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Epidemiological Analysis of Determinants in ICU Mortality in the State of Tocantins in Brazil

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Abstract:

The availability of places in intensive care units in Tocantins has become a serious public health problem, in this sense, through the identification of studies and data collection of works that resulted from the analysis of variables that generated better quality indicators in intensive care, such as the reduction of length of stay, care costs and the mortality rate, aiming to explain scientific criteria and technocracy as a public policy for patient admission, and infection control as a direct or indirect way of guaranteeing a greater supply of ICU beds. To analyze hospitalization, demand and mortality data in ICUs through the DATASUS website and identify which epidemiological determinants have the highest mortality rate among patients admitted to hospitals in the State of Tocantins. The work consists of retrospective, quantitative documentary research and a statistical method of data collection and correlation. Data from all patients over 18 years of age admitted to public ICUs during the last 5 years will be included in the survey. All data related to COVID-19 ICUs that were implemented in 2020 will be excluded. Infectious and parasitic diseases along with neoplasia are the most prevalent in the mortality rate of the eight regions, corroborating the promotion of new research for the prevention and treatment of tropical diseases in the state of Tocantins.

Keywords: Intensive Care Unit, Epidemiology, Length of stay, Mortality rate

1. Introduction

"Everyone's right and the State's duty", is what the inscription of health in the Federal Constitution of 1988 provides, and must be "guaranteed by social and economic policies aimed at reducing the risk of disease and other aggravations" (BRASIL, 1988). Until then, the Ministry of Health participated with less than 20% of the federal resources destined to the financing of health in the country, today, the resources destined to health, do not differ from countries that managed to obtain better assistance to the population than the one that today, in average, is provided to Brazilians, hovering around 8% of GDP. According to IBGE data, financing and investment in health in the country predominantly incurs in the private service, which provides assistance to only 20% of the population. Efficiency in health investments and the development of strategic planning has become essential in health policies, since just spending larger fractions of GDP does not mean better health conditions (COSTA et al. 2019).

According to data from the CNES (national council of health establishments), the health system in Tocantins provides 176 general ICU (intensive care unit) beds, 86 of which are provided by the SUS (Unified Health System) and ninety by the private and supplementary system. with the largest number located in the capital Palmas (88 beds), followed by the municipality of Araguaína, with 65, and Gurupi, with 23. Between the years 2020 and 2021, 419 additional COVID-19 ICU beds were made available in reason for the pandemic.

With regard to general ICU beds, the biggest determinants of the demand for beds in Tocantins due to morbidity are cardiovascular and respiratory diseases, followed by external causes related to multiple traumas (REIS, 2018). According to data provided by DATASUS (Information Department of the Unified Health System) there were about 61 thousand hospital admissions in the state related to cardiovascular diseases between 2016 and 2021, followed by 53 thousand admissions, in the same period, related to cardiovascular diseases. external causes. According to Simão et al. (2013) the main etiological factors of cardiovascular diseases are systemic arterial hypertension, dyslipidemia, diabetes

mellitus, sedentary lifestyle and smoking, which is the main preventable cause. In Brazil, the percentage of smoking evolved with a significant drop in the last 30 years. According to data from INCA (National Cancer Institute) in 1989 there was an estimated prevalence of smokers in the country at 34.8%, this number dropped to 12.6% in 2019, with 15.9% in the male population and 9, 6% in the female population. On the other hand, systemic arterial hypertension affects about 35% of the Brazilian population, and, according to the SBC (Brazilian Society of Cardiology), only 50% of this population has the disease controlled through drug therapy. In this plan, the main causal links of ICU admission are sensitive to a prevention and promotion program in primary health care, known as ISAB (Primary Care Sensitive Internment), which is an important component of the assessment of health conditions in the indices. of municipal development.

The importance of analyzing the evolution of Chronic Non-Communicable Diseases (NCDs) in the last century stems from the insufficiency of studies that rescue the historical character of the changes that occurred in Brazilian society, which determine the processes of demographic and epidemiological transition in a context of relevant social inequalities. In the field of knowledge, despite the advancement of methods of analysis based on epidemiological models of association between risks and health problems, there is a need to redirect the search for identification and more consistent evidence of the social determinants of these diseases, based on the construction of integrative conceptual models, which take into account the complexity of their levels of determination (CESSE, 2007). In Brazil, the first ICU (Intensive Care Unit) with 10 beds was opened in 1967 at the Hospital dos Servidores do Estado do Rio de Janeiro. In 1968, an ICU was created in the state of Santa Catarina; then another in Porto Alegre, Rio Grande doSul. due to the growing number of patients requiring ICU and the high cost of hospitalizations (RODRIGUEZ, 2016).

Also, according to Rodrigues (2016), research that points out these characteristics of patients hospitalized in ICUs helps in the consolidation and favors changes in care strategies. The resulting information can also be used to help improve the management of the unit, whether from a human, structural, process, or even care management point of view.

Research published in August 2010 by the Brazilian Institute of Geography and Statistics (IBGE) shows that the pattern of deaths caused by infectious and communicable diseases in Brazil is being replaced by deaths resulting from chronic, degenerative diseases and also from external causes. linked to accidents and violence. Data indicate that diseases of the circulatory system constitute the main group of causes of death in Brazil. Among men, the second place is accidents and violence and, among women, neoplasms. According to DE MORAIS (2016), most Brazilian municipalities, especially those furthest from a central economy and with low population rates, have presented difficulties in managing the Unified Health System (SUS), due to different factors, such as difficulty in the contribution of qualified human resources, access to the use of technologies and the lack of adequate physical structures.

In this spectrum, the state of Tocantins has 39 municipalities, distributed in a territorial area of 277,620,914 km², with a population density of 4.98 inhab/km², has 576 SUS health establishments (IBGE, 2009) and is composed of eight regions of health.

According to the information technology department of the Brazilian Unified Health System (DATASUS), 24 billion were spent in the period from May 2011 to April 2016 in Brazil. In Tocantins, this expenditure reached 325 million in the same period. According to Ribeiro (2009), in tertiary care, the intensive care unit (ICU) is currently one of the most complex scenarios in care.

The availability of places in intensive care units in Tocantins has become a serious public health problem, in this sense, through the identification of studies and data collection of works that resulted from the analysis of variables that generated better quality indicators in intensive care. , such as the reduction of length of stay, care costs and the mortality rate, aiming to explain scientific criteria and technocracy as a public policy for patient admission, and infection control as a direct or indirect way of guaranteeing a greater supply of beds of ICU (REIS, 2018). Given the above, this project will be developed in order to describe the epidemiological characteristics that increase the need for vacancies and the mortality rate of patients in ICUs in the State of Tocantins.

2. Methodology

A retrospective documentary research, quantitative and statistical method of data collection and correlation. Data from patients hospitalized in all public ICUs in the state of Tocantins in the last 5 years (January 2017 to December 2021), comprising adult admission ICUs for general treatment, available on the public websites of the state health department and DATASUS.

Data from all patients over 18 years of age admitted to public ICUs during the last 5 years were included in the survey. All data related to COVID-19 ICUs that were implemented in the last year were excluded. Initially, the number of general ICU beds in force during the retrospective period of data collection was collected through the DATASUS website and the Tocantins State Health Department. Then, the municipal and regional data (health regions) of the epidemiological prevalence of diseases related to the ISAB (indicator of hospitalizations sensitive to primary care) were allocated, where they were compared with the rate of hospitalization due to disease. Finally, there was a correlation with regional and municipal health data with hospitalization and mortality rates, thus analyzing regional epidemiological variations regarding the demand for ICU beds and mortality. The correlation of epidemiological determinants may be publicly disclosed aiming at the possible allocation of regional and municipal resources for the prevention of certain diseases and health promotion in primary care, aiming to reduce hospitalization rates and, consequently, mortality rates.

Correlation data between epidemiological indicators, demand for beds, hospitalization rates and mortality rates were analyzed using Pearson's coefficient in order to assess the degree of linear association and with the chi-square test for parametric and non-parametric variables. -parametric. After validation, they will be compared with regional data by paired Student's T test using SPSS® software. The values were demonstrated through tables and graphs generated by

STATA®, considering the significance level of $p < 0.05$ or 5%. Data with a tolerable sampling error of 5% may be used using the Barbetta Formula (BARBETTA, 2008).

3. Results

A correlation was made between the amount of population and the GDP of each health region of the eight in the state of Tocantins. Table 1 shows that the five main diseases that have the highest prevalence of deaths in the ICUs of the eight health regions of Tocantins are Infectious and Parasitic Diseases, Neoplasms, Hemodynamic Disorders, Endocrine Disorders and Mental Disorders. In this context, after Pearson's correlation analysis, it was observed that there was a positive correction between the regional GDP and the population with the diseases with the highest mortality rate, except for endocrine diseases, in which a negative correlation was observed. This showed that infectious and parasitic diseases along with neoplasia are the most prevalent in the mortality rate of the eight regions, surprisingly mental and behavioral disorders entered the list of the five main causes of death in the state.

	Infectious and Parasitic Diseases	Neoplasms	Hemodynamic Disorders	Endocrine Disorders	Mental Disorders
Population	0,64	0,75	0,15	- 0,47	- 0,58
Regional GDP	0,58	0,42	0,13	- 0,43	- 0,4

Table 1: Correlation between GDP, Population Mortality Rate

4. Conclusion

We conclude that the disease with the highest mortality rate in the eight health regions in the State of Tocantins are infectious and parasitic diseases, taking into account the economic and climatic aspects of each health region, which corroborates the need for greater investments in prevention of tropical diseases in this region. We can also observe that among the five diseases with the highest prevalence of mortality in the ICUs of the eight health regions of the State of Tocantins was metal and behavioral disorders, noting that there is a very large lack in the health regions to treat this type of pathology. Furthermore, it was analyzed that there was no statistical correlation between economic and population data in reducing the mortality rates of the most prevalent diseases in this region.

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