cities in the Northeast region had a satisfactory degree of adequacy regarding these data, which reached a percentage of 63% in the South of the country[19]. It is a very marked difference, demonstrating distinct stages of structuring and organization of health services provided to the population in the distinct regions, making it clear the need to improve the quality of health information in the Northeast region, so that they can be used to subsidize the adoption of measures aimed at improving healthcare.

Médici[20], when analyzing the health profile in Brazil, stated that the high incidence of deaths due to ill-defined causes would be associated with child mortality and infectious and parasitic diseases; regarding the location, the author emphasizes that deaths due to ill-defined causes occur in places the healthcare service offer is incipient. The authors also states that the absence of adequate mortality information would be, therefore, the main symptom of the precarious healthcare service offered in Brazil.

This study showed a strong decrease in the proportion of this type of death in this region, going from a deficient level of information to a very good one, according to the percentage classification of deaths due to ill-defined causes proposed by Chakiel[21], which value is < 10%.

This significant decrease results in transformations that occurred within society, emphasizing the rapid process of urbanization experienced by the population of this

region, following a national trend. Probably, the urbanization phenomenon made healthcare services available to a large part of the population, as these services are mostly located in urban areas, with a higher concentration in the capital cities. Moreover, it is noteworthy the implementation of microterritorialized healthcare programs, represented by the Health Community Agents Program (PACS) and the Family Health Program (PSF), which increased the offer and coverage of basic healthcare services offered to the residents of regions located in the outskirts of the cities and the rural zones, interiorizing the healthcare actions. Additionally, there have been administrative actions or measures that increased the coverage of epidemiological surveillance systems and the registration of vital statistics, leading to a higher incidence of notification and improvement in death registry, including the filling out of the information concerning the underlying cause of death in the death certificate. Moreover, a higher sensitization by healthcare professionals when filling out the DCs and a higher degree of awareness regarding the importance of registering the information as subsidy to create healthcare programs and, consequently, define priorities, must also have contributed to observed decrease.

When comparing Brazil to other nations in the American continent, many differences can be observed regarding the participation of ill-defined causes in the mortality profile. In the USA and Canada, they are accountable for around 1%[22] and in Chile, in 2003, the percentage of deaths registered as due to ill-defined causes was 2.8%[23], much lower than that observed in Brazil in the same year, 13.3%[9].

The difficulty to have access to healthcare services is one of several factors contributing for this significant number of deaths to have as the declared underlying cause of death, symptoms, signs and ill-defined conditions. Making considerations about this matter, Costa & Nascimento[24] stated that many people who need medical assistance do not seek it, due to several reasons, especially the lack of financial resources to reach the hospital or clinic, due to the distance, or even due to difficult access to means of transportation.

This type of difficulty frequently occurs in the urban area, affecting the poorer social classes that live in peripheral areas, especially in cities that have not been able to offer more equitable basic healthcare services, according to the needs of the communities.

As for the rural-dwelling populations, especially those that live in towns located distant from the better organized and/or structured centers regarding healthcare personnel and equipment, seeking healthcare services would be even more difficult. In addition to this problem, the same authors mention other causes that have a negative impact on seeking healthcare services, such as unavailability of scheduled consultations, scarcity of healthcare professionals, deficient availability or unavailability of complementa-

ry examinations, constant and long waiting lines, mainly during the night and intermediation through customer service channels to have access to the services. A study about death due to ill-defined causes in the state of Rio de Janeiro showed the impact of dissimilarities regarding the healthcare access and attention provided to the population, of which proportion was higher among female individuals with lower levels of schooling, non-Caucasians, treated at large public healthcare service units located in the outskirts of the metropolitan region[25].

Travassos *et al.*[26], analyzing data about the access to healthcare services in Brazil, demonstrated marked geographic differences between the regions and concluded that the differential regarding access among residents from the North/Northeast and South/Southeast regions increased, that is, the improvement observed regarding the access was higher in the more developed regions.

It was also verified that women demonstrated higher proportions of deaths due to ill-defined causes in all years when compared to men, with a similar decreasing trend. In absolute terms, more men died whose underlying cause of death was not declared, totaling 202,277 deaths.

The occurrence pattern of death due to ill-defined causes, according to the age range, also reflects significant differences. The upper and lower limits of the life cycle, represented by infants and toddlers (< 1 year and 1-4 years) and the elderly (60 years and older) were the ones that demonstrated the highest reduction rates. Chakiel[21] and Jasper-Faijer[27] stated that, in general, the proportion of ill-defined causes is higher in the first and the last age ranges, a behavior verified in most countries of Latin America. Therefore, the data shown here are in accordance with those aforementioned ones.

The elderly, individuals aged 60 years and older, concentrated the highest frequency of this type of death throughout the entire study period, totaling 1,254,506 deaths, 57.1% of the total deaths classified as SSIDC in this region. In this age range, the proportions were > 40% until the year 1997, continuously decreasing until the last year of the series when it reached 9.5%, still above the average for the region, which is 8%. One possible explanation for the higher proportion of this type of death in this age range is based on the difficulty to establish the underlying cause of death as a consequence of the presence of multiple diseases (hypertension, diabetes, neoplasias, among others) and also, the influence of age on the clinical expression of signs and symptoms[28]. One should consider that this age range, although numerous and increasingly larger, is still not the main object by healthcare policies and needs further actions. Elderly-oriented, all-encompassing healthcare programs are necessary to integrate them to the assistance network and that is made possible through the strengthening of ongoing actions, represented, among others, by programs to control/monitor arterial hypertension

and *diabetes mellitus*, both with high incidences among the elderly, sometimes being more severe in this population group due to the existence of comorbidities such as atherosclerosis and arteriosclerosis, as well as neoplasias. Another aspect to be considered is the family's difficulty to deal with the elderly patient, who might refuse to go the basic healthcare unit to receive treatment.

On the other extremity is the age range constituted of infants younger than one year, which was accountable for 18% of the total number of deaths due to SSIDC, corresponding, in absolute values, to 395,869 deaths. Infants younger than one year have received special attention in the general population group, as it is a biologically more vulnerable group, thus being the target of governmental actions with a universal scope, based on social and healthcare programs implemented by the federal government alone, or in partnership with state and/or municipal governments. These are actions that integrate the children and their families to a constant monitoring system in the public healthcare service network, following the growth and development of these children.

The use of intensive medical technology of oral rehydration from 1988 on, introduced in the lower-income strata of the population, which is distributed throughout the country by *Pastoral da Criança* – a non-governmental organization maintained by the Catholic Church in Brazil – has had great impact on the decrease in post-neonatal child mortality.

The Child Mortality Decrease Program – PRMI – was specifically created for the states of the Northeast region in 1995 by the Ministry of Health in partnership with the State Secretaries of Health of the states in that region to combat the persistently high levels of child mortality, in opposition of what had been happening in the other regions of the country. Its main objectives were to decrease the coefficients of child mortality through an intersectoral approach[29].

The aforementioned programs contributed, on the one hand, to decrease child mortality and on the other hand, to increase society's awareness of this age range, making it the center of attentions by the family and the State.

As the deaths due to ill-defined causes did not occur during the first five years of life, there would be an increased risk in the subsequent age ranges. However, that was not observed, that is, the data obtained showed polarity, as the highest levels of occurrence of death due to ill-defined causes are observed in the upper and lower limits of the life cycle (< 1 year and 1 to 4), and especially among the elderly. It is worth mentioning that the rate ratio increased from 1.0 in the first years to 3.5 in 2005, decreasing to 2.7 in 2009.

When the data are disaggregated according to local of residence, capital city or countryside, a mortality rate reduction trend was observed according to the age ranges,

with the curves showing distinct patterns. In the capital cities, the rates were lower since the beginning of the series, regardless of the age range, whereas in the countryside, the rates were higher, being expressed more intensively in adults aged 20 to 59 years (7.1-fold higher, a decrease in 81.9% in the countryside *vs.* 11.6% in capital cities). The global rates in the countryside were on average 5.4-fold higher than in the capital cities, and the highest rates were observed in the period between 1982 and 1989, when it was > 7.0. In the last year of the series, the rate was 2.5 (9.3 in the countryside and 3.7 in the capital cities).

The observed trend reflects the positive impact of previously described sectoral actions in the healthcare sector, which, together, have resulted in improvements in the healthcare systems and health information registry in several cities; however, due to the great heterogeneity in the stages of socioeconomic and health development observed among the cities and towns located in this region, it is probable that in a large part of these cities/towns, it is necessary to increase the coverage of the local healthcare systems, which might contribute to further decrease the incidence of deaths classified as due to ill-defined causes. It is a pattern that differs from the stage where most of the cities/towns located in the South and Southeast regions were. Considering that, it can be expected that the difference caused by the different stages of vital healthcare service structuring/organization among the regions and even among the towns/cities, will increase in the next years, thus increasing the differences among them. This can be minimized if the interventions are carried out, such as the universalization of pre-school education in the first years of life through day care centers and, for the elderly, the social reintegration and leisure programs, integrating them into social and healthcare services.

Probably, the technical and operational difficulties to increase the healthcare coverage and follow the patient until his or her demise and the need to improve the quality of the filling out of death certificates by the information registry on the underlying cause of death still exist, being a challenge for healthcare professionals and healthcare service managers. Therefore, the responses offered so far have not been enough to result in more marked decreases, bringing this region to the same level observed in the other regions of the country, where the service structure is more organized, being perhaps the expression of the necessity of a differentiated intervention.

More significant changes, regarding the decrease in the occurrence of deaths due to ill-defined causes depend on the evolution of the region as a whole. The way one lives also defines the way one dies; and the lack of economic resources by a significant part of the population implies in limited access to several types of services, including

healthcare services. The northeast region is characterized by precarious socioeconomic conditions and, consequently, health indicators that are systematically below those of the national average. The differences between the South/Southeast regions and the North/Northeast regions have been broadly studied in the literature.

Taking into account the data related to the historical series of 2000 to 2006, published in the Indicators and Basic Data[30] report, they show that child mortality rates were < 20/1,000 live births for the states in the South and Southeast regions, except for the state of Minas Gerais, which had rates > 20.0/1,000 live births in the period of 2000 to 2002; whereas the states in the Northeast region, the rates were > 25/1,000, live births (l.b.) in the period of 2000 to 2006. The state of Alagoas registered the highest mortality rates throughout the analyzed period, from 58.4/1,000 l.b. in 2000 decreasing to 41.2/1,000 l.b. in 2007. Considering the regional mean, the child mortality rate in the Northeast region was 41.6/1,000 l.b., much higher than the one observed in the South region, of 17.0/1,000 l.b.; seven years later, the child mortality rate in the South region was 12.9/1,000 l.b., less than 50% of the that verified in the Northeast region, which was at 28.7/1,000 l.b.

The social exclusion damages go beyond the perpetuation of poverty, impairing the accumulation of human capital, which is crucial to decrease the first. Monteiro Neto[31] states that the Northeast region has been the target of specific governmental policies aimed at promoting economic growth since the 1950s, but the region remains poorer, when compared to the rest of the country. This author emphasizes that "This region has, in fact, had a good performance since the 1960s, regarding the economic growth rates – thanks mainly to the efforts aimed at promoting the establishment of industrial enterprises in the region through tax incentive policies and infra-structure investments. The region's per capita income has also increased substantially; however, the gap, when compared with the other states in the country, remains considerable".

This study is a preliminary analysis of data on mortality classified as Symptoms, Signs and Ill-defined conditions (SSIDC) in the Northeast region of Brazil between 1979 and 2009; it was limited to using two demographic variables, sex and age range. We believe that degree of schooling might be an important variable, which could help expand the present study regarding the proportion distribution differential of this type of death. This information was not used due to its questionable quality and the low frequency of data in this field. Another aspect that might reinforce the analytical potential of data regarding deaths due to SSIDC, would be to separate data per sub-units in the states, such as micro-regions and even cities, which would permit the observation of spatial-temporal variations shown by the data, allowing the identification of locations according to the degree of vulnerability.

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