

EPIDEMIOLOGICAL PROFILE OF DENGUE CASES IN DOURADOS, MATO GROSSO DO SUL, FROM 2007 TO 2020

**PERFIL EPIDEMIOLÓGICO DE CASOS DE DENGUE EM DOURADOS, MATO
GROSSO DO SUL, NO PERÍODO DE 2007 A 2020**

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ABSTRACT

This study aimed to present an epidemiological overview of reported dengue cases in the municipality of Dourados, Mato Grosso do Sul, from 2007 to 2020. The variables analyzed were sex, age group, educational level, race, and clinical outcomes. Data were obtained from the Notifiable Diseases Information System (SINAN). A descriptive, quantitative, and retrospective study of reported dengue cases was conducted. It was observed that 2010 saw the highest number of cases, marking the period of peak disease occurrence in the municipality. Females predominated among the reported cases, accounting for 58.01% of the records. The 20–39-year age group had the highest frequency of cases. Regarding race, self-identified white individuals predominated, while incomplete elementary education was the most frequent level. The findings of this study may contribute to understanding the dynamics of dengue occurrence in the municipality.

Keywords: Dengue; Dourados; Epidemiology; Statistical analysis.

RESUMO

Este trabalho teve como objetivo apresentar um panorama epidemiológico dos casos notificados de dengue no município de Dourados, Mato Grosso do Sul, no período de 2007 a 2020. Foram analisadas as variáveis sexo, faixa etária, escolaridade, raça e evolução dos casos. Os dados foram obtidos no Sistema de Informação de Agravos de Notificação (SINAN). Foi realizado um estudo descritivo, quantitativo e retrospectivo dos casos notificados no período. Observou-se que o ano de 2010 apresentou o maior número de casos, caracterizando-se como o período de maior ocorrência da doença no município. Entre os casos notificados, houve predominância do sexo feminino, que correspondeu a 58,01% dos registros. A faixa etária de 20 a 39 anos apresentou a maior

frequência de casos. Em relação à raça, predominaram indivíduos autodeclarados brancos, enquanto o ensino fundamental incompleto foi o nível de escolaridade mais frequente. Os achados deste estudo podem contribuir para a compreensão da dinâmica da ocorrência da dengue no município.

Palavras-chave: Dengue; Dourados; Epidemiologia; Análise estatística.

1. INTRODUCTION

Dengue, a viral disease, is considered a serious public health problem that occurs in several countries. Hot and humid climates contribute to the proliferation and distribution of mosquito vectors; therefore, dengue is considered a tropical disease (Ribeiro *et al.*, 2006; Silva *et al.*, 2021). In addition, socio-environmental factors are also determinants for the advancement and aggravation of this disease that affects thousands of people around the world, causing victims and bringing numerous damages to the population.

The transmission of dengue occurs through the bite of the vector mosquito, in a well-known transmission cycle (man – *Aedes aegypti* – man). When feeding on infected blood, after 8 to 12 days of incubation, the mosquito can transmit the virus. Mechanical transmission can also occur when blood feeding is interrupted, and the mosquito quickly feeds on a new host (Oliveira *et al.*, 2019).

The creation of artificial environments (breeding places) conducive to the reproduction of the mosquito, because of the incorrect disposal or storage of containers, which can accumulate rainwater, is a decisive factor in the spread of the disease (Câmara *et al.*, 2007; Ferreira; Neto; Mondini, 2018). Therefore, social commitment,

including the prevention of the disease and increased awareness among the population, is fundamental. As there are no specific treatments for the disease, and no viable vaccination program so far, mosquito control through public policies, to promote health and social engagement, has been the main way to fight dengue (Silva *et al.*, 2020).

In Brazil, in addition to the favorable climate for the reproduction of the main vector (*Aedes mosquito*), other factors have been identified as contributing to the spread of the disease over the years. These include the rapid and disorderly growth of cities, precarious sanitation conditions, lack of care among the population, and an inefficient surveillance system of public health agencies (Ferreira; Neto; Mondini, 2018). The first epidemic in the country was recorded between 1981 and 1982, caused by serotypes 1 and 4, in Boa Vista/Roraima, and since then dengue epidemics have been recurrent in all states, making dengue a worrying public health problem (Teixeira; Barreto; Guerra, 1999; Abe; Marques; Costa, 2012).

The situation in the Midwest region followed the pattern of the national panorama, and between 2006 and 2007, it was the region with the highest number of dengue cases. In this scenario, Mato Grosso do Sul stood out with a high incidence rate, and in 2007 the state was responsible for 67% of all cases of the disease in the Midwest region (Maciel; Júnior; Martelli, 2008).

Statistical surveys and data analysis are important to provide information on the behavior and factors associated with dengue incidence, which can be used to support the control and awareness programs in society. Therefore, this study aimed to present a

descriptive analysis of reported dengue cases in the municipality of Dourados/MS from 2007 to 2020.

2. METHODS

This was a descriptive, quantitative, and retrospective study of reported dengue cases, conducted in Dourados, located in the Midwest region of Brazil, in the south of the state of Mato Grosso do Sul (MS), with a humid tropical climate in the summer and a dry during winter, with some frosts (Schneider; Silva, 2014).

Founded on December 20, 1935, Dourados had an estimated population of 225,495 inhabitants in 2020. It has a territorial area of 4,062.889 km², population density of 47.97 inhabitants/km², and is approximately 220 km from Campo Grande, capital of the state of MS, belonging to the Paraná River basin (IBGE, 2021).

The following variables were studied: annual notifications of dengue cases by sex, age group, race, level of education, and clinical outcomes (cure and deaths). This information was collected from the online epidemiological database of the Notifiable Diseases Information System (Sistema Nacional de Agravos de Notificações – SINAN)(DATASUS, 2021), from 2007 to 2020.

In order to determine whether the proportion of dengue cases among women was greater than 50% of the total cases in the studied period, a proportion test was carried out (Ferreira, 2009), considering the null hypothesis as, the proportion of dengue cases among women (p_m) was less than or equal to 50%, that is, $H_0: p_m \leq 0.5$, against the alternative hypothesis that the proportion was greater than 50% ($H_1: p_m > 0.5$), and adopting a significance level of

$\alpha=5\%$ ($p \leq 0.05$). This test was performed using R software (R Core Team, 2021).

3. RESULTS

Between 2007 and 2020, a total of 28,310 cases of dengue were reported in Dourados/MS. Figure 1 shows that the recurrent pattern of dengue occurred approximately every three years. The largest epidemic in the city occurred in 2010, with 7,274 cases of dengue reported.

Figure 1. Reported cases of dengue in Dourados/MS from 2007 to 2020



This disease affects people of all ages, from children under one year of age to the elderly over 80 years of age, but with a higher frequency in individuals between 20 and 39 years of age, totaling 10,901 cases (38.50%) (Table 1). It was also observed that, from 10 years of age onwards, the number of dengue cases increased, and from 60 years of age onwards it decreased, as shown in Table 1.

Table 1. Notification of annual dengue cases in Dourados/MS according to the age group from 2007 to 2020

Period	2007	2008	2009	2010	2011
< 1 year	12	-	21	25	1
1 to 4	54	-	20	85	2
5 to 9	176	4	38	193	3
10 to 14	338	2	68	475	7
15 to 19	392	4	80	802	5
20 to 39	1697	13	305	3049	20

⚠ Esta tabela possui muitas colunas e foi cortada para impressão. Para visualizá-la completa, acesse o artigo original em:

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Regarding race (Figure 2), the highest number of dengue cases occurred among the white people, followed by the brown people, while Indigenous people had the lowest number of cases. However, the region in which the city is located may be an essential factor in determining the distribution of dengue cases by race, due to regional differences.

Figure 2. Notifications of dengue cases by race between the time period from 2007 to 2020 in the city of Dourados/MS.

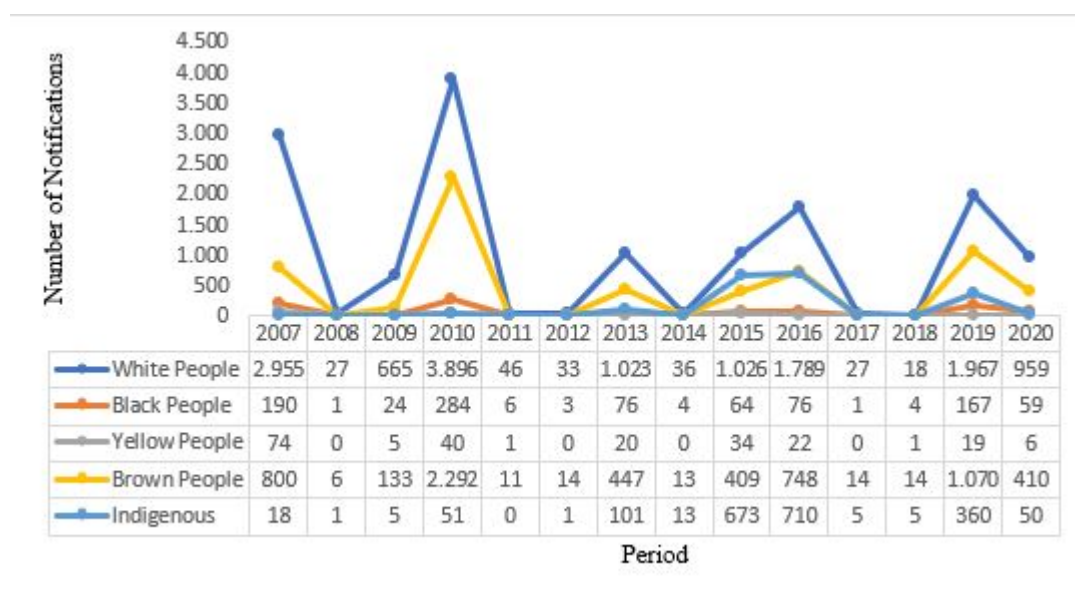
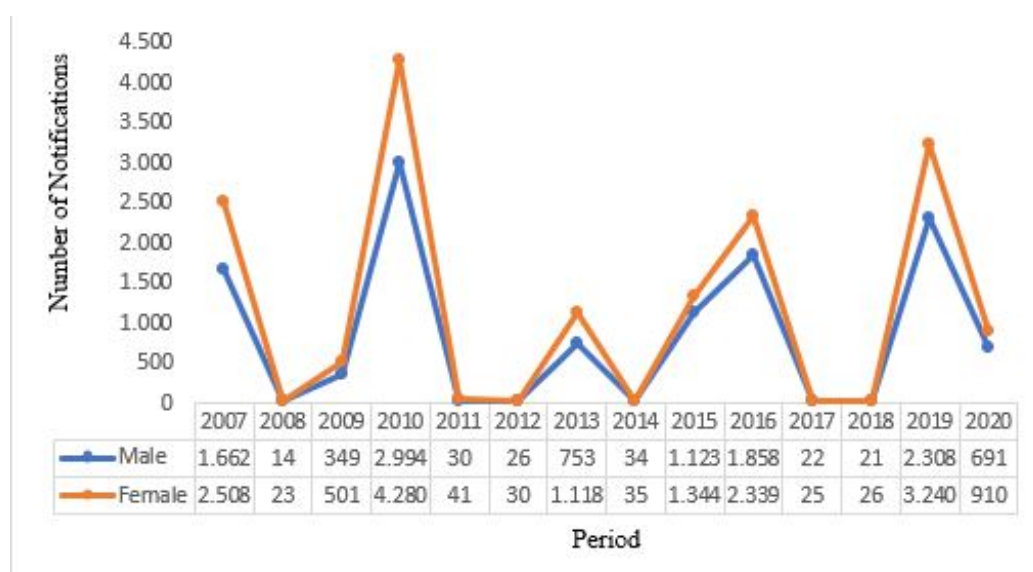


Figure 3 refers to the distribution of the numbers of dengue cases by sex. When considering the total cases, during the analyzed period, there was a greater number of cases among the women (58.01%). A test was applied to verify if the proportion of women was significantly greater than 50%, which showed a $p\text{-value} < 0.05$, indicating that the data support the statement that women were more affected by the disease.

Figure 3. Annual dengue cases by sex in Dourados/MS from 2007 to 2020



Regarding the number of notifications according to the level of education (Table 2), although this information was missing or incomplete in 10,913 (38.55%) of the dengue notification records in

Dourados, it was observed that the highest number of dengue cases occurred among individuals with incomplete elementary education, followed by those with incomplete and complete high school education, respectively.

Table 2. Notification of annual dengue cases in Dourados/MS according to the level of education from 2007 to 2020

Period	Information missing or incomplete	Illiterate	Incomplete elementary school	Complete elementary school	Incomplete high school
2007	262	170	1986	13	1032
2008	5	1	12	9	1
2009	128	7	274	125	108
2010	2879	88	2168	638	477

⚠ Esta tabela possui muitas colunas e foi cortada para impressão. Para visualizá-la completa, acesse o artigo original em:
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Finally, a clinical overview of the evolution of the disease is presented in Table 3. Of the total 28,310 reported cases, 21,758 (76.86%) patients were cured and 43 died from complications resulting from dengue. However, 6,502 (22.97%) of the information was either missing or incomplete in the notification forms, which makes a more realistic analysis of the evolution of cases difficult.

Table 3. Evolution of dengue cases in Dourados/MS between 2007 and 2020

Period	Information missing or incomplete	Cure	Death by dengue
2007	489	3678	3
2008	6	31	-
2009	10	840	-
2010	2541	4719	7
2011	2	69	-
2012	16	40	-
2013	83	1786	2
2014	35	34	-
2015	431	2033	4
2016	410	3778	9
2017	26	21	-
2018	4	43	-
2019	2034	3510	8
2020	415	1176	10

4. DISCUSSION

In the municipality of Dourados, dengue affected all age groups, with a higher frequency among individuals aged 20–39 years. Similar results were observed in surveys conducted in other regions. Monteiro *et al.* (2009), for example, observed that the highest rate of registered cases of dengue was among people aged 15 to 49 years. However, it is worth mentioning (Table 1) that individuals aged 40 to

59 years also presented with a large number of cases, being the second most-affected age group, in the reported years.

Still, with regard to age, we observed that the number of cases decreased in individuals over 60 years of age. Fantinati *et al.* (2013) and Souza *et al.* (2020) observed similar results in studies conducted in the central region of Goiânia City (state of Goiás) and in the state of Piauí, respectively, indicating that this characteristic appears to be consistent.

With regard to race, we found that in Dourados, the highest number of dengue cases was observed among white people. However, this finding seems to be a direct consequence of the fact that most of the population of Dourados is white. In Carvalho *et al.* (2020) and Pereira *et al.* (2020), higher numbers of dengue cases were observed for the brown people (followed by the whites), implying that the study region may determine the most-affected race by the disease.

Considering sex, a more consistent result was obtained, with women being the most affected. Other studies, by providing evidence that dengue affects more women, support this pattern. Oliveira *et al.* (2020) and Souza *et al.* (2020), who reported percentages of 53% and 58.7%, respectively, are examples of such studies. An explanation for this pattern may be the greater permanence of women in the home environment, as argued by Ribeiro *et al.* (2006) and Fantinati *et al.* (2013).

Our results also indicate that education plays an important role in the spread of dengue. Lower levels of education could be related to a lower level of awareness and access to information regarding the control and prevention of the disease, and this may negatively affect

vector control (Oliveira *et al.*, 2020; Santos *et al.* 2019). It is also known that socio-environmental factors have an impact on the spread of the vector and the progression of the disease in the urban environment. Hence, precarious infrastructure and lack of information compromise the fight against the disease.

Given these findings, dengue was found to be a disease that has brought discomfort and concern to the population of Dourados. In this sense, it is extremely important to conduct continuous awareness campaigns by the public management of the municipality. It is also imperative that the role of each citizen be emphasized, to ensure awareness of possible mosquito breeding sites in homes/establishments and by practicing preventive methods. This is because even with a high chance of cure, dengue causes numerous fatal victims, as it was found in this study.

It is also important to ensure correct completion of the records of notifications of dengue cases to avoid missing or incomplete records. This is because from this information, researchers and public managers can have access to basic information to facilitate a more realistic understanding of the profile and pattern of the incidence of the disease. Finally, the information obtained in this study can provide useful information for the development of programs to prevent and combat dengue in the municipality.

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