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Factors associated with dengue virus infection: a cross-sectional study of health surveillance data in the municipality of São Mateus (Espírito Santo), from 2016 to 2020

Fatores associados à infeção pelo vírus da dengue: estudo transversal de dados de vigilância em saúde do município de São Mateus (ES), entre os anos de 2016 e 2020

Factores asociados a la infección por el virus del dengue: estudio transversal de datos de vigilancia en salud en la ciudad de Sao Mateus (ES), entre los años 2016 a 2020

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Abstract

Introduction: Dengue is an endemic infectious disease in tropical and subtropical regions. Knowing the factors associated with dengue cases is necessary to organize the health care system and ensure preventive measures and proper clinical management. **Objective:** To analyze the factors associated with dengue virus infection in cases reported to the health surveillance system. **Methods:** This is a cross-sectional study of secondary data on suspected dengue cases reported to the Information System on Diseases of Compulsory Declaration. The sample included individuals with a report of suspected dengue made between January 1, 2016, and December 31, 2020, who lived in São Mateus (Espírito Santo). We calculated the relative and absolute frequencies of the variables and used Poisson regression with robust variance to estimate the prevalence ratio (PR) and 95% confidence intervals (95%CI). **Results:** A total of 4,547 suspected dengue cases were reported, of which 2,438 (53.8%) were confirmed, 844 (27.7%) were confirmed by laboratory criteria, nine presented warning signs, three had severe dengue, 35 required hospitalization, and four died from dengue. The prevalence of dengue was higher in the age group ≥60 years (PR=1.28; 95%CI 1.14–1.45), individuals with five to eight years of schooling (PR=1.47; 95%CI 1.19–1.81), with positive tourniquet test (PR=1.40; 95%CI 1.22–1.60), and diabetes mellitus (PR=4.19; 95%CI 1.91–9.20). **Conclusions:** Dengue was more prevalent among individuals aged 60 years and older, with five to eight years of schooling, diabetes mellitus, positive tourniquet test, and leukopenia. These groups are more likely to develop severe dengue, requiring efforts from health care and surveillance services for their clinical management.

Keywords: Dengue; Dengue virus; Arbovirus infections; Cross-sectional studies; Epidemiology.

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Resumo

Introdução: A dengue é uma doença infecciosa endêmica em regiões tropicais e subtropicais. Para organizar uma rede assistência de saúde e garantir medidas preventivas, manejo clínico adequado, é necessário conhecer os fatores associadas aos casos de dengue. **Objetivo:** Analisar os fatores associados à infecção pelo vírus da dengue de indivíduos notificados no sistema de vigilância em saúde. **Métodos:** Estudo transversal de dados secundários de casos de suspeitos de dengue notificados no Sistema Nacional de Informação de Agravos de Notificação. Foram incluídos os indivíduos notificados com suspeita de dengue com data de notificação entre dia 1º de janeiro de 2016 e 31 de dezembro de 2020 e que residiam em São Mateus (ES). Foram calculadas as frequências relativas e absolutas das variáveis e foi utilizada a regressão de Poisson de variância robusta para calcular a razão de prevalência (RP) e estimar os intervalos de confiança de 95% (IC95%). **Resultados:** Foram notificados 4.547 casos suspeitos de dengue, 2.438 (53,8%) casos foram confirmados, 844 (27,7%) confirmados por critério laboratorial, nove apresentaram sinais de alarme, três foram de dengue grave, 35 necessitaram de internação hospitalar e quatro evoluíram a óbito por dengue. A faixa etária ≥60 anos (RP=1,28; IC95% 1,14–1,45), indivíduos com cinco a oito anos de estudo (RP=1,47; IC95% 1,19–1,81), com prova do laço positiva (RP=1,40; IC95% 1,22–1,60) e diabetes *mellitus* (RP=4,19; IC95% 1,91–9,20) apresentaram maiores prevalências de dengue. **Conclusão:** A prevalência da dengue foi maior no grupo de indivíduos com idade maior e igual a 60 anos, com cinco a oito anos de estudo, com diabetes *mellitus*, que apresentaram prova do laço positiva e leucopenia. Esses grupos apresentam chances maiores de desenvolvimento da dengue grave, sendo necessários esforços dos serviços de assistência e vigilância em saúde em seu manejo clínico.

Palavras-chave: Dengue; Vírus da dengue; Infecções por arbovírus; Estudos transversais; Epidemiologia.

Resumen

Introducción: El dengue es una enfermedad infecciosa endémica en las regiones tropicales y subtropicales. Para organizar una red de atención en salud y asegurar medidas preventivas, manejo clínico adecuado, es necesario conocer los factores asociados a los casos de dengue. **Objetivo:** Analizar los factores asociados a la infección por el virus del dengue en personas notificadas en el sistema de vigilancia en salud. **Métodos:** Estudio transversal de datos secundarios sobre casos sospechosos de dengue notificados en el Sistema Nacional de Información de Enfermedades de Declaración Obligatoria. Se incluyeron personas notificadas con sospecha de dengue con fecha de notificación entre el 1 de enero de 2016 y el 31 de diciembre de 2020 y residentes en Sao Mateus (ES). Se calcularon las frecuencias relativas y absolutas de las variables y se utilizó regresión de Poisson de varianza robusta para calcular la razón de prevalencia (RP) y se estimaron los intervalos de confianza del 95% (IC95%). **Resultados:** Se notificaron 4.547 casos sospechosos de dengue, se confirmaron 2.438 (53,8%), se confirmaron por criterio de laboratorio 844 (27,7%), nueve casos presentaron signos de alarma, tres casos presentaron dengue grave, 35 casos requirieron hospitalización y cuatro fallecieron por dengue. El grupo de edad ≥60 años (RP=1,28 – IC95% 1,14–1,45), con escolaridad de 5 a 8 años (RP=1,47 – IC95% 1,19–1,81), prueba de torniquete positiva (RP=1,40 – IC95% 1,22–1,60) y diabetes mellitus (RP=4,19 – IC95% 1,91–9,20) presentaron mayor prevalencia de dengue. **Conclusión:** la prevalencia de dengue es mayor en el grupo de individuos mayores de 60 años, entre 5 y 8 años de escolaridad, con diabetes mellitus, con vínculo positivo comprobado y leucopenia. Estos grupos son más propensos a desarrollar dengue grave, lo que requiere esfuerzos de los servicios de salud y vigilancia en el manejo clínico de estos individuos.

Palabras clave: Dengue; Virus del dengue; Infecciones por arbovirus; Estudios transversales; Epidemiología.

INTRODUCTION

Dengue is an infectious disease caused by an arbovirus of the *Flaviviridae* family and transmitted by the *Aedes aegypti* vector. This virus infection is endemic in tropical and subtropical regions, where socio-environmental circumstances facilitate its transmission. Estimates indicate that 2.5 to 3 billion people are exposed to the risk of infection.[1,2]

In 2021, Brazil recorded 544,460 confirmed dengue cases, resulting in an incidence of 255.2 cases per 100 thousand inhabitants.[3] Although most dengue cases are mild, they are at risk of worsening and death. In the past year, of the 371 cases of severe dengue reported in Brazil, 240 died.[3] In the state of Espírito Santo, 15,230 cases of the disease were reported, with an incidence of 374.7 cases per 100 thousand inhabitants in 2021.[3]

Dengue transmission involves several factors, including lifestyle and environmental, social, cultural, and economic aspects, as well as the individual's subjectivity, making disease control a challenge for public health.[4,5] Various approaches are recommended to reduce the incidence of dengue, such as vector control, health education, training of health professionals, and structuring of services.[4]

At this point, knowing demographic and clinical factors and comorbidities associated with confirmed dengue cases is necessary to organize the healthcare system and ensure preventive measures, proper clinical management, and rehabilitation for these individuals.[6] This study aimed to analyze the factors associated with dengue virus infection in cases reported to the health surveillance system.

METHODS

This is a cross-sectional study of secondary data on suspected dengue cases reported to the Information System on Diseases of Compulsory Declaration (*Sistema Nacional de Informação de Agravos de Notificação* — Sinan) through the Municipal Health Department of São Mateus (Espírito Santo), from 2016 to 2020.

The state of Espírito Santo is the smallest in the Southeast Region. The municipality of São Mateus is located in the northern coastal region, with an estimated population of 132,642 inhabitants and a population density of 46.62 inhabitants/km².[7]

The sample included individuals with a report of suspected dengue made between January 1, 2016, and December 31, 2020, who lived in São Mateus. We excluded individuals with ignored data on the outcome of dengue confirmation.

The dependent variable of the study was confirmed dengue (dengue, dengue with warning signs, and severe dengue). Dengue was confirmed by positive laboratory tests or clinical-epidemiological criteria for the disease from the National Guide to Health Surveillance.[8] The covariates originated from the report form/investigation of suspected dengue, including the following:

a. Sociodemographic: gender (female; male); age (in years: 0 to 14; 15 to 19; 20 to 29; 30 to 39; 40 to 49; 50 to 59; 60 and older); ethnicity/skin color (white; black; multiracial; others; ignored); years of schooling (illiterate; 1 to 4; 5 to 8; more than 8).
b. Comorbidities: diabetes mellitus (yes; no; ignored); liver diseases (yes; no; ignored); hypertension (yes; no; ignored); autoimmune diseases (yes; no; ignored); hematologic diseases (yes; no; ignored); chronic kidney disease (yes; no; ignored); acid-peptic disease (yes; no; ignored).
c. Clinical signs: fever (yes; no); headache (yes; no); vomiting (yes; no); back pain (yes; no); joint pain (yes; no); petechiae (yes; no); positive tourniquet test (yes; no); myalgia (yes; no); exanthema (yes; no); nausea (yes; no); conjunctivitis (yes; no); severe arthralgia (yes; no); leukopenia (yes; no); retro-orbital pain (yes; no).
d. Hospitalization (yes; no; ignored); case course (cure; death; death from other causes; ignored).

Data were provided by the Epidemiological Surveillance Service of São Mateus and extracted from Sinan Net (2016 to 2019) and e-SUS VS (2020). The two systems were populated by health professionals through the report and investigation of suspected dengue cases.

We calculated relative and absolute frequencies of confirmed dengue cases, dengue with warning signs, and severe dengue. Poisson regression with robust variance was used to estimate the prevalence ratio (PR), and the dependent variable was confirmed dengue (dengue, dengue with warning signs, and severe dengue) compared to ruled-out cases. The initial model — crude analysis — incorporated all variables. Those with a p-value>0.02 were excluded. The final model — adjusted analysis — included the variables with p-value≤0.02. Analysis results were expressed as crude and adjusted PR, and 95% confidence intervals (95%CI) were estimated. All analyses were performed in the Stata software, v. 14.0 (StataCorp, College Station, TX, USA).

The study project was submitted to the Research Ethics Committee of Centro Universitário Norte do Espírito Santo at Universidade Federal do Espírito Santo and approved under Opinion no. 4,387,360.

RESULTS

Between 2016 and 2020, 4,547 suspected dengue cases were reported, of which 18 were excluded because the outcome information was ignored, 2,438 (53.8%) were confirmed for dengue, 12 (0.3%) for dengue with warning signs and severe dengue, and 2,079 (45.9%) were ruled out (Figure 1).

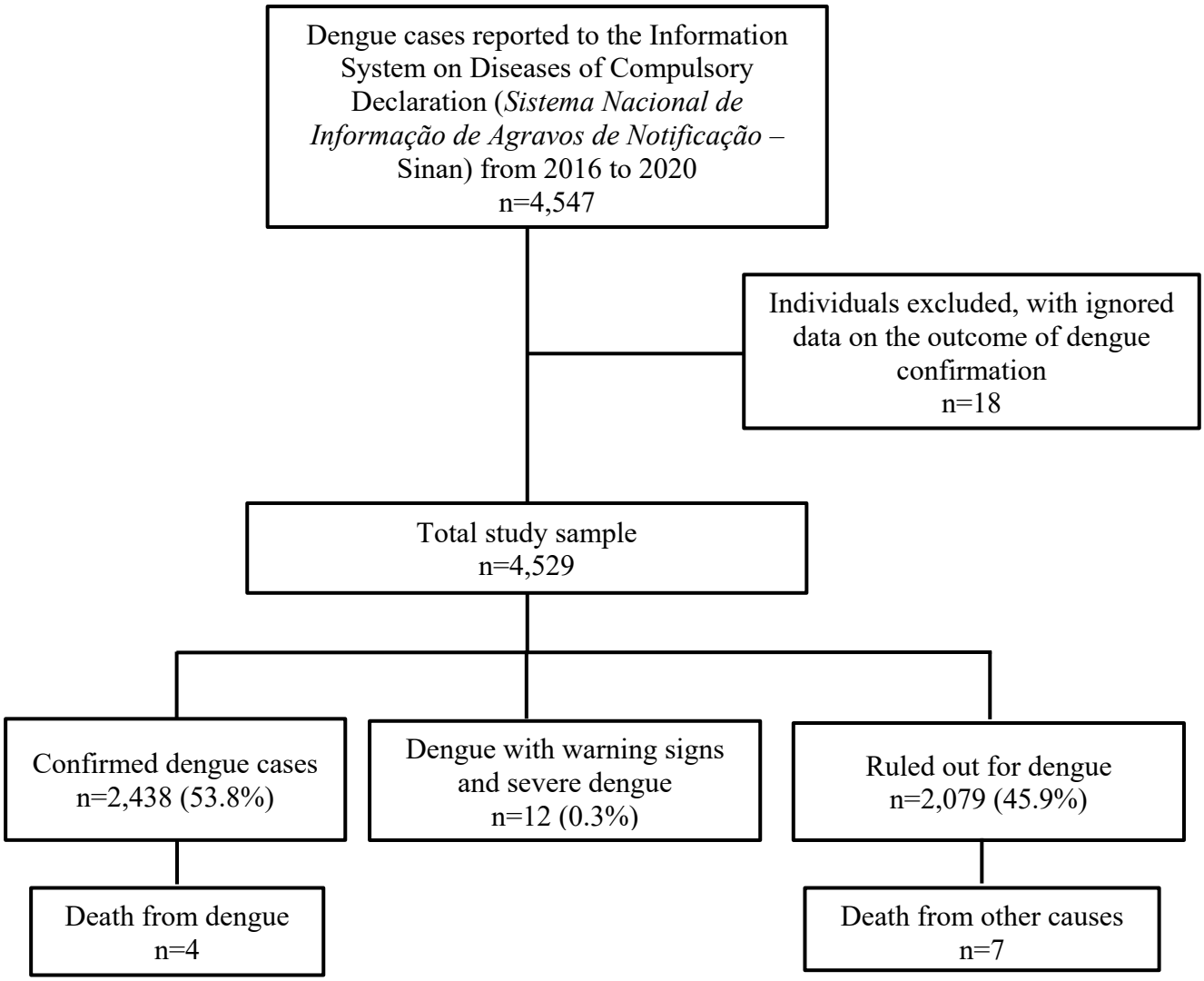

Figure 1. Process of inclusion in the study of suspected and confirmed cases of dengue virus infection in the municipality of São Mateus (Espírito Santo), from 2016 to 2020.

Among those with confirmed dengue, 844 (27.7%) were confirmed by laboratory criteria, and 35 required hospitalization. The most frequent sociodemographic characteristics were: female gender (1,391; 56.7%), age group 60 years and older (318; 60.4%), multiracial individuals (1,486; 52.0%), five to eight years schooling (1,584; 56.4%), and over 8 years of schooling (632; 52.2%). The main signs and symptoms were: fever (1,924; 55.3%), positive tourniquet test (1,988; 55.3%), exanthema (906; 62.7%), and leukopenia (1,361; 62.9%) (Tables 1 and 2).

Table 1. Distribution of sociodemographic characteristics and comorbidities of individuals with dengue, severe dengue, and warning signs and of ruled-out cases of dengue virus infection in the municipality of São Mateus (Espírito Santo), Brazil, from 2016 to 2020 (n=4,529).

Variable	Confirmed dengue cases	Dengue with warning signs and severe dengue	Ruled out
	n (%)	n (%)	n (%)
Gender			
Female	1,391 (56.71)	8 (0.33)	1,054 (42.97)
Male	1,047 (50.84)	4 (0.19)	1,024 (49.35)
Age group			
0–14	279 (44.43)	-	349 (55.57)
15–19	253 (50.70)	1 (0.20)	245 (49.10)
20–29	426 (52.92)	3 (0.37)	376 (46.71)
30–39	440 (56.19)	-	343 (43.81)
40–49	396 (54.92)	-	325 (45.08)
50–59	326 (57.50)	1 (0.18)	240 (42.33)
≥60	318 (60.46)	7 (1.33)	201 (38.21)
Ethnicity/skin color			
White	666 (59.41)	5 (0.45)	450 (40.14)
Black	248 (52.99)	-	220 (47.01)
Multiracial	1,486 (52.05)	7 (0.25)	1,362 (47.71)
Other	38 (44.71)	-	57 (55.29)
Schooling			
Illiterate	70 (32.11)	-	148 (67.86)
1–4 years	133 (49.81)	2 (0.75)	132 (49.44)
5–8 years	1,584 (56.47)	6 (0.21)	1,215 (43.32)
>8 years	632 (52.23)	4 (0.33)	574 (47.44)
Diabetes mellitus			
Yes	93 (91.18)	2 (1.96)	7 (6.86)
No	2,122 (53.32)	10 (0.27)	1,847 (46.41)
Liver diseases			
Yes	92 (56.10)	4 (2.44)	68 (41.46)
No	2,030 (53.09)	8 (0.21)	1,786 (46.71)
Hypertension			
Yes	4 (30.77)	-	9 (69.23)
No	2,118 (53.28)	12 (0.30)	1,845 (46.42)
Autoimmune diseases			
Yes	2 (33.33)	-	4 (66.67)
No	2,120 (53.24)	12 (0.30)	1,850 (46.46)
Hematologic diseases			
Yes	1 (14.29)	-	6 (85.71)
No	2,121 (53.28)	12 (0.30)	1,848 (46.42)
Chronic kidney disease			
Yes	6 (54.55)	-	5 (45.45)
No	2,116 (53.21)	12 (0.30)	1,849 (46.49)
Acid-peptic disease			
Yes	6 (54.55)	-	5 (45.45)
No	2,116 (53.21)	12 (0.30)	1,849 (46.49)

Table 2. Distribution of clinical signs of individuals with dengue, severe dengue, and warning signs and of ruled-out cases of dengue virus infection in the municipality of São Mateus (Espírito Santo), Brazil, from 2016 to 2020 (n=4,529).

Variable	Confirmed dengue cases	Dengue with warning signs and severe dengue	Ruled out
	n (%)	n (%)	n (%)
Fever			
Yes	1,924 (55.35)	11 (0.32)	1,541 (44.33)
No	198 (38.67)	1 (0.20)	313 (61.13)
Headache			
Yes	183 (46.33)	4 (1.01)	208 (52.66)
No	1,939 (53.97)	8 (0.22)	1,646 (45.81)
Vomiting			
Yes	267 (54.05)	4 (0.81)	223 (45.14)
No	1,855 (53.09)	8 (0.23)	1,631 (46.68)
Back pain			
Yes	461 (32.80)	2 (0.29)	226 (32.88)
No	1,661 (50.35)	10 (0.30)	1,628 (49.35)
Arthritis			
Yes	145 (77.54)	4 (2.14)	38 (20.32)
No	1,977 (52.01)	8 (0.21)	1,816 (47.78)
Petechiae			
Yes	103 (88.79)	-	13 (11.21)
No	2,019 (52.14)	12 (0.31)	1,841 (47.55)
Positive tourniquet test			
Yes	1,988 (55.36)	12 (0.33)	1,591 (44.31)
No	134 (33.75)	-	263 (66.25)
Myalgia			
Yes	302 (79.89)	2 (0.53)	74 (19.58)
No	1,820 (50.42)	10 (0.28)	1,780 (49.31)
Exanthema			
Yes	906 (62.79)	8 (0.55)	529 (36.66)
No	1,216 (47.78)	4 (0.16)	1,325 (52.06)
Nausea			
Yes	27 (57.45)	-	20 (42.55)
No	2,095 (53.16)	12 (0.30)	1,834 (46.54)
Conjunctivitis			
Yes	240 (57.14)	5 (1.19)	175 (41.67)
No	1,882 (52.75)	7 (0.20)	1,679 (47.06)
Severe arthralgia			
Yes	156 (62.15)	6 (2.39)	89 (35.46)
No	1,966 (52.61)	6 (0.16)	1,765 (47.23)
Leukopenia			
Yes	1,361 (62.98)	7 (0.32)	793 (36.70)
No	761 (41.65)	5 (0.27)	1,061 (58.07)
Retro-orbital pain (n=5,191)			
Yes	32 (47.76)	1 (1.49)	34 (50.75)
No	2,090 (53.30)	11 (0.28)	1,820 (46.42)

Among the cases with warning signs and severe dengue, nine had warning signs and three had severe forms of the disease. Seven individuals died from other causes and four from dengue. The most frequent sociodemographic and clinical characteristics were: female gender (eight cases), age group 60 years and older (seven cases), multiracial individuals (seven cases), liver disease (four cases), fever (11 cases), exanthema (eight cases), severe arthralgia (six cases), and leukopenia (seven cases) (Tables 1 and 2).

The adjusted model revealed that dengue was more prevalent among the age group ≥60 years (PR=1.28; 95%CI 1.14–1.45), those with five to eight years of schooling (PR=1.47; 95%CI 1.19–1.81), who had fever (PR=1.14; 95%CI 1.02–1.28), joint pain (PR=1.24; 95%CI 1.11–1.39), petechiae (PR=1.19; 95%CI 1.07–1.34), positive tourniquet test (PR=1.40; 95%CI 1.22–1.60), myalgia (PR=1.36; 95%CI 1.27–1.46), leukopenia (PR=1.34; 95%CI 1.25–1.43), and diabetes mellitus as a comorbidity (PR=4.19; 95%CI 1.91–9.20). Males (PR=0.93; 95%CI 0.88–0.98) and multiracial individuals (PR=0.88; 95%CI 0.83–0.94) presented the lowest prevalence of dengue (Table 3).

Table 3. Crude and adjusted prevalence ratios (PR) and the respective 95% confidence intervals (95%CI) of sociodemographic characteristics, comorbidities, and clinical signs associated with dengue in the municipality of São Mateus (Espírito Santo), Brazil, from 2016 to 2020 (n=4,529).

Variable	Crude prevalence ratio	Adjusted prevalence ratio
	PR (95%CI)	PR (95%CI)
Gender		
Female	Reference	Reference
Male	0.88 (0.84–0.93)	0.93 (0.88–0.98)
Age group		
0–14	Reference	Reference
15–19	1.14 (1.01–1.29)	1.08 (0.94–1.23)
20–29	1.19 (1.07–1.33)	1.1 (0.97–1.24)
30–39	1.26 (1.12–1.40)	1.17 (1.04–1.32)
40–49	1.23 (1.10–1.37)	1.14 (1.01–1.29)
50–59	1.29 (1.16–1.55)	1.16 (1.02–1.32)
≥60	1.39 (1.24–1.55)	1.28 (1.14–1.45)
Ethnicity/skin color		
White	Reference	Reference
Black	0.88 (0.80–0.97)	0.94 (0.85–1.04)
Multiracial	0.88 (0.82–0.92)	0.88 (0.83–0.94)
Other	0.74 (0.58–0.95)	0.73 (0.58–0.91)
Schooling		
Illiterate	Reference	Reference
1–4 years	1.57 (1.25–1.97)	1.36 (1.08–1.73)
5–8 years	1.76 (1.45–2.14)	1.47 (1.19–1.81)
>8 years	1.63 (1.33–2.00)	1.35 (1.09–1.68)
Fever		
No	Reference	Reference
Yes	1.43 (1.27–1.60)	1.14 (1.02–1.28)

Continue...

Table 3. Continuation.

Variable	Crude prevalence ratio	Adjusted prevalence ratio
	PR (95%CI)	PR (95%CI)
Back pain		
No	Reference	Reference
Yes	1.32 (1.24–1.41)	1.05 (0.98–1.12)
Arthritis		
No	Reference	Reference
Yes	1.52 (1.41–1.65)	1.24 (1.11–1.39)
Petechiae		
No	Reference	Reference
Yes	1.69 (1.57–1.81)	1.19 (1.07–1.34)
Positive tourniquet test		
No		Reference
Yes	1.65 (1.43–1.89)	1.4 (1.22–1.60)
Myalgia		
No	Reference	Reference
Yes	1.58 (1.49–1.68)	1.36 (1.27–1.46)
Exanthema		
No	Reference	Reference
Yes	1.32 (1.24–1.39)	1.01 (1.04–1.17)
Conjunctivitis		
No	Reference	-
Yes	1.01 (1.00–1.20)	-
Severe arthralgia		
No	Reference	Reference
Yes	1.22 (1.11–1.34)	0.97 (0.88–1.08)
Leukopenia		
No	Reference	Reference
Yes	1.5 (1.41–1.60)	1.34 (1.25–1.43)
Diabetes mellitus		
No	Reference	Reference
Yes	1.60 (1.64–3.36)	4.19 (1.91–9.20)
Liver diseases		
No	Reference	-
Yes	1.09 (0.96–1.25)	-
Hematologic diseases		
No	Reference	-
Yes	0.26 (0.04–1.63)	-

DISCUSSION

The study describes a higher prevalence of dengue among individuals aged 60 years and older, with five to eight years of schooling, and who have diabetes mellitus. Fever, myalgia, positive tourniquet test,

joint pain, leukopenia, and petechiae are the most frequent clinical signs and symptoms of the disease, especially in cases of dengue with warning signs and severe dengue. The prevalence of dengue with warning signs and severe dengue was low. Brazil has a prevalence of 0.8% in this group.[9,10]

In Brazil, most dengue cases are confirmed by clinical-epidemiological criteria, with a low confirmation by laboratory criteria, which is similar to our findings.[3] Despite the low complexity of serological tests for dengue, the need for timely collection and the individual's clinical improvement contribute to the low collection of specific diagnostic tests.[9]

Individuals aged 30 years and older presented the highest prevalence of dengue, while older adults (aged ≥60 years) had the highest concentration of confirmed cases. A cross-sectional study conducted in Brazil between 2010 and 2019 analyzed dengue cases reported to Sinan, finding similar results as to the prevalence of dengue cases in individuals aged 30 years and older.[10] The older adult population has a weakened immune system, requiring effective clinical follow-up measures. The higher number of dengue cases in older adults increases the likelihood of severe disease since older age is a risk factor for dengue complications.[11,12]

Schooling was a significant factor in the study. The educational level of Brazilians is related to the ease of access to health services. A population-based study performed in Brazil in 2013 showed that the higher the educational level of the individual, the better the access to health services.[13] Thus, the greater access of this group to dengue diagnostic tests may have influenced the prevalence of the disease.

The limited access to education in Brazil is strongly related to poverty, which in turn may be associated with dengue infection.[14] A systematic review published in 2015, which analyzed various social and economic conditions of poverty, found no solid association between regular income and dengue rates.[15] In this context, a scoping review published in 2018 discussed containment measures for vector-borne infectious diseases, recommending poverty-related actions, such as access to sanitation, proper housing, health services, and environmental education.[16]

Among clinical signs, a positive tourniquet test and leukopenia were significant factors in the study. The hemodynamic assessment of dengue is necessary since some of its main complications are hemorrhage and distributive shock.[17] Blood count evaluation is essential in this scenario, as it helps in the clinical management of the disease and in the detection of hemoconcentration and thrombocytopenia.[18]

A systematic review carried out in 2021 showed that 68.5 to 82% of individuals diagnosed with severe dengue had blood count abnormalities, with leukopenia and/or thrombocytopenia.[18] Regarding the tourniquet test, systematic reviews with meta-analysis revealed that the method has low sensitivity and specificity for dengue diagnosis and no significant difference in the definition of severe and hemorrhagic cases.[19,20] Nonetheless, the World Health Organization and the Ministry of Health recommend the practice, which is highly widespread in Brazilian health services, for dengue classification.[21]

In this study, individuals with diabetes mellitus presented a higher prevalence of dengue than non-diabetic individuals. Diabetic individuals infected by the virus are more likely to develop severe dengue due to their weakened immune response, requiring different clinical management.[22,23] Although only diabetes mellitus showed statistical significance in this study, individuals with other comorbidities, such as cardiovascular disease, hypertension, obesity, chronic respiratory diseases, and chronic kidney disease, are also more likely to develop severe dengue and require an appropriate clinical approach.[12,24]

As a limitation, we can mention that the information from Sinan and e-SUS VS is provided by several health services, and even though the filling recommendations are widely disseminated by the Ministry of Health, we cannot rule out the possibility of a classification different from the actual situation of the

individual. Blank and/or incomplete fields in the report form and potential filling errors may have influenced the data characterizing the epidemiological and clinical dengue profile. However, a national study analyzing the completeness of report forms of suspected dengue in Sinan classified them as good, justifying the use of this database for health research.[9]

We conclude that the prevalence of dengue was higher in individuals aged 60 years and older, with five to eight years of schooling, diabetes mellitus, positive tourniquet test, and leukopenia. These groups are more likely to develop severe dengue, requiring efforts from health care and surveillance services for their clinical management.

CONFLICT OF INTERESTS

Nothing to declare.

AUTHORS' CONTRIBUTIONS

JPC: Project administration, Formal analysis, Conceptualization, Data curation, Writing – original draft, Writing – review & editing, Methodology, Validation. TSF: Conceptualization, Data curation, Writing – original draft, Writing – review & editing, Methodology, Validation. DRL: Conceptualization, Data curation, Writing – original draft, Writing – review & editing, Methodology, Validation. HSG: Conceptualization, Data curation, Writing – original draft, Writing – review & editing, Methodology, Validation. CCDB: Project administration, Conceptualization, Data curation, Writing – original draft, Writing – review & editing, Methodology, Validation.

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