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Profile of morbimortality by stroke in brazil between 2015 and 2020

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Guilherme Ribeiro Ferreira
Medical Student

Hayla Akkache Tonet
Medical Student

Héctor Hugo Queiroz Franca
Medical Student

João Lucas de Moraes Dias
Medical Student

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1 INTRODUCTION

Stroke is the second leading cause of death worldwide, including Brazil[1],2. It is a more common condition in the elderly, but it has an increasing prevalence in young adults due to the development of risk factors that were typically attributed to older ages3. Risk factors can be categorized into non-modifiable (race, ethnicity, gender, and age) and modifiable (arterial hypertension, obesity, diabetes mellitus, smoking, and alcoholism), both contributing to distinct trends in incidence and mortality from stroke4. There are two pathological subtypes of stroke, the hemorrhagic one that courses with intraparenchymal or subarachnoid hemorrhage, and the ischemic one that involves areas of cerebral, retinal, and even spinal infarction5,6. Clinical syndromes and focal neurological deficits are determined by the affected vascular territory, a parameter that is also used to classify strokes, presume prognoses, and determine more specific interventions3.

A quick and complete anamnesis is a critical step in making the diagnosis of stroke and helping to locate the affected region, but only with the clinical picture, it is not possible to consistently distinguish a hemorrhagic stroke from an ischemic one7. Among the various signs and symptoms, the most common are paresis and paresthesia in the contralateral hemibody, central facial paralysis, diplopia, dysarthria, ataxia, nausea, vomiting, and explosive headache. It is essential to establish the time of onset of the condition to determine the therapy that will be adopted next8. After the event, if early and adequate intervention is not carried out, the motor and sensory deficits can become irreversible, which has a significant effect in the social, occupational, financial, family, and personal spheres, considering the impact on quality of life and the need for care for years due to acquired limitations9,10.

Non-contrast CT scan of the head is the most important tool to confirm the diagnosis and determine whether the process is ischemic or hemorrhagic. Diffusion-weighted magnetic resonance imaging can also be performed and, even demonstrating the extent of the stroke, it is not a first-line exam due to lack of

availability and the longer time required to obtain the images11. Laboratory tests are used to investigate basic health and the etiology of the event, and it is recommended to include blood count, differential blood cell count, lipid profile, hemoglobin A1c, creatinine, albumin, and glomerular filtration rate. In the face of an ischemic stroke, it is necessary to perform a random dosage of serum sugar, platelet count, and prothrombin time to verify the patient's eligibility for intravenous thrombolysis12.

Treatments for stroke have undergone significant improvements in recent years. However, the effectiveness of interventions in limiting progression and reducing irreversible damage depends on the time between the onset of clinical manifestations and access to adequate care. For this reason, the guidelines on the management of stroke patients emphasize the importance of coordinated systems to reduce this time, in which emergency medical services play an essential role13.

Patients with ischemic stroke and time since onset of symptoms less than 4.5 hours are candidates for intravenous thrombolysis with tissue plasminogen activator (rt-AP) Alteplase in the absence of contraindications. Outside the therapeutic window, other options should be considered, such as endovascular thrombectomy. Maintaining slightly elevated blood pressure in the first days of hospitalization is important to perfuse the peri-infarction zones14. For hemorrhagic stroke, recombinant activated factor VII (rFVIIa) is used because it stops hematoma growth, even though it increases the risk of thromboembolic events. Other alternatives are non-specific hemostatic agents, such as concentrated prothrombin complex15.

In the 1950s, a Committee of Experts was convened by the United Nations to develop tools capable of measuring the different "levels of life". Among the twelve proposed indicators, the Swaroop-Uemura index was intended to quantify health levels considering the proportional mortality of people aged 50 years or more. Later, in 1959, the Nelson de Moraes Curve was created, an indicator that allows the study of proportional mortality and dispenses with population data is easy to prepare, includes the Swaroop-Uemura index, and provides a graphical representation of the data for better visualization16.

Between 2015 and 2020, considering the Swaroop-Uemura index equal to 79.39% and the Nelson de Moraes Curve of type IV, Brazil had an excellent level of health care17. Considering the global impact of stroke in different areas and the level of health in Brazil, it is expected that health systems have improved the management of this syndrome to improve epidemiological statistics.

This ecological study is relevant because knowing the mortality rates and the hospital morbidity profile of stroke allows new public policies and management strategies to be developed, guided by the weaknesses pointed out by the study so that it is possible to improve the profile of this disease. in the country18. For this, the objective of this study was to investigate the epidemiological profile of stroke in Brazil between 2015 and 2020, based on the design and evaluation of health indicators, observing whether stroke management in this time interval had the expected impact on morbidity and mortality.

2 METHODOLOGY

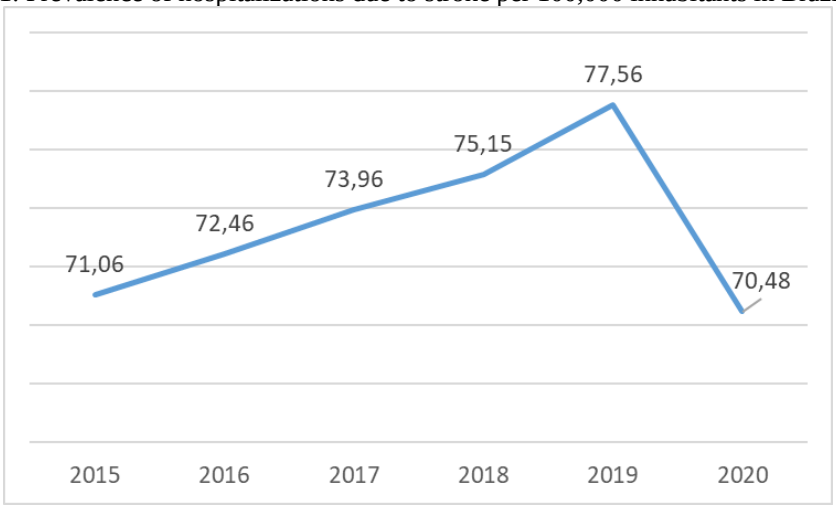
An analytical ecological study was conducted on the bases of the Mortality Information System (SIM), SUS Hospital Information System (SIH/SUS), and Management of Studies and Analysis of Demographic Dynamics of the Directorate of Research of IBGE. In these data systems, the numbers of deaths per residence per year of death according to the ICD-10 category; hospitalizations per year of care according to the ICD-10 morbidity list; and second-year resident population.

As eligibility criteria for the data, the ICD-10 I64 (stroke not specified as hemorrhagic or ischemic), the entire national territory, and the interval between 2015 and 2020 were considered, while ignored information was an exclusion criterion due to the ability to overestimate the results. Based on the information collected, two researchers calculated the prevalence rates of hospitalizations (ratio between the absolute number of hospitalizations due to stroke and the estimate of the resident population per year, based on 100,000), specific mortality (ratio between the absolute number of deaths due to stroke and estimated resident population per year, based on 100,000) and proportional stroke mortality (ratio between the absolute number of deaths from stroke and the total number of deaths from all causes). After comparing the results, if there was any divergence, a third researcher would perform the calculation to compare the result and discard the incorrect data. To assess the actual epidemiological profile, the indexes obtained each year were observed.

3 RESULTS

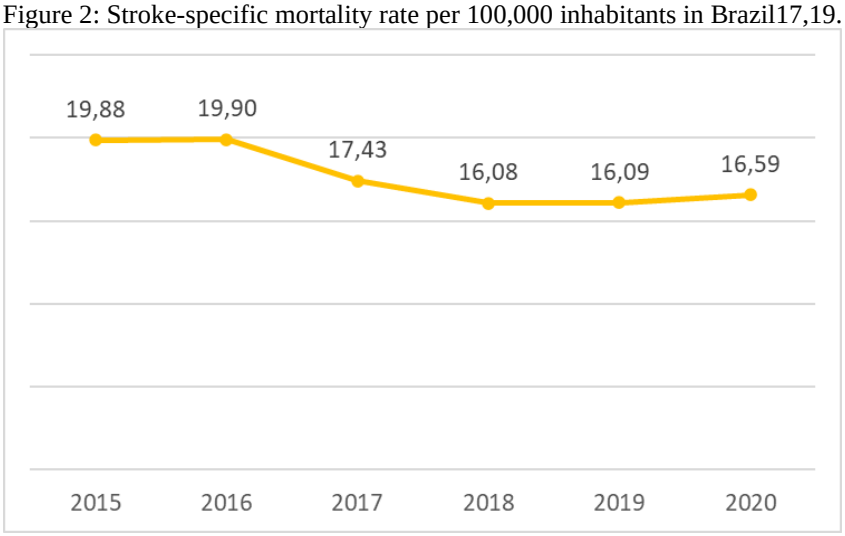
In figure 1, it is observed that in 2015 the prevalence of hospital admissions due to stroke was 71.06 per 100,000 inhabitants, a rate that rose successively until reaching the value of 77.56 in 2019, a moment that was succeeded by a decrease important for levels lower than the first year investigated, considering the prevalence of 70.48 in 2020. 19,20.

Figure 1: Prevalence of hospitalizations due to stroke per 100,000 inhabitants in Brazil19,20.



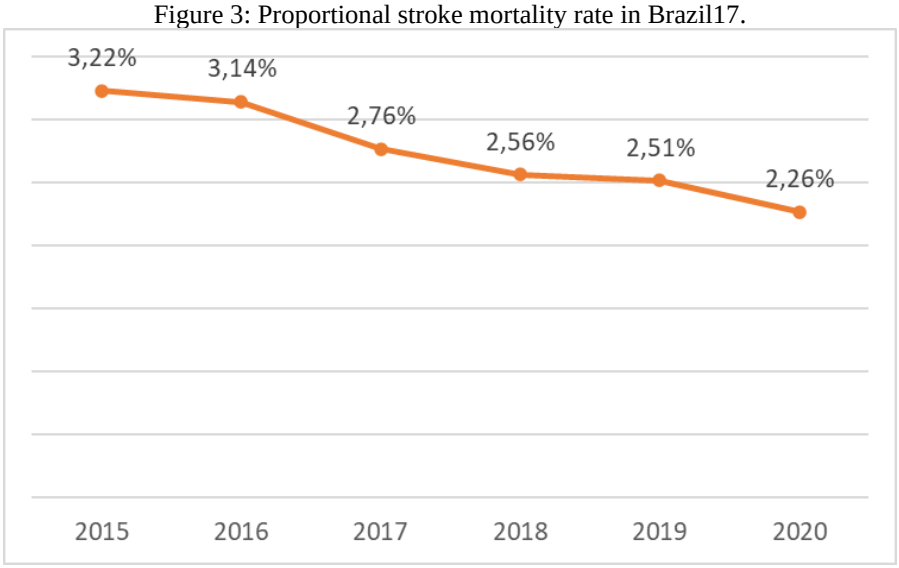
As shown in figure 2, between 2015 and 2016 the specific mortality rate remained stable but went through consecutive falls until reaching a value of 16.08 in 2018, which remained stable in 2019, to be followed by a slight increase to 16, 59 in the last year evaluated17,19.

Figure 2: Stroke-specific mortality rate per 100,000 inhabitants in Brazil17,19.



It is evident in figure 3 that the proportional mortality rates due to stroke decreased throughout all the years of the study, with no increase in the time interval considered17.

Figure 3: Proportional stroke mortality rate in Brazil17.



4 DISCUSSION AND CONCLUSION

The study showed that 71.06 out of every 100,000 people required hospitalization as a result of a stroke, and this number increased slightly until reaching 77.56 hospitalizations in 2019 until 2020 only 70.48 hospitalizations were necessary. Similarly, the specific mortality rate found reflects that 16.08 out of every 100,000 people died from a stroke in 2015, a rate that decreased over the years, stabilized in 2019,

and increased in 2020 to 16.59 deaths. On the other hand, the observed proportional mortality indicates that 3.22% of all deaths that occurred in 2015 were attributed to stroke, a proportion that decreased to 2.26% in 2020.

A study that investigated stroke hospitalizations from 2009 to 2016 reports a global decrease in age-adjusted hospitalization rates, although it expected a continuous increase in the number of hospitalizations, as occurred 21. A survey that studied temporal trends in stroke mortality showed a decrease in crude rates adjusted for age and sex, concluding that this trend should continue, and indeed it did22.

The rise in the prevalence of hospital admissions due to stroke can be attributed to early diagnosis measures and improvement of pre-hospital care services that allow greater access to emergency services, in addition to the rapid aging of the population13. The decline in stroke mortality rates is closely related to greater access to emergency services, as well as the development of new technologies for diagnosis and improvement of known therapies11-13.

It is concluded, therefore, that Brazil had a consistent behavior regarding the improvement of stroke management between 2015 and 2020, considering its excellent level of health care demonstrated in the Nelson de Moraes Curve and Swaroop-Uemura index. The improvement in the epidemiological profile is evidence that can be explored in future research to identify measures adopted over the years that favored changes in indicators, for example.

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