

AN ANALYSIS OF DENGUE IN THE LAST 5 YEARS IN BRAZIL BY REGION AND IN THE 27 BRAZILIAN STATES

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Abstract: Dengue is an acute febrile illness of great importance for global public health. caused by an arbovirus that has its spread favored in environments with tropical climate characteristics, it tends to have seasonal patterns, with a peak incidence generally during and after the rainy seasons. The Brazilian epidemiological scenario of arboviruses is worrying due to the occurrence of the triple epidemic, dengue, chikungunya fever (chikf) and congenital zika virus syndrome (zikv). The expansion of dengue occurrence areas in Brazil is associated both with urbanization, without the proper sanitation structure, and with the globalization of the economy. The work aimed to compare the incidence of dengue cases in the years 2015 to 2019 in Brazil, between the five regions and between the 27 states, based on data collected in Datasus and analyzed with statistical tools. the years 2015, 2016 and 2019 presented the highest numbers of cases, with the southeast region having the highest incidence and the north region having the lowest incidence. After processing the data, it was possible to conclude that there was a significant difference between the number of dengue cases between states and regions in the established period.

Keywords: Arbovirus; Dengue; Zika; Chikungunya; incidence.

INTRODUCTION

Dengue is an arbovirus that has caused great concern for the population, in addition to being a global public health problem. Tropical countries are the most affected due to their environmental, climatic and social characteristics that favor the spread of the virus in a simpler way. This disease is characterized by being acute febrile, whose etiological agent is made up of four antigenically distinct serotypes: DEN-1, DEN-2, DEN-3 and DEN-4. Clinically, manifestations range from a nonspecific and benign viral syndrome to a

serious and fatal hemorrhagic disease with shock. The risk factors for serious cases are: the serotype strain of the infecting virus, the patient's immune and genetic status, concomitant disease with other diseases and previous infection with another viral serotype of the disease. Transmission occurs mainly through the bite of the infected *Aedes aegypti* mosquito, which has a "domestic" habit. Its coexistence with man is favored by the use of artificial containers in the development of immature forms, an ecological condition that makes this species predominantly urban (RIBEIRO et. al. 2006).

Infection with one of the serotypes only confers permanent, or at least long-lasting, immunity for that serotype, that is, there is no cross-immunity. It is possible that there is a transient, short-term cross-immunity between the different serotypes (TAUIL 2001).

The expansion of dengue occurrence areas in the world and in Brazil is associated both with urbanization, without the proper sanitation structure, and with the "globalization" of the economy. Such factors contribute not only to the active dispersal of the mosquito but also to the spread of the various serotypes of the disease. Transmission in the State of São Paulo began in 1987 and since then has shown a growth/rise trend: in 2019, 1,558,467 cases were confirmed (VASCONCELOS 1993).

At the beginning of 2019, the World Health Organization listed dengue as a potential threat among ten diseases for 2019 and current outbreaks in many countries confirm this observation. Dengue epidemics tend to have seasonal patterns, with transmission often peaking during and after rainy seasons. There are several factors that contribute to this increase and include high mosquito population levels, susceptibility to circulating serotypes, favorable air temperatures, precipitation and humidity, which affect the reproduction and feeding patterns of

mosquito populations, as well as the period of dengue virus incubation. Lack of proactive control interventions and staffing are some of the other challenges (WORLD HEALTH ORGANIZATION, 2019).

The Brazilian epidemiological scenario of arboviruses is worrying due to the occurrence of the triple epidemic, dengue, chikungunya fever (CHIKF) and congenital Zika virus syndrome (ZIKV) until Epidemiological Week 12 for the year 2019, 290,889 probable cases of the triple epidemic were registered, and still at risk of the re-emergence of Urban Yellow Fever (BRAZIL, 2019).

Between 2015 and 2016, the country reported an annual average of 1,586,155 probable cases. However, in 2017, after two or four years of the likely introduction of the Zika virus (ZIKV), Brazil saw a reduction in dengue fever to 252,054 cases, in addition to a reduction in the number of severe dengue fever and deaths. Regarding dengue, the causes of this decline are not yet fully known. In fact, current data on population immunity, cross-reactions between Dengue virus (DENV) and ZIKV, mosquito ecology, vector control measures and environmental factors are not sufficient to explain the dengue scenario in 2017 (JUNIOR 2018).

As explained above, one can see the degree of importance for the world and especially developing countries of studies and scientific research that portray the development of this disease so that, through these studies, an attempt is made to carry out prevention work so that the incidence of the disease dengue will decrease.

METHODOLOGY

As a methodological path for the work, a literary review on dengue fever was first carried out. The articles were selected from the website <https://scholar.google.com.br/> with the search keywords: dengue; dengue in Brazil; dengue fever in recent years; dengue cases, dengue treatment. Among this research, articles were chosen that contained more clear and consistent information about the disease. The types of articles selected were literary reviews and some epidemiological studies on dengue. The period of the articles chosen was from 2010 to 2020.

In parallel with the research, a statistical comparison test was also carried out. For this purpose, the last five years of dengue cases in Brazil were selected and the data were taken from the DATASUS website. With the help of statistical tools that help compare data, the ANOVA statistical test was used, which uses the variances of the data to compare their means between years. The comparison of the test over the last five years was carried out both for the regions of Brazil (north, northeast, central-west, south and southeast) and by state (in this case it was compared to the 27 states of Brazil). With this result, it was possible to confirm whether or not there was a change in dengue cases in the last five years in Brazil.

RESULTS AND DISCUSSION

According to DATASUS, in 2015, 2016, 2017, 2018, 2019, 1,700,324, 1,514,873, 243,248, 265,460, 1,558,467 cases of dengue were reported respectively. From this data, tables and graphs were created in relation to the month with the highest incidence of dengue cases and it was noticed that this generally occurred in the first half of each year.

Comparisons were also made regarding the regions of the country and it was observed

that the region with the highest incidence during the years 2015, 2016 and 2019 was the southeast region and the region with the lowest incidence in those same years was the northern region. In 2017, the highest incidence was in the northeast region and the lowest incidence in the southern region, in 2018 the highest incidence was in the central-western region and the lowest incidence in the southern region.

In relation to the states in 2015, the lowest incidence of dengue cases was in Roraima with 1,108 cases and the highest incidence was in São Paulo with 749,943 cases. In 2016, the state with the lowest incidence was Roraima with 210 cases and the highest incidence was Minas Gerais with 529,022 cases. In 2017, the state with the lowest incidence was Rio Grande do Sul with 183 cases and the highest incidence in Goiás with 64,068 cases. In 2018, the state with the lowest incidence of cases was Roraima with 111 cases and the highest incidence in Goiás with 91,545 cases. In 2019, the state with the lowest number of cases was Amapá with 225 cases and the state with the highest number of cases was Minas Gerais with 483,907.

To provide better assistance in discussing the work, the ANOVA statistical test was carried out both to see if there was a difference between dengue cases in relation to states and by region of the country during these years. It was observed that, in many states, the p-value of the test was less than 0.00, therefore there is a significant difference between the number of dengue cases in relation to the established period. Regarding the region of Brazil, the ANOVA test returned a p-value of 0.005, so this also indicates that there is a significant

difference between the regions of the country in relation to reported dengue cases.

The data and results of the research were in accordance with the data found in the Epidemiological Bulletin number 31 of the health surveillance secretariat of the ministry of health volume 51 August 2020. The incidence of dengue cases found were the same as those in the current work.

The objective of the study concludes that during 2017 and 2018 there was a large drop in the number of dengue cases in the country, while during 2019 this had a large increase. The causes of this large variation in data are not yet well justified in the literature, however this increase is worrying for epidemiological agencies that will promote public health policies for the population.

FINAL CONSIDERATIONS

In the present work, knowledge and data about dengue in Brazil were systematized, which consisted of a literary review also highlighting data obtained from DATASUS for a better understanding of the general picture of dengue in the country.

Through this work, the importance of continuous scientific and systematic study of the disease and its relationship with public and national prevention policies was observed.

The work also brought notes that could guide future actions for more in-depth studies and work. As seen during 2017 and 2018, the number of dengue cases in the country had a considerable drop, observing the successes and failures made in these years, we can promote health in order to minimize errors and increasingly try to eradicate this disease from the country.

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