EPIDEMIOLOGICAL PROFILE OF DENGUE IN SENADOR CANEDO – GOIÁS, BRAZIL

PERFIL EPIDEMIOLÓGICO DE DENGUE EM SENADOR CANEDO – GOIÁS, BRASIL

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ABSTRACT

The objective of the study was to characterize the epidemiological profile of the cases notified for dengue in the municipality of Senador Canedo, Goiás, from 2014 to 2018. This is a population-based descriptive study on dengue, analyzing the year-of-notification variables, municipality of residence, sex, age group, race / color, education, epidemiological week, serotype, final classification, evolution, tests performed, if you were pregnant, and if there was hospitalization, whose data were obtained from the Diseases and Notifications System (SINAN), available on the website of the Unified Health System Database (DATASUS). corresponding to the period from 2014 to 2018. 7,903 dengue cases were confirmed, with the highest incidence rate in 2018, with the highest concentration of cases in the months from January to March. Dengue cases were more frequent in females (52.51%), race / brown color (51.33%), and in the age group 20 to 39 years (43.62%). Most cases (91.32%) were confirmed by clinical-epidemiological criteria, 96.67% progressed to cure and 5.58% were hospitalized. The study identified that dengue is a challenging endemic disease, as it is a disease dependent on preventive actions by the population, and in view of its high incidence, with epidemic periods, and the possibility of death.

Keywords: *Aedes*. Dengue. Communicable Diseases. Epidemiology. Incidence.

RESUMO

O objetivo do estudo foi caracterizar o perfil epidemiológico dos casos notificados por dengue no município de Senador Canedo, Goiás, no período de 2014 a 2018. Trata-se de um estudo descritivo de base populacional sobre dengue, sendo analisadas as variáveis de ano da notificação, município de residência, sexo, faixa etária, raça/cor, escolaridade, semana epidemiológica, sorotipo, classificação final, evolução, exames realizados, se estava gestante, e se houve hospitalização, cujos dados foram obtidos do Sistema de Agravos e Notificações (SINAN), disponível no site do Banco de Dados do Sistema Único de Saúde (DATASUS), correspondentes ao período de 2014 a 2018. Foram confirmados 7.903 casos de dengue, com a maior taxa de incidência no ano de 2018, com maior concentração de casos nos meses de janeiro a março. Os casos de dengue foram mais frequentes no sexo feminino (52,51%), raça/cor parda (51,33%), e na faixa etária de 20 a 39 anos (43,62%). A maioria dos casos (91,32%) foram confirmados por critério clínico-epidemiológico, 96,67% evoluíram para a cura e 5,58% foram hospitalizados. O estudo permitiu identificar que a dengue consiste em uma endemia desafiadora, por tratar-se de uma doença dependente de ações preventivas da população, e tendo em vista sua alta incidência, com períodos epidêmicos e possibilidade de evolução para o óbito.

Palavras-chave: *Aedes*. Dengue. Doenças Transmissíveis. Epidemiologia. Incidência.

INTRODUCTION

Dengue is among the tropical diseases of greatest public health importance. It currently stands out among reemerging diseases and is the most prevalent urban arbovirosis in the Americas, including Brazil (LAUGHLIN *et al.,* 2012).

The first dengue notifications in the world occurred in the years 1779, and in Brazil, the first dengue epidemic, clinically and laboratorians documented, occurred in 1981, in Boa Vista, Roraima, caused by serotypes 1 and 4 (LOPES; NOZAWA; LINHARES, 2014; SOUZA; PAIXÃO; OLIVEIRA, 2018).

In recent years, in Brazil, dengue has been occurring endemically, presenting considerable epidemiological aspects, with emphasis on the increase in incidence, hospitalizations, and deaths. In addition, it includes the simultaneous circulation of the four serotypes, epidemics of great magnitude and, the intensification of the process of internalization of transmission, with the registration of cases in municipalities of different population sizes (LOPES; NOZAWA; LINHARES, 2014; NUNES *et al.,* 2019).

In 2015, Brazil presented the record number of dengue cases with a reduction in the year 2017 (LOPES; NOZAWA; LINHARES, 2014; NUNES *et al.,* 2019). In the year 2018, the Midwest Region of Brazil had the highest dengue incidence rate (664.8/100,000 inhabitants), followed by the Northeast region (117.1/100,000 inhabitants), North (97.2/100,000 inhabitants), Southeast (82.8/100,000 inhabitants), and South (5.8/100,000 inhabitants) (BRASIL, 2018a). In the Midwest region, in 2018, the state of Goiás had the highest dengue incidence rate (1,322.2/100,000 inhabitants), followed by Mato Grosso (212.7/100,000 inhabitants), Mato Grosso do Sul (205.6/100,000 inhabitants), and Distrito Federal (82.2/100,000 inhabitants) (BRASIL, 2018a).

Facing the high incidence rate of dengue in recent years, its wide distribution among Brazilian regions and its great potential to cause severe and lethal damage to humans, Brazilian authorities have made efforts to confront it (HERINGER *et al.,* 2017; NUNES *et al.,* 2019).

In this context, it is important to know the epidemiological profile of people affected by dengue in a given region so that there is a central management planning connected to the local, with the purpose of organizing the flow of assistance, the logistics of support, and the work process of health teams, taking into account the needs of the population. In addition, there must be the availability of human and material resources, guarantee of health facilities that offer promotion, prevention, diagnosis, and treatment services for diagnosed cases of dengue (HERINGER *et al.,* 2017).

Given the Declaration of Public Health Emergency in Brazil and in the State of Goiás, due to the dengue epidemic in the territory of Goiás, an analysis of the epidemiological profile of the cases reported in Senador Canedo, Goiás, which is part of the metropolitan region of Goiânia, is necessary. This analysis made on the notified cases not only allows data to be obtained but also the development of a policy focused on the reality and evaluation of the existing programs. Since, this type of study has the essential role of subsidizing the planning, implementation, and evaluation of policies and actions of the Unified Health System (SUS) and, consequently, contribute to the reduction of hospitalizations and mortality due to dengue.

From this context, the objective of the study was to characterize the epidemiological profile of reported cases of dengue in the municipality of Senador Canedo, Goiás, in the period from 2014 to 2018.

MATERIAL AND METHODS

This is a population-based descriptive study on dengue in the municipality of Senador Canedo, Goiás. Senador Canedo is a municipality belonging to the metropolitan area of Goiânia, Goiás, Brazil, bordered by the municipalities of Aparecida de Goiânia, Bela Vista de Goiás, Bonfinópolis,

Caldazinha, Goianápolis, Goiânia and Leopoldo de Bulhões. It has an urban area of 248.291 Km² and approximately 102,947 inhabitants.

The study population comprised all dengue cases reported from 2014 to 2018 in the municipality of Senador Canedo. Information on notifications were obtained from DATASUS (2021a), through the *Sistema de Informação de Agravos de Notificação* (SINAN). The data on the resident population in Senado Canedo, years 2014 to 2018, were extracted from DATASUS (2021b).

The study included data on year of notification, municipality of residence, gender, age group, race/color, education, epidemiological week, serotype, final classification, evolution, tests performed, whether pregnant, and whether there was hospitalization.

The data obtained from DATASUS were organized in Microsoft® Excel spreadsheets for analysis. Descriptive analysis was performed. The results were presented in tables and graphs.

To calculate the incidence rate in the years 2014 to 2018, the formula was used: incidence rate = number of dengue cases/total resident population in a determined year x 100,000 thousand inhabitants (RIPSA, 2018).

The study was conducted from secondary source database, available for public research, and was therefore not submitted to any Research Ethics Committee.

RESULTS AND DISCUSSION

In the analyzed period, 7,903 cases of dengue were identified. The incidence rate was highest in the year 2018, it followed by the year 2015, as they were presented in Table 1.

Table 1 - Distribution of dengue cases according to the year of notification in the municipality of Senado Canedo, from 2014 to 2018

Year notification	Probable Cases	Incidence Rate (/100.000 inhabitants)
2014	623	637,5
2015	1562	1556,3
2016	1059	1028,7
2017	621	588,9
2018	4038	3598,2
Total	7903	1523,6

Source: DATASUS (2021a).

Regarding the epidemiological week, we can observe that the epidemiological weeks with the highest numbers of reported cases were from 03 to 12, in the year 2018, which corresponds to the period from January to March and are presented in Figure 1.

Regarding the serotype, it was observed that in 7,895 notifications (99.9%), this variable was filled in as ignored/blank, as they have shown in Table 2.

Regarding the socio-demographic characteristics, the notifications were more frequent in the female gender (52.51%), mixed-race/color (51.33%), age group 20 to 39 years old (43.62%), and in education, we observed a high rate of not filling in the data through the ignored/blank marker (48.87%), and are presented in Table 3.

Regarding the confirmation criteria, 91.32% of the cases were confirmed by clinical-epidemiological criteria, 96.67% progressed to cure, and 5.58% were hospitalized, as they have shown in Table 4.

Regarding the exams performed, for the serological exam (IGM) the majority did not perform it (91.40%), for the Elisa serology exam, it was also found that 96.27% did not perform it, the viral isolation exam, 97.19% did not perform it, and the histopathology exam, 90.32% did not perform it, as they have shown in Table 5.

Figure 1 - Distribution of dengue cases according to the epidemiological week in the municipality of Senado Canedo, from 2014 to 2018
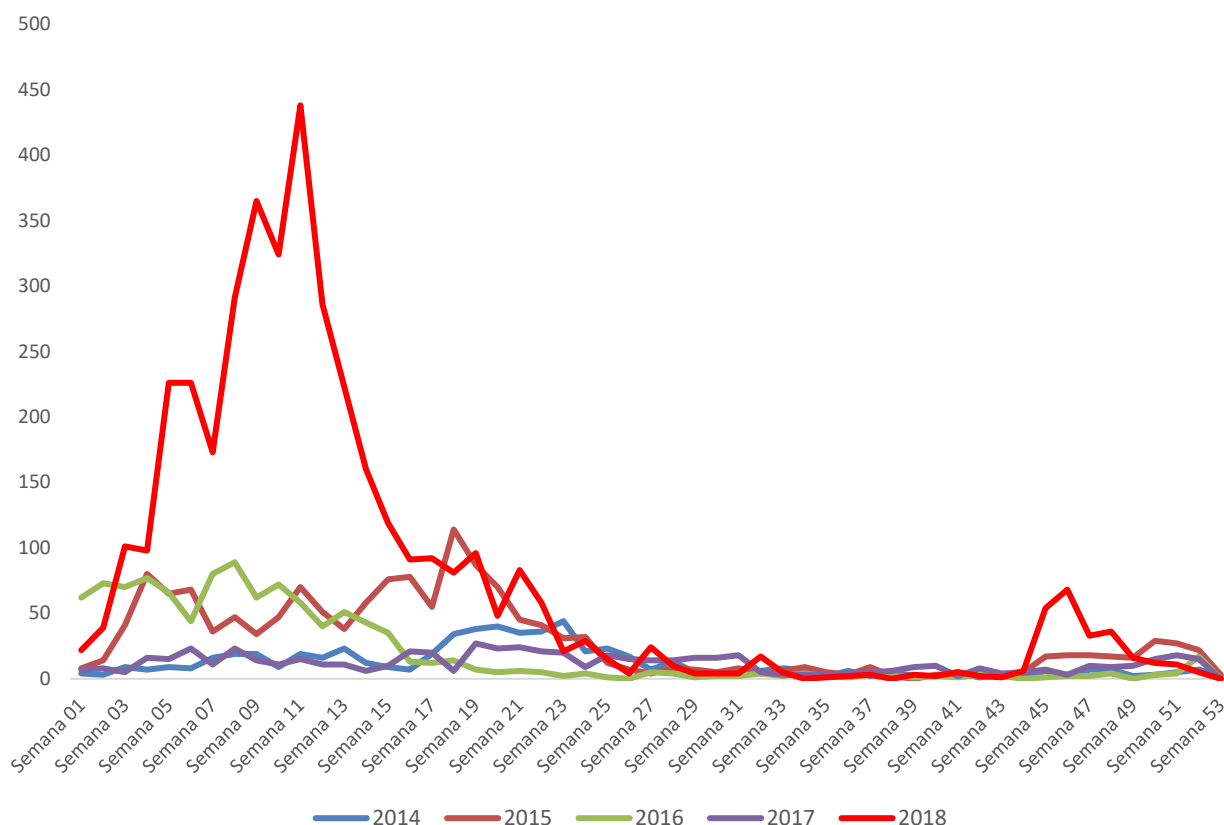
Source: DATASUS (2021a).

Table 2 - Serotype of dengue cases in the municipality of Senador Canedo, in the period from 2014 to 2018

Serotype	2014	2015	2016	2017	2018	Total
Ign/blank	619	1558	1063	622	4033	7895
DEN 1	1	0	2	0	0	3
DEN 2	0	0	0	0	4	4
DEN 4	0	1	0	0	0	1
Total	**616**	**1559**	**1065**	**622**	**4037**	**7903**

Source: DATASUS (2021a).

Senador Canedo, for being located in a metropolitan area and of constant population growth, has experienced an increase in the number of dengue cases and, consequently, in the incidence rate, being affected in 2018 by the highest rate in its history (3598.2/100. 000 inhabitants), surpassing the capital of the state of Goiás, Goiânia, which in the same year had an incidence rate of 2002.1/1000,000 inhabitants, and also surpassing the incidence rates of two bordering municipalities, Aparecida de Goiânia and Bela Vista de Goiás, which had rates of 3178.3/1000,000 inhabitants and 1674.1/100,000 respectively (BRASIL, 2021).

The increase in cases can be explained by the circulation in the country in the year 2018, of a new dengue serotype, stronger than the serotype in circulation in previous years, with the predominance of DENV2, over the other serotypes, especially DENV1, which has been dominant since 2009 (BRASIL, 2018b). This change of serotype can trigger outbreaks and epidemics where there are still large numbers of susceptible people who have never been infected by DENV2.

Table 3 - Socio-demographic characteristics of dengue cases in the municipality of Senador Canedo, in the period from 2014 to 2018

Variables	N	%
Sex		
Male	3751	47,46
Female	4150	52,51
Ignoraded/blank	2	0,03
Pregnant		
1st Trimester	24	0,30
2nd Trimester	23	0,29
3rd Trimester	29	0,37
Ignored gestational age	9	0,11
No	2213	28,00
Not applicable	4996	63,22
Ignored/blank	609	7,71
Age group		
<1 year	93	1,18
1-4	103	1,30
5-9	237	3,00
10-14	503	6,36
15-19	833	10,54
20-39	3447	43,62
40-59	2094	26,50
60-64	228	2,88
65-69	139	1,76
70-79	176	2,23
80 or more	48	0,61
Ignored/blank	2	0,03
Education		
Illiterate	84	1,06
1st to 4th grade incomplete	177	2,24
4th grade complete	195	2,47
Incomplete 5th to 8th grade ES*	551	6,97
Elementary school complete	387	4,90
High school incomplete	636	8,05
High school complete	1171	14,82
Tertiary education incomplete	226	2,86
Tertiary education complete	283	3,58
Not applicable	331	4,19
Ingnored/blank	3862	48,87
Race/color		
White	1655	20,94
Black	425	5,38
Yellow	297	3,76
Brown	4057	51,33
Indigenous	13	0,16
Ignored/blank	1456	18,42
Total	7903	100

Notes: *ES – Elementary School.
Source: DATASUS (2021a).

Table 4 - Criteria for confirmation and evolution of dengue cases in the municipality of Senador Canedo, from 2014 to 2018

Variables	N	%
Confirmation Criterion		
Laboratory	511	6,47
Clinical-epidemiological	7217	91,32
Under investigation	11	0,14
Ignored/blank	164	2,08
Evolution		
Cure	7640	96,67
Death by the notified grievance	12	0,15
Death from another cause	3	0,04
Ignored/blank	248	3,14
Hospitalization ocurred		
Yes	441	5,58
No	6077	76,89
Ignored/blank	1385	17,52
Total	**7903**	**100**

Source: DATASUS (2021a).

Table 5 - Exams performed for confirmation of dengue cases in the municipality of Senador Canedo, in the period from 2014 to 2018.

Serological examination (IgM) Dengue	N	%
Ign/blank	183	2,32
Positive	443	5,61
Negative	41	0,52
Inconclusive	13	0,16
Not performed	7223	91,40
Elisa serology test		
Ign/blank	200	2,53
Positive	57	0,72
Negative	34	0,43
Inconclusive	4	0,05
Not performed	7608	96,27
Viral isolation exam		
Ign/blank	210	2,66
Positive	3	0,04
Negative	7	0,09
Inconclusive	2	0,03
Not performed	7681	97,19
Histopathology examination		
Ign/blank	750	9,49
Positive	6	0,08
Negative	8	0,10
Inconclusive	1	0,01
Not performed	7138	90,32
Total	7903	100

Source: DATASUS (2021a).

The incidence of dengue cases was higher in the months of January through March, which corresponds to the rainy season in the region. It is estimated that dengue cases increase from the

month in which the rains begin until three months after their end (OLIVEIRA *et al.,* 2012; FANTINATI *et al.,* 2013; CANÇADO *et al.,* 2014).

The literature points out that the epidemiological aspects of dengue are influenced by the urbanization process, deficiency of social infrastructure, and habits of the population that favor the proliferation of breeding sites for the vector. These associated factors create favorable ecological conditions for the transmission of dengue viruses by Aedes aegypti (OLIVEIRA *et al.,* 2012).

In an analysis of the socio-demographic profile, it was shown that the highest incidence of reported cases occurred in women, data confirmed by other studies (OLIVEIRA *et al.,* 2012; FANTINATI *et al.,* 2013; SOUZA; PAIXÃO; OLIVEIRA, 2018). This condition is explained by the fact that women stay longer at home, especially during the daytime, being more exposed to the vector. In addition, the transmission occurs mainly in the home and home environment during the day, or because they seek more health services, which corroborates the higher number of notifications in women (SOUZA; PAIXÃO; OLIVEIRA, 2018).

The age group most affected by the disease was that of young people and adults, in productive age, between 20 and 59 years, representing 70.12% of all cases, showing a predominance of the disease in adults, according to the epidemiology of dengue in Brazil (MACIEL *et al.,* 2008; SOUZA; PAIXÃO; OLIVEIRA, 2018). Most of them were of brown race/color (51.33%), according to the predominance of the region.

Regarding the evolution of the disease, it was observed that most cases of dengue evolved to cure, and did not require hospitalization, corroborating other studies that point out that the worsening of the disease, need for hospitalization, and mortality from dengue is low, but the economic burden, the demand for human and material resources and access to resolutive health services remains substantial in endemic environments (LOPES *et al.,* 2018; NOOR, 2019).

In this study, regarding the tests for confirmation of the disease, most were not performed, which can be related to the fact that most cases were confirmed by epidemiological criteria, which in the impossibility of specific laboratory confirmation or for cases with inconclusive laboratory results. Therefore, confirmation by epidemiological link with a laboratory-confirmed case is considered, after evaluating the spatial distribution of confirmed cases. Therefore, after laboratory confirmation of the first cases in an area, the remaining dengue cases can be confirmed by clinical-epidemiological criteria (BRASIL, 2018c).

Concerning the serotype of dengue cases in the analyzed period, most of the notification forms in this item were left blank or ignored. We know that it is of utmost importance to know the serotype circulating in a given region or municipality because some genetic variants in each serotype seem to be more virulent or have greater epidemic potential. In addition, the simultaneous circulation of different serotypes demonstrates that successive infections increase the appearance of more severe clinical forms of the disease (MIAGOSTOVICH, 2001; ORTIZ-BAEZ *et al.,* 2019; JESUS *et al.,* 2020).

This work presented some limitations for its development, such as the use of secondary data, conditioned to the quality of the records. A high number of blank data was evidenced, a possible reflection of the absence of the record by the professional.

CONCLUSION

Given this scenario, dengue remains a serious public health problem in Senador Canedo, Goiás, and, therefore, initiatives to address dengue epidemics should increase the awareness of the population so that there is a collective mobilization to combat the mosquito. In addition, it is important to reinforce about the signs and symptoms of the disease, in order to encourage faster access of the population to health services, allowing early diagnosis and treatment of severe forms of dengue.

It is also worth emphasizing the importance of the work of the Agents to Combat Endemic Diseases facing the control and prevention of dengue in the perspective of integration with epidemiological and sanitary surveillance and primary health care.

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