Cogitare Enfermagem

ORIGINAL ARTICLE

CLINICAL-EPIDEMIOLOGICAL PROFILE OF DENGUE IN THE MUNICIPALITY OF ANÁPOLIS - GOIÁS FROM 2016 TO 2020

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ABSTRACT

Objective: to describe the clinical epidemiological profile of dengue in Anápolis, Goiás - BR between the years 2016 to 2020. Methods: descriptive study of a quantitative nature. Data from the dengue notification form registered in the Epidemiological Surveillance Department were used. Chi-square test was used with significance level five (5%) ($p<0.05$). Results: 27,544 cases were notified with the peak in 2019, being 54.2% female, age group 25 to 44 years 36.7% and brown color 70.3%. Of the cases that occurred, 97.7% were not hospitalized, classic dengue predominated in 98% and cure was obtained in 99.9% of cases. There was a significant difference regarding age group and dengue classification, hospitalization, and clinical evolution ($p= 0.001$). Conclusion: It is evident that dengue is prevalent in Anápolis, and strategies of prevention and control of the vector are necessary, especially during seasonal periods.

DESCRIPTORS: Dengue; Epidemiology; Serologic Tests; Aedes; Arboviruses.

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INTRODUCTION

Dengue is a non-contagious, systemic, infectious viral disease transmitted by the *Aedes aegypti* mosquito, which may progress to remission of symptoms or worsen, requiring constant reevaluation and observation[1]. It is caused by an arbovirus of the genus *flavivirus*, family *Flaviviridae*, and is the most prevalent arthropod-borne urban arboviruses in the world, with the dengue virus (DENV) as the etiologic agent, with four distinct serotypes, called DENV-1 to DENV-4[2]. Infection with any of the four serotypes can result in various clinical outcomes, such as febrile illness; febrile dengue fever; hemorrhagic fever; and dengue shock syndrome (DSS)[3].

In the Americas, Brazil is the leader in reported cases with about 40% of total infections. In 2020, until the Epidemiological Week (SE), 557,750 probable cases were reported in the country, and the region with the highest incidence is the Midwest with 632.7 cases/100,000 inhabitants4. According to Epidemiological Bulletin No. 2 of 2016, which shows the monitoring of cases in 2015, Goiás stood out as the state with the highest number of cases in the region with 2,466,4 cases/100,000 inhabitants[5]. In the 2020 Epidemiological Bulletin, Goiás showed an incidence of 405.7 cases per 100,000 inhabitants[4].

Dengue is a global concern, and due to the increase in the number and severity of cases not only in Brazil but also worldwide there is a need to conduct investigations to identify patterns of occurrence in cities[6-7]. It is a compulsorily notifiable disease in Brazil, and data are reported in the Sistema de Informação de Agravos de Notificação (SINAN)[8]. Dengue is a serious public health problem, being responsible for deaths and hospitalizations annually worldwide, which stimulates the need to develop an effective vaccine to prevent infection by all serotypes. Some countries are already engaged in developing a low-cost tetravalent vaccine[9].

Through vaccination, it is possible to effectively combat the disease. There are several vaccines against dengue in experimental stages; Sanofi's *Dengvaxia* vaccine was the first to prove effective and to reach the market in several countries, including Brazil[9]. The vaccine, however, is expensive and there is little knowledge regarding its large-scale use. Moreover, according to the parameters established by the Ministry of Health's National Immunization Program (PNI), the efficacy of this vaccine is considered low.

Therefore, the implementation of this vaccine in the country's national vaccination schedule is currently unfeasible[10].

Dengue virus infection can occur in an asymptomatic or symptomatic form. In the presence of symptoms, it can evolve to a systemic disease with a broad clinical spectrum of non-severe to severe clinical manifestations[11]. The clinical presentation can range from mild fever to classic dengue with hemorrhage and/or shock, and there are three identifiable phases: febrile, critical, and recovery. The febrile phase is described as high fever of rapid onset, lasting about two to seven days, and is characterized by myalgia, headache, retro-orbital eye pain, and skin erythema with facial flushing[12]. In cases in which the patient enters the critical phase, besides fever and thrombocytopenia, mucosal hemorrhage, hematemesis, and may evolve to a clinically relevant picture of capillary extravasation and hypotension are observed[11].

Severe cases are characterized by bleeding, organ dysfunction, or severe plasma extravasation. Shock occurs when a critical volume of plasma is lost and is usually preceded by the alarm signs, such as intense and continuous abdominal pain, persistent vomiting, postural hypotension and/or lipothymia, progressive increase in hematocrit, among others[8]. After patients pass through the critical period of 24-48 hours, recovery from the disease can be observed. The reabsorption of extravascular fluids occurs and, along with this, an improvement in the general clinical picture[12-13].

The present research is justified by the need to provide updated results through this study to the current social and economic scenario regarding public health, since dengue is considered the fastest growing vector-borne disease in the world. In Brazil, the disease has become endemic, interspersed with periods of epidemics associated with the introduction of new serotypes[14].

Given the impact of dengue on health and the increase in the number of cases, it is important to know the clinical and epidemiological reality of the disease so that prevention and control actions can be adopted. Given this issue, the present study aimed to describe the clinical epidemiological profile of dengue in Anápolis, Goiás - BR between the years 2016 to 2020.

METHOD

This is an epidemiological, descriptive, cross-sectional, retrospective study. Information provided by the Department of Epidemiological Surveillance of the Municipal Health Secretariat on dengue, recorded in the database of the Information System for Notifiable Diseases (*Sistema de Informação de Agravos de Notificações*- SINAN) in the period from January 2016 to December 2020, was analyzed. The study was conducted in the municipality of Anápolis - GO, which is located 53 km from the capital Goiânia and 139 km from the federal capital. Together, these two cities make the axis Goiânia-Anápolis-Brasília, the most developed region of the Midwest.

According to the last census conducted in Anápolis by the (*Instituto Brasileiro de Geografia e Estatística IBGE)* Brazilian Institute of Geography and Statistics (IBGE) of 2010, the population consists of 334,613 inhabitants. The study population includes all people enrolled in SINAN, linked to the Department of Epidemiology of the Municipal Health Department of Anápolis in the period from January 2016 to December 2020.

The inclusion criteria are patients diagnosed with dengue, of both genders, who were notified in SINAN in the city of Anápolis-Goiás in the period from 2016 to 2020, and the exclusion criteria are data from duplicate notification forms.

The sociodemographic characteristics evaluated were gender, age group, and ethnicity. The clinical and epidemiological variables were hospitalization, classification into classic dengue, dengue with alarm signs, and severe dengue. And, the groups were analyzed considering the evolution (death by grievance, other causes, put under investigation and by the groups that had cure as prognosis) described in SINAN, this variable being considered as the outcome of the disease.

The results were described as frequencies and percentages and represented by tables. To verify the association between categorical variables, Pearson's chi-square test was used, with $p<0.05$ as the significance criterion in all analyses; data were analyzed using the StatisticalPackage for the Social Science (SPSS) version 16.0 software.

The present study was approved by the Research Ethics Committee- UniEVANGÉLICA opinion number 4.666.940 following Resolution 466/2012 of the National Health Council (CNS) which provides for research with human beings.

RESULTS

According to the data obtained from the dengue notification forms of the Department of Epidemiological Surveillance of the Municipal Health Department of Anapolis, in the

period from January 2016 to December 2020, assistance was offered to 27,544 cases. In the year 2016, 8,256 cases were notified, in 2017 there were 1,110 cases, followed by 2,162 cases in the year 2018, beginning a rise in cases in 2019 with 11,291 occurrences, and in 2020 a decrease with 4,725 new cases (Figure 1).

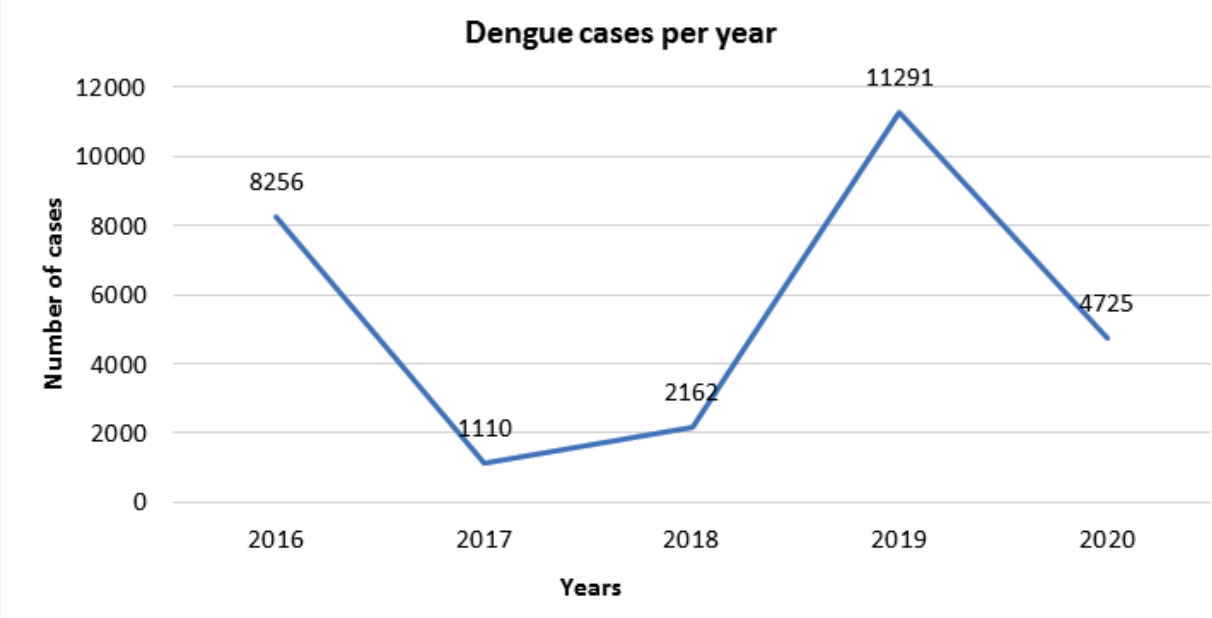

Figure 1 - Number of cases with dengue in relation to the years 2016 to 2020 in the municipality of Anápolis. Anápolis-GO, Brazil, 2020

SOURCE: Schults, et al., 2022.

Of the total subjects analyzed in this series, 14,939 (54.2%) were female and 12,605 (45.8%) were male, a female to male ratio of 1.18:1. Regarding the age range, the most prevalent was from 25 to 44 years with 10,101 (36.7%) of the cases, followed by the age range from 11 to 24 years with 7,269 (26.4%). As for ethnicity, 19,352 (70.3%) are brown, followed by 6,933 (25.2%) are white (Table 1).

Table 1: Distribution of reported cases of dengue according to sex and age group in the years 2016 to 2020 in Anápolis. Anápolis-GO, Brazil, 2021

VARIABLES	n	(%)
GENDER		
Male	12,605	45.8
Female	14,939	54.2
AGE GROUP		
0 – 10	1,886	6.8
11 – 24	7,269	26.4
25 – 44	10,101	36.7
45 – 59	5,357	19.4
Over 60	2,931	10.7
ETHNICITY		

White	6,933	25.2
Black	556	2
Yellow	154	0.5
Brown	19,352	70.3
Indigenous	15	0.1
Not Informed	534	1.9

SOURCE: Schults, *et al.*, 2022.

Regarding hospitalization, it can be observed that 26,924 (97.7%) were not hospitalized, having statistical relevance among the years studied (p= 0.001). Of the values found, regarding final classification, 27,009 (98%) had classical dengue between the years referred in the studies (p= 0.01). Regarding evolution, 27,519 (99.9%) of the cases achieved cure (p= 0.693) as shown in Table 2.

Table 2 - Distribution of dengue cases according to hospitalization, classification and clinical evolution between the years 2016 to 2020, in Anápolis.Anápolis GO, Brazil, 2021

VARIABLES	**N**	**%**	**p**
HOSPITALIZATION			
No	26,924	97.7	
Yes	600	2.2	0.001
Ignored	20	0.1	
CLASSIFICATION			
Classic Dengue	27,009	98	
Dengue with alarm signs	513	1.9	0.01
Severe dengue	22	0.1	
EVOLUTION			
Cure	27,519	99.9	
Death from the grievance	16	0.06	0.693
Death by other causes	2	0.09	
Unknown	7	0.03	

SOURCE: Schults, *et al.*, 2022.

Regarding the final classification of cases in relation to age group, it was evident that 9,930(36.7%) of the cases developed classic dengue fever among the age group of 25 to 44 years; as for dengue with alarm signs, 15 (30.6%) cases were among the age group of 25

to 44 years; and dengue with severe signs, 6 (27.3%) cases were above 60 years, showing significant difference among cases (p=0.001) (Table 3).

Table 3 - Notified dengue cases according to age group classification from 2016 to 2020 in Anápolis. Anápolis-GO, Brazil, 2021

	CLASSIFICATION			p
Age Group	**n (%)**	**n (%)**	**n (%)**	
	Classic Dengue	Dengue with alarm signs	Dengue with severe alarms	
0 – 10	1,866 (6.9)	16 (3.1)	4 (18.2)	0.001
11 – 24	7,179 (26.6)	88 (17.1)	2 (9.1)	
25 – 44	9,939 (36.7)	157 (30.6)	5 (22.7)	
45 – 59	5,227(19.4)	125 (24.4)	5 (22.7)	
Over 60	2,798 (10.4)	127 (24.8)	6 (27.3)	

SOURCE: Schults, *et al.*, 2022.

As for hospitalization, 175 (29.2%) of the cases in the 25 to 44 age group required hospitalization, 9,918 (36.8%) did not require hospitalization, and eight (40%) cases were ignored. In contrast to these results, in the 11 to 24 age group, 107 (17.8%) cases required hospitalization, 7,157 (26.6%) cases did not require hospitalization, and 5(25%) cases were ignored, showing a significant difference between cases (*p*=0.001) (Table 4).

Table 4 - Notified dengue cases according to hospitalization in relation to age group from 2016 to 2020 in Anápolis.Anápolis GO, Brazil, 2021

	HOSPITALIZATION			p
Age Group	**n (%)**	**n (%)**	**n (%)**	
	Yes	No	Ignored	
0 – 10	27 (4.5)	1856 (6.9)	3 (15)	0.001
11 – 24	107 (17.8)	7157 (26.6)	5 (25)	
25 – 44	175 (29.2)	9918 (36.8)	8 (40)	
45 -59	150 (25.0)	5204 (19.3)	3 (15)	
Over 60	141 (23.5)	2789 (10.4)	1 (5)	

SOURCE : Schults, *et al.*, 2022.

In relation to cure and age group, it was evident that 10,094 (36.7%) were in the 25 to 44 age group, and, in relation to death by disease, the group above 60 years old was the one with the highest number, seven (43.8%) cases. Regarding the criterion of death by other causes, the age groups 45 to 59 years and over 60 years presented 1 (50%) case each. Ignored cases from 25 to 44 years of age had 5 (71.4%), showing a significant difference between cases (p=0.001) (Table 5).

Tabela 5 - Casos notificados de dengue de acordo com a evolução clínica em relação à faixa etária de 2016 a 2020 em Anápolis. Anápolis-GO, Brasil, 2021

	EVOLUTION				p
Age Group	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
	Cure	Death by grievance	Death from other causes	Ignored	
0 to 10	1,884 (6.8)	1 (6.2)	0 (0)	1 (14.3)	0.001
11 to24	7,268 (26.4)	1 (6.2)	0 (0)	0 (0)	
25 to 44	10,094 (36.7)	2 (12.5)	0 (0)	5 (71.4)	
45 to 59	5,351 (19.5)	5 (31.3)	1 (50.0)	0 (0)	
Over 60	2,922 (10.6)	7 (43.8)	1 (50.0)	1 (14.3)	

SOURCE : Schults, *et al.*, 2022.

DISCUSSION

The temporal pattern of the numbers of dengue cases in the municipality of Anápolis-GO during the period studied was like the national pattern with an increase in the number of cases in 2016, followed by a decrease in notifications in 2017. The slight increase in 2018 proved discrepant, because on a national scale there was a decrease in records, but the Midwest region had the highest incidence rate[15].

In 2019, a worrying increase was obtained in the country and in the municipality, where the national increase was six times more in the municipality of Anápolis- GO - BR that recorded an increase of more than four times compared to the same period of the previous year. That year, the state of Goiás ranked second among the states with the highest number of notifications[8].

This significant increase in the number of dengue cases can be explained by the re-emergence of serotype two in the country. Serotype one was predominant in the country; however, the population became less and less susceptible, reducing the number of reported cases. Serotype two then re-emerged, causing a new increase in dengue cases. This phenomenon occurs worldwide; one serotype ends up being replaced by another for epidemiological reasons, when there are not enough susceptible people to maintain its circulation[16]. Another important point that can justify this difference is that increases occur cyclically in diseases such as dengue due to the likely decrease in vector control actions and population education[17].

The progressive increase in cases that began in 2017 was interrupted by a decrease in the year 2020. This may be attributed to the context of the pandemic of the new coronavirus, causing COVID-19, since the population takes more care aiming to contain the spread of

the virus and has therefore the control of vectors[18]. Another hypothesis is that due to the pandemic, dengue was underreported[19]. This is due to the intensified efforts in combating COVID-19, resulting in an underreporting of the actual number of dengue cases this year.

One of the variables analyzed in this study was the relationship between the number of cases and gender, resulting in a higher number of women reported with dengue. The greater involvement of women may be related to the influence of the home environment[20], since it is a place where the transmission of this disease occurs significantly, making them more susceptible to infection. Another aspect that justifies the higher number of reported cases in females is due to the greater demand for medical care by women, resulting in higher number of diagnoses and notifications[21].

On the other hand, the lower number of cases in males may also be due to not seeking medical care[22], which results in a decrease in reported cases in men. Women, in their majority, have access to health policies that encourage them to seek medical care to the detriment of men[23], which can cause a bias in the comparisons between the rates found[21].

Regarding age, the high incidence of dengue in the years analyzed brings an important negative impact to society, because it affected mainly the age group component of the population economically[21]. Among the notifications, 10,101 of the dengue cases are in the age group 25 to 44 years, which impacts productivity and generates economic burden for the health system and for families.

As for the characteristics of race/ethnicity, it was found in this study that the highest percentage of patients was brown[24], followed, respectively, by white, black, and yellow. In contrast, it was observed that the white ethnicity would be associated with increased occurrence of the severe form of the disease[25]. Therefore, the importance of the variable ethnicity should be highlighted, as it is a factor that favors the understanding of social inequalities and needs regarding the planning of public policies aimed at specific groups[26].

Regarding hospitalization, most of the study population did not require hospital admission. The result found can be correlated to the fact that most of the sample did not progress to forms of dengue with alarm signs or severe dengue. These data corroborate the findings of similar studies[25,27].

Regarding clinical evolution, it was found that most cases of dengue fever were cured in all age groups analyzed, despite the percentage of deaths. This result was compatible with a study carried out in the state of Tocantins, although a higher percentage of deaths was observed[28]. The result emphasizes the importance of health professionals knowing about the disease so that the diagnosis and treatment can be carried out immediately[29]. Joint actions by society and the government are the most effective measures to control the disease[30].

This study has certain limitations, such as the use of secondary data, since they are conditioned to the quality of the records, besides not allowing estimating how much the frequency of underreporting can distort the results found. However, the databases used, even with their limitations, are considered reliable and of good quality with production of reliable information, and the large amount of data brings relevance to the results.

These intense variations during the years described above reaffirm the need for concrete actions aimed at combating dengue, and preventive measures aimed at epidemiological control and surveillance, relying on the population's participation, made aware by educational actions coming from primary care.

CONCLUSION

Based on the results it can be concluded that the highest incidence of dengue fever occurred in women, brown in the age group between 25 and 44 years. There was a large variation between the years analyzed, with 2017 and 2018 recording the lowest numbers followed by a significant increase in 2019 and subsequent decrease in 2020. Regarding the clinical aspects, most of the patients analyzed developed classic dengue without alarm signs or severity and achieved cure without the need for hospitalization. It was also evidenced that as age increases, there is a concomitant increase in the chances of worsening of dengue.

Moreover, the lack of filling out some information in the notification forms, such as clinical evolution and hospitalization, reaffirms the need to prepare professionals for the notification of cases and a greater training of health professionals, since this data interferes directly in the areas of teaching and research in Brazil, among others, and can compromise both the development and improvement of the Brazilian Unified Health System and health care.

This study can contribute to planning public policies to prevent and combat the disease and control the vector with interventions focused on the most vulnerable population and directed mainly to the periods before the seasonality, aiming to reduce contagion. The practice of disease notification is extremely important for improving the provision of health care services and can be used as a specific health indicator by managers and health professionals.

REFERENCES

01. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Departamento de Vigilância das Doenças Transmissíveis. Dengue: diagnóstico e manejo clínico: adulto e criança. [Internet]. Brasília: Ministério da Saúde; 2016 [acesso em 10 ago 2020]. Disponível em: https://bvsms.saude.gov.br/bvs/publicacoes/dengue_diagnostico_manejo_clinico_adulto.pdf.

02. Biassoti AV, Ortiz MAL. Diagnóstico laboratorial da dengue. Rev UNINGÁ Review. [Internet]. 2017 [acesso em 10 ago 2020]; 29(1):122-6. Disponível em: http://revista.uninga.br/index.php/uningareviews/article/view/1921/1518.

03. Oliveira LFRJ de, Silva GAM, Bueno R de S, Nunes VAP, Silva MM da, Graciano AR. Avaliação da expressão de marcadores imunológicos na febre hemorrágica da dengue. Rev. Pesqui. Saúde.[Internet]. 2017 [acesso em 12 ago 2020]; 18(2): 76-80. Disponível em: http://www.periodicoseletronicos.ufma.br/index.php/revistahuufma/article/view/8379.

04. Ministério da Saúde (BR). Sistema de Informação de Agravos de Notificação. Ficha de notificação/investigação da Dengue e Chikungunya. [Internet]. Brasília: Ministério da Saúde; 2016 [Acesso em 05 de out 2020]. Disponível em: http://portalsinan.saude.gov.br/sinan-dengue-chikungunya.

05. Guedes DA de MO, Rocha BAM da. Perfil epidemiológico dos casos de dengue notificados em Ceres-Goiás, de 2014 a 2015. Rev. Epidemiol. [Internet]. 2019 [acesso em 20 set 2020]; 9(2):161-6. Disponível em: https://doi.org/10.17058/reci.v9i2.11396.

06. Silva EL da, Almeida BA, Santos-Barbosa CN, Neves SC das, Correa WA, Pesarini JR, *et al*. Prevenção da dengue: experiências escolares. PECIBES. [Internet]. 2017 [acesso em 20 set 2020]; 3(2): 66-73. Disponível em: https://periodicos.ufms.br/index.php/pecibes/article/view/5264.

07. Ferreira AC, Chiaravalloti Neto F, Mondini A. Dengue em Araraquara, SP: epidemiologia, clima e infestação por Aedes aegypti. Rev. Saúde Públ. [Internet]. 2018 [acesso em 22 set 2020]; 52(18). Disponível em: https://doi.org/10.11606/S1518-8787.2018052000414.

08. Ministério da Saúde(BR). Secretaria de Vigilância em Saúde. Guia de Vigilância em Saúde. [Internet]. Brasília: Ministério da Saúde; 2019 [acesso em 20 out 2020]. Disponível em: https://bvsms.saude.gov.br/bvs/publicacoes/guia_vigilancia_saude_3ed.pdf.

09. Oliveira MSF de. Vacina da dengue no Brasil. [Trabalho de Conclusão de Curso]. Brasília (DF): Faculdade de Ciências da Educação e Saúde, Centro Universitário de Brasília; 2016 [acesso em 04 out 2020]. Disponível em: https://repositorio.uniceub.br/jspui/bitstream/235/11055/1/21458110.pdf.

10. Kruczewski B, Casara MEM, Trevisan G, Rodrigues AP. Implantação da vacina da dengue no Brasil: estudo situacional. Seminário de Iniciação Científica e Seminário Integrado de Ensino, Pesquisa e Extensão. [Internet]. 2017 [acesso em 20 set 2021]. Disponível em: https://portalperiodicos.unoesc.edu.br/siepe/article/view/15044.

11. Gonçalves CWB, Silva FC da, Milhomem CHC, Vasconcelos MMR, Silveira JM, Pita DFQ, *et al*. Análise de aspectos epidemiológicos da dengue no estado do Tocantins. Rev. Patol. Tocantins. [Internet]. 2019 [acesso em 20 out 2020]; 6(4):13-19. Disponível em: https://sistemas.uft.edu.br/periodicos/index.php/patologia/article/view/7125/16446.

12. Muller DA, Depelsenaire ACI, Young PR. Clinical and laboratory diagnosis of dengue virus infection. J. Infect. Dis. [Internet]. 2017 [acesso em 10 out 2020]. Disponível em: https://doi.org/10.1093/infdis/jiw649.

13. Barbosa BRS, Caldeira-Júnior AM de. Leucopenia e trombocitopenia no diagnóstico da dengue. Rev. Cient. Sena Aires. [Internet]. 2018 [acesso em 10 out 2020]; 7(3): 171–181. Disponível em: http://revistafacesa.senaaires.com.br/index.php/revisa/article/view/318.

14. Mendonça F de A, Souza AV e, Dutra D de A. Saúde pública, urbanização e dengue no Brasil. Soc. Nat. [Internet]. 2009 [acesso em 15 out 2020]; 21(3): 257–269. Disponível em: https://doi.org/10.1590/S1982-45132009000300003.

15. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Boletim Epidemiológico. Monitoramento dos casos de dengue, febre de chikungunya e doença aguda pelo vírus Zika até a Semana Epidemiológica 34 de 2018. [Internet]. Brasília: Ministério da Saúde; 2018 [acesso em 15 out 2021]. Disponível em: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/boletins/boletins-epidemiologicos/edicoes/2022/boletim-epidemiologico-vol-53-no18.

16. Laboratórios de investigação médica. Re–emergência do sorotipo dois do vírus da dengue no Brasil é um dos responsáveis pelo aumento de 600% dos casos da doença no País. [Internet]. 2019 [acesso em 10 set 2021 Oct 11]. Disponível em: https://limhc.fm.usp.br/portal/entrada-de-novo-grupo-de-virus-da-dengue-no-brasil-e-um-dos-responsaveis-pelo-aumento-de-600-dos-casos-da-doenca-no-pais/.

17. Dias LBA, Almeida SCL, Haes TM, Mota LM, Roriz-Filho JS. Dengue: transmissão, aspectos clínicos, diagnóstico e tratamento. Rev. Ciênc. Inf. Doc. [Internet]. 2010 [acesso em 15 abr 2021]; 43(2): 143–52. Disponível em: https://doi.org/10.11606/issn.2176-7262.v43i2p143-152.

18. Wilder-Smith A, Tissera H, Ooi EE, Coloma J, Scott TW, Gubler DJ. Preventing dengue epidemics during the COVID-19 pandemic. Am. J. Trop. Med. Hyg. [Internet]. 2020 [acesso em 20 abr 2021]; 103(2): 570-1.Disponível em: https://www.ajtmh.org/view/journals/tpmd/103/2/article-p570.xml?tab_body=pdf.

19. Mascarenhas MDM, Batista FM de A, Rodrigues MTP, Barbosa O de AA, Barros VC. Ocorrência simultânea de COVID-19 e dengue: o que os dados revelam? Cad. Saúde Pública [Internet]. 2020 [acesso em 02 abr 2021]; 36(6). Disponível em: https://doi.org/10.1590/0102-311X00126520.

20. Vasconcelos PF da C, Rosa EST da, Rosa JFST da, Freitas RB, Dégallier N, Rodrigues SG, *et al*. Epidemia de febre clássica de dengue causada pelo sorotipo dois em Araguaiana, Tocantins, Brasil. Rev. Inst. Med. Trop. [Internet]. 1993 [acesso em 15 maio 2021]; 35(2): 141-8. Disponível em: https://www.scielo.br/j/rimtsp/a/HMvq9hbJxz6st3HfMjYHvRD/?format=pdf&lang=pt.

21. Santos SD dos, Ribeiro MCS de A. Incidência de dengue e indicadores socioeconômicos e entomológicos em Santos, São Paulo, 2012-2016. Nursing. [Internet]. 2021 [acesso em 15 maio 2021]; 24(273): 5229-35. Disponível em: https://doi.org/10.36489/nursing.2021v24i273p5229-5242.

22. Gomes R, Moreira MCN, Nascimento EF do, Rebello LEF de S, Couto MT, Schraiber LB. Os homens não vêm! Ausência e/ou invisibilidade masculina na atenção primária. Ciênc. Saúde Colet. [Internet]. 2011 [acesso em 14 maio 2021]. Disponível em: https://doi.org/10.1590/S1413-81232011000700030.

23. Guimarães LM, Cunha GM da. Diferenças por sexo e idade no preenchimento da escolaridade em fichas de vigilância em capitais brasileiras com maior incidência de dengue, 2008-2017. Cad. Saúde Pública. [Internet]. 2020 [acesso em 20 maio 2021]; 36(10). Disponível em: https://doi.org/10.1590/0102-311X00187219.

24. Viana JA, Almeida VFM de, Lima LNF de, Maciel YAP, Tavares HS de A, Gonçalves MID, *et al*. Fatores epidemiológicos, demográficos e ambientais da dengue, zika, febre chikungunya no Município de Augustinópolis, Estado do Tocantins. Braz. J. Of Dev. [Internet]. 2020 [acesso em 20 maio 2021]; 6(12):99605-24. Disponível em: https://www.brazilianjournals.com/index.php/BRJD/article/view/21848/17434.

25. Barreto ML, Teixeira MG. Dengue no Brasil: situação epidemiológica e contribuições para uma agenda de pesquisa. Estud. av. [Internet]. 2008 [acesso em 20 maio 2021]; 22(64). Disponível em: https://doi.org/10.1590/S0103-40142008000300005.

26. Silva MBA, Brito MIB da S, Silva JM, Barreto JOF, Lopes KAdeM, Vasconcelos LL do E, *et al.* Perfil das arboviroses dengue, chikungunya e zika no Distrito Sanitário III do município de Recife (Brasil). Rev. Bras. Meio Ambiente. [Internet]. 2021 [acesso em 05 ago 2021]; 9(1). Disponível em: https://revistabrasileirademeioambiente.com/index.php/RVBMA/article/view/607.

27. Dourado J de M, Araújo CS de, Godói IPD. Hospitalizações, óbitos e gastos com dengue entre 2000 E 2015 na região norte do Brasil. Rev Bras Interdisciplinar de Saúde. [Internet]. 2020 [acesso em 28 maio 2021]; 2(4): 32-9. Disponível em: https://revistarebis.rebis.com.br/index.php/rebis/article/view/126/126.

28. Fonseca ALGP da, Brito AB, Valadares F de A, Pereira JF e S, Pereira K e S. Análise epidemiológica dos fatores associados à ocorrência de dengue grave no período de 2017-2019 no estado do Tocantins. JNT. [Internet]. 2021 [acesso em 22 maio 2021]; 1(22): 3-10. Disponível em: http://revistas.faculdadefacit.edu.br/index.php/JNT/article/view/790/575.

29. Pinheiro IM, Santos AC dos S, Sampaio RL. Coeficiente de Pearson: correlação entre as variáveis notificação de casos de dengue e fatores climáticos. Braz. J. Health Rev. [Internet]. 2020 [acesso em 15 abr 2021]; 3(1): 587–604. Disponível em: https://brazilianjournals.com/index.php/BJHR/article/view/6460.

30. Santana VTP de, Duarte PM. Perfil epidemiológico dos casos de dengue registrados no município de Primavera do Leste–Mt entre o período de 2002 a 2012. Braz. J. Of Dev. [Internet]. 2019 [acesso em 12 abr 2021]; 5(11): 27508-27518. Disponível em: https://brazilianjournals.com/index.php/BRJD/article/view/4982.

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - Teixeira LS, Mota MS, Oliveira NPT, Negreiros CB, Silva BM, Correia SF, Silva, CTX; Drafting the work or revising it critically for important intellectual content - Teixeira LS, Silva, CTX; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - Silva, CTX. All authors approved the final version of the text.

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