Where do older adults die in Brazil? An analysis of two decades
Onde morrem os idosos no Brasil? Uma análise de duas décadas

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Abstract
Objective: To describe the characteristics of older adult deaths reported in Brazil between 1998 and 2018.

Methods: This is a retrospective, descriptive study performed using secondary data from the Brazilian Ministry of Health.

Results: During the analyzed period, 14,145,686 older adults died in the country, of which 40.42% were over 80 years old. The main cause of death was circulatory system disease (21.50%), and the most frequent place of death was a hospital environment (68%). The Southeast region accounted for 52.83% of the country’s hospital deaths and 73.33% of those occurring in other health facilities, whereas 38.56% of the deaths that happened at home took place in the Northeast region.

Conclusions: The hospital environment was the predominant place of death in all regions of the country, and the main causes of death were chronic noncommunicable diseases. Alternative care modalities emerge as a possibility of establishing accessible end-of-life care in scenarios other than the hospital.

Keywords: aged; aged, 80 and over; death; right to die.

Resumo
Objetivo: Descrever as características dos óbitos de idosos no Brasil notificados entre os anos de 1998 e 2018.

Metodologia: Estudo descritivo retrospectivo realizado por meio de dados secundários do Ministério da Saúde.

Resultados: Durante o período analisado, morreram 14.145.686 idosos no país, destes, 40.42% tinham mais de 80 anos. A principal causa de morte foram as doenças do aparelho circulatório (21,50%), e o local de morte mais frequente foi o ambiente hospitalar (68%). Na Região Sudeste ocorreram 52,83% dos óbitos em hospitais do Brasil e 73,33% dos ocorridos em outros estabelecimentos de saúde, enquanto 38,56% das mortes em domicílio ocorreram na Região Nordeste (38,56%).

Conclusões: O ambiente hospitalar foi o local de óbito predominante em todas as regiões do país, e as principais causas de óbito foram as doenças crónicas não transmissíveis. Modalidades alternativas de cuidado emergem como possibilidade de estabelecer cuidados de fim de vida acessíveis em outros cenários que não o hospitalar.

Palavras-chave: idoso; idoso de 80 anos ou mais; óbito; morte com dignidade.
INTRODUCTION
Expressions related to death are formed by socially disseminated interpretations established in various historical and sociocultural contexts through the years, thus not only representing the end of biological life.\(^1\) According to studies performed by Mendes and colleagues,\(^1\) death is viewed as an enemy, a reason for shame, and humans feel powerless when faced with it, even avoiding discussions on the theme; this results in fragile communication between health care professionals and patients/family members and affects the ways assistance is provided.

Literature reviews reveal that in the past, death was faced somewhat naturally, due to large epidemics and the lack of technological resources that led to finitude being a customary event.\(^2\) It is also clear that a family moment of goodbye was preferred, seeking the home as the place for end-of-life care and giving the sick individual an active role in his or her last decisions in life, which contributed to his or her identity affirmation.\(^2\)

Technological resources aimed at increasing life expectancy, maintenance of life, and quality of life are differential tools in the diagnosis and treatment of diseases. On the other hand, they have allowed us to postpone death through dys thanasia and have made hospitals into places people commonly die in, thus making the end-of-life process lonelier and frequently uncomfortable, as opposed to the familiar and welcoming environment found in earlier times.\(^3\)

In the last decades, the transition from mortality due to infectious causes to mortality due to chronic noncommunicable diseases (NCDs) and the search for rescuing this possibility of dying among family members took place along with the growth of initiatives linked to palliative care, which allows death to be recognized again as a part of the birth–death process without prejudice in the quality of health assistance.\(^4\)

Considering the extensive number of publications regarding quality of the end of life and the increase in life expectancy of the Brazilian population, this study aimed to describe the characteristics of older adult deaths reported between 1998 and 2018, especially considering the place of death, and to comprehend their trend of changes through the years based on data from the Ministry of Health.

METHODS
This is a retrospective, descriptive study performed using secondary data from the Brazilian Ministry of Health, Department of Informatics of the Unified Health System (DATASUS). We collected data on death reports of older adults in Brazil from 1998 to 2018.

We considered for analysis information available on the DATASUS, more precisely in the Mortality Information System (Sistema de Informações sobre Mortalidade, or SIM for short, in Portuguese), about older adult deaths (individuals aged 60 years or older) occurring in all 5 regions of the country. The data were classified according to cause of death using the International Classification of Diseases (ICD-10) and place of occurrence (hospital, at home, other health facility, or other/unknown location). Other variables considered were marital status, sex, race, and age group.

Data were compiled in tables and graphs using Microsoft Excel 365 and expressed as absolute and relative frequencies. To analyze statistical differences in variables between deaths reported in different places of occurrence, we used a χ\(^2\) association test, calculated using RStudio version 3.5.3 (2019) and based on odds ratio (OR) with 95%CI.

Considering that death reports are mandatory and that these data are in the public domain, the requirement for informed consent was waived.

RESULTS
Between 1998 and 2018, there were 23 183 843 deaths for various causes in Brazil, and of these, 14 145 686 were older adults. Within the analyzed period, the highest proportion of the deaths occurred among the oldest old (aged 80 years or over), with 40.42%, and this decreased along with age, reaching 12.42% among those aged between 60 and 64 years. There were 7 215 564 deaths (51%) reported for men, while women accounted for 6 927 746 deaths (48.97%); 2376 death reports did not include the sex. In this study, most deaths were of White (57.81%), married individuals (38.55%), followed by widowed individuals (34.35%) (Table 1).

The Southeast region was stood out, with 48.50% of all deaths in the studied period. The lowest proportions were found for the Central-West (5.63%) and North (4.52%) regions. While the Southeast region had the highest percentage of deaths occurring in hospital environments (52.83%) and other health facilities (73.33%) in comparison with other regions, deaths occurring at home were more common in the Northeast region (38.56%).

Chart 1 illustrates that female, white older persons aged between 60 and 79 years who were married and lived in the Southeast and South regions had higher chances of dying in a hospital environment.

During this period, we noticed a predominance of hospital deaths over other places of death in the studied reports, totaling 9 619 020 deaths (68%), followed by at-home deaths (25.29%). Figure 1A shows that the number of hospital deaths followed the overall number of older adult deaths through an upward
trend line with a steep slope. Figure 1B, on the other hand, analyzes the proportions according to the main places of death, and there was no significant change in the percentage of deaths happening in hospital environments during the studied period.

Regarding the main causes of death in hospitals, at home, and in other health facilities between 1998 and 2018, the main cause of death in all places was circulatory system disease, representing more than one-third of all deaths; the other four main causes of death appear in different positions according to the place of death, as shown in Chart 2.

Chart 2 indicates that neoplasms were the second main cause of death in hospitals (18.57%) and the third cause of death both in other health facilities (11.17%) and at home (12.55%). Out of all causes of death among older adults in Brazil, circulatory system diseases stand out, followed by neoplasms, respiratory system diseases, clinical and laboratory alterations, and endocrine and metabolic diseases.

**DISCUSSION**

In this study, the most present age group among the reported deaths was 80 years or older, followed by the age groups of 75–79 years and 70–74 years. This reflects the increase in the life expectancy of the Brazilian population, which is currently of 73.1 years for men and 80.1 years for women; this number has increased in 9 years since 1993 for both sexes.

Advances in health technology have led to a reduction in mortality due to infectious diseases and an increase in...
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The death of older adults in a hospital environment was predominant in Brazil (68%), as observed in Figure 1. This reality can be explained by a high dependency on hospital care and, consequently, a significant number of referrals at the end of life. This is seen in societies where older adults that require specialized care are assisted by unqualified caregivers/family members and do not traditionally have a regulated and established at-home palliative care network, such as is frequently the case in Brazil. This way, when older adults are nearing the end of life and require more complex care, they are hospitalized for receiving medical treatment until their death.5,6

In face of this scenario, the available evidence places Brazil as the second country worldwide with the most hospital deaths.9 According to Cross and Warraich,10 the opposite is seen in the United States, which has a robust network of palliative and hospice care. The percentage of deaths at home has increased in the United States, and in 2017 the number of at-home deaths was higher than that of hospital deaths, making the home the most frequent place of death (30.7%) in the country.

Despite a predominance of hospital deaths, according to studies, the home is the preferred place of death for most Brazilian older adults. A death at home with the help of end-of-life care, when evaluated by grieving family members, demonstrates better results and indicates a better quality of death with a lower caregiver burden.8,11 We have noticed that the Brazilian reality regarding the place of death is not a result of the individual’s wishes, but a reflection of the hegemonic model of institutionalized death, explained by a lack of regulation and access to care in scenarios other than the hospital.11

The literature indicates that the place of death is related to socioeconomic and cultural aspects, place of residence, hospital availability, and access to palliative care, as well as individual matters such as sex, age, race, and marital status.8,12-15

According to studies by Ziwary et al.,8 hospital deaths are directly associated with the level of deprivation of a population. This was also observed in our study, where the desired place of death was more respected in places with higher social equality and good end-of-life assistance; this highlights the importance of public action for modifying the reality of deaths in a certain location.

Regarding the cultural matter, Ramos et al.13 state that Brazilians are more prone to dying in hospital institutions because they value the thought of living as long as possible, having difficulties in accepting death and tending to choose treatments that prolong life even though they result in dys thanasia and therapeutic obstinacy.

It is important to note that cultural and socioeconomic discrepancies among different regions of Brazil also affect access to end-of-life care. Although all regions presented a higher percentage of hospital deaths among older adults,
the Northeast region stood out regarding at-home deaths (38.56%), which may reflect the local culture or difficulties in accessing hospital care. The Southeast region, with a higher human development index, represented the highest proportion of deaths in other health facilities (73.33%); these are usually private and paid institutions for end-of-life care such as hospice centers and long-term care facilities for older adults.

Regarding the sociodemographic characteristics that influence the place of death among older adults, gender relations, permeated by a global model of a sexist society, affect the way men and women receive or provide care and consequently

FIGURE 1. Number of deaths between 1998 and 2018, in Brazil, by place of occurrence.
CHART 2. Main causes of death between 1998 and 2008, classified by absolute and relative frequencies, according to the analysis of causes by place of death (reported as hospital, home, or other health facilities).

<table>
<thead>
<tr>
<th></th>
<th>Hospital</th>
<th>Other health facility</th>
<th>At home</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Circulatory system diseases</td>
<td>Circulatory system diseases</td>
<td>Circulatory system diseases</td>
<td>Circulatory system</td>
</tr>
<tr>
<td></td>
<td>3 310 755 (34.42%)</td>
<td>198 559 (40.58%)</td>
<td>1 336 704 (37.37%)</td>
<td>5 009 089 (21.50%)</td>
</tr>
<tr>
<td>II</td>
<td>Neoplasms</td>
<td>Respiratory system diseases</td>
<td>Abnormal signs, symptoms, and</td>
<td>Neoplasms</td>
</tr>
<tr>
<td></td>
<td>1 786 189 (18.57%)</td>
<td>74 108 (15.14%)</td>
<td>findings at clinical and laboratory examinations</td>
<td>2 320 089 (10%)</td>
</tr>
<tr>
<td>III</td>
<td>Respiratory system diseases</td>
<td>Neoplasms</td>
<td>Respiratory system diseases</td>
<td>Respiratory system</td>
</tr>
<tr>
<td></td>
<td>1 549 389 (16.11%)</td>
<td>54 674 (11.17%)</td>
<td>448 900 (12.55%)</td>
<td>1 927 384 (8.31%)</td>
</tr>
<tr>
<td>IV</td>
<td>Nutritional and metabolic</td>
<td>Nutritional and metabolic</td>
<td>Respiratory system diseases</td>
<td>Abnormal signs,</td>
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<td>endocrine diseases</td>
<td>endocrine diseases</td>
<td>41 336 (8.45%)</td>
<td>symptoms, and</td>
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<td>702 822 (7.31%)</td>
<td></td>
<td>269 585 (7.64%)</td>
<td>findings at clinical</td>
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<td>and laboratory</td>
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<td>examinations (1 354 417 (5.84%)</td>
</tr>
<tr>
<td>V</td>
<td>Digestive system diseases</td>
<td>Abnormal signs, symptoms, and</td>
<td>Nutritional and metabolic</td>
<td>Nutritional and</td>
</tr>
<tr>
<td></td>
<td>568 386 (5.91%)</td>
<td>findings at clinical and laboratory examinations</td>
<td>endocrine diseases</td>
<td>endocrine diseases</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(39 819; 8.14%)</td>
<td>236 948 (6.62%)</td>
<td>1 005 582 (4.33%)</td>
</tr>
</tbody>
</table>

Source: authors' own; 2021.

Their place of death. Studies report that women experience caregiving for their sick spouses and family members on their deathbed, whereas men avoid the role of caregiver in order to escape an alleged characterization of weakness. Moreover, since women have a higher life expectancy than men (80.01 years), they tend to die widowed and to choose, in the end of life, institutionalization in nursing homes or other health facilities to avoid burdening their family members.

Regarding race, a study by Smith et al. performed in a medical school in the United States indicated that Black patients experience more aggressive end-of-life care, using health care services at higher rates and being more prone to dying in hospitals. This was also observed in our study, where hospital deaths reached 66.82% among Black individuals, possibly due to lower access to other modalities of care.

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, severely affected Brazil and made it the second country with the highest numbers of cases and deaths worldwide. Among all COVID-19 deaths, 69.3% occurred among older adults, especially those with risk factors such as chronic NCDs; the mortality rate in this group reached 50% of all hospitalized patients during the pandemic. This may be a temporary modifying factor of the proportion between infectious diseases and chronic NCDs as causes of death in the country and even reinforce sociocultural discrepancies regarding places of death due to COVID-19 in various regions of Brazil, as shown in previous studies.

CONCLUSION

The increase in life expectancy, evidenced in this study, is a consequence of technological advances and a shift in the Brazilian profile of causes of death towards chronic NCDs, especially circulatory system diseases, neoplasms, and respiratory system diseases. These long-term conditions present a high end-of-life hospitalization rate, resulting in high health care costs and more hospital deaths (68% of all deaths in Brazil), placing the country as the second nation with the most hospital deaths worldwide.

Brazil is a country of continental dimensions with wide regional and social inequalities. The Northeast region stood out among at-home deaths (38.56%), whereas the Southeast region had the highest proportion of deaths in other health facilities (73.33%). In addition, we noticed a higher percentage of Black individuals (66.82%) among hospital deaths and of women (50.17%) among deaths in other health facilities.

Alternative care modalities emerge as a possibility of establishing accessible end-of-life care in scenarios other than the hospital environment, decreasing end-of-life hospitalization and, consequently, health care costs and hospital deaths, allowing adequate assistance in the end of life, and respecting the patient’s preferences and wishes.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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AUTHORS' CONTRIBUTIONS

KRL: Formal analysis, writing – review & editing, methodology, supervision, validation. DCB: Data curation, writing – original draft, investigation, methodology. BF: Data curation, writing – original draft, investigation, methodology. DKO: Data curation, writing – original draft, investigation, methodology. SHDN: Data curation, writing – original draft, investigation, methodology. ACC: Data curation, writing – original draft, investigation, methodology.

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