

## Chikungunya and COVID-19 in Brazil: The danger of an overlapping crises

To the Editor,

The first case of Coronavirus disease 2019 (COVID-19) was identified in Brazil on February 26, 2020. Since then, the country has witnessed a marked increase in the number of cases, becoming the third most affected country preceded by the United States of America and India.<sup>1</sup> In the global pandemic, Brazil is witnessing an overlap of the chikungunya virus (CHIKV) epidemic representing a burden on the public health system.

The first case of CHIKV infection was confirmed in northern Brazil in September 2014. Since then the disease has spread across the country. In 2019, 132,205 cases of chikungunya were reported in Brazil, with an incidence rate of 62.9 cases per 100 thousand inhabitants. The southeast and northeast regions had the highest rates of incidence with 104.6 cases per 100 thousand inhabitants and 59.4 cases per 100 thousand inhabitants, respectively. The states of Rio de Janeiro and Rio Grande do Norte concentrated 75.6% of the cases.<sup>2</sup>

Some studies expected a concomitant increase in the number of Chikungunya cases amidst COVID-19 due to (i) social isolation increasing vector transmission attributable to the endophilic nature of *Aedes aegypti*, (ii) suspension of arboviral surveillance programs in an attempt to contain the pandemic, and (iii) redirection of diagnostic tools to detect cases of COVID-19.<sup>3</sup> However, in 2020, 82,419 cases of the disease were reported, with an incidence rate of 39.2 cases per 100 thousand inhabitants, which represented a decrease of 37.66% concerning 2019. The northeast and southeast regions still present the highest incidence rates, but there was a variation in the incidence rate compared to 2019. The Northeast region reported the highest number of cases (103.4 cases per 100 thousand inhabitants), with an incidence rate approximately 74% higher than 2019 and the southeast region reported the second-highest cases (24.1 cases per 100 thousand inhabitants) with an incidence rate of 76.96% lower than 2019.<sup>4</sup>

It was also noted that 71.8% of the cases (59,141 cases), occurred up to the 26th epidemiological week (January 2020 to June 2020), when the states Espírito Santo, Bahia and Rio Grande do Norte had the highest rates.<sup>4</sup> Indeed, in the state of Bahia, a 2% increase in cases of chikungunya was observed as compared to the same period in 2019 when there were no traces of COVID-19.<sup>5</sup>

So in 2020, variation in the incidence of the disease was observed. Although there was an increase in arboviral infections during the first half of 2020, these cases were significantly decreased during the second half of 2020. In fact, the increase in the number of

cases started in November 2019, when it was suspected that up to 67.9% of individuals in the region had contracted chikungunya. Many of these people were diagnosed as COVID-19 positive, after February 2020, when testing for COVID-19 became possible in the region.<sup>6</sup> Therefore, recently, cases of chikungunya and COVID-19 could have been diagnosed interchangeably, leading to incorrect diagnoses.<sup>7</sup> Hence, in addition to the concomitant epidemic, one of the main reasons for the increase in the number of Chikungunya cases at the beginning of 2020 can be the similarity in the clinical presentation of chikungunya and COVID-19 that has led to misdiagnosis and delay in treatment. However, misleading diagnosis is a two-sided coin, and may also be the reason for the decrease in cases of Chikungunya observed in the second semester. This interchangeability of diagnoses has been attributed to similar clinical presentation between the two diseases, such as the acute onset of fever, headache, fatigue, chills, myalgia, joint swelling, and conjunctivitis,<sup>8,9</sup> making the data of the cases diagnosed with Chikungunya uncertain.

The difficulty in diagnosis due to the overlap between symptoms of COVID-19 and other diseases was also identified in other countries, such as Pakistan, where the similarity between symptoms of COVID-19 and typhoid fever led to the underdiagnoses of the second.<sup>10</sup> In addition to the uncertainty regarding epidemiological data, the overlapping of symptoms and the wrong diagnosis also hinder clinical management, which, in the absence of adequate medication, worsens the transmission and the clinical picture of both diseases. Chikungunya, if not treated in time, can progress to a fatal course, such as hemorrhagic shock, Guillain-Barré syndrome, encephalitis that requires advanced health facilities. On the other hand, 15% of patients with COVID-19 may be weakened to have severe pulmonary discomfort, requiring hospitalization in intensive care units.<sup>11</sup> Thus, the right diagnosis is a necessity to reduce the terminal course of both the disease and also to decrease the burden on the health system.

Despite what the figures show, the Chikungunya epidemic is far from declining in Brazil. Due to the the inaccessibility to basic sanitation services, such as piped water supply, especially in poor communities,<sup>11</sup> many individuals and communities are storing water in their homes, enabling mosquitoes to reproduce and proliferate.<sup>12</sup> This situation, which was already serious in the pre-pandemic period, has been aggravated since the beginning of 2020, when the focus of epidemiological surveillance services was redirected to the control of COVID-19.

To address this problem, the federal government, in cooperation with the Brazilian Ministry of Health, can mobilize community health

workers to initiate health literacy campaigns emphasizing the prevention strategies and clinical features of CHIKV and COVID-19 transmission. It is vital that these campaigns reach as many individuals possible, and particularly, the affected and at-risk populations.<sup>13,14</sup> The World Health Organization has also been encouraging and supporting the federal government to develop the capacity to detect, differentiate, and confirm both CHIKV and COVID-19 cases, manage patients individually, and execute public health strategies to prevent transmissions.<sup>14</sup> Double laboratory work-ups could be implemented to avoid misdiagnosis of both arboviral and COVID-19 infections.

Overall, Chikungunya represents an emerging exotic disease that spreads quickly, that must be dealt with a concrete response including but not limited to research, diagnostic tests, therapeutic agents, interventions, and vaccines. The overlapping crisis of COVID-19 represents not only a challenge, but also an opportunity to build a robust response strategy towards exotic diseases in Brazil.

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#### REFERENCES

1. Brazil. WHO Coronavirus disease (COVID-19) dashboard. *Who.int.*, Accessed March 14 World Health Organization; 2021 <https://covid19.who.int/region/amro/country/br>
2. de Vigilância das Arboviroses C-G. Monitoramento dos casos de arboviroses urbanas transmitidas pelo Aedes (dengue, chikungunya e Zika), Semanas Epidemiológicas 01 a 52. Gov.br. Accessed March 14, 2021. <https://portalarquivos2.saude.gov.br/images/pdf/2020/janeiro/20/Boletim-epidemiologico-SVS-02-1-1.pdf>
3. Weaver SC, Charlier C, Vasilakis N, Lecuit M. Chikungunya, and other emerging vector-borne viral diseases. *Annu Rev Med.* 2018; 69(1):395-408.
4. Gov.br. Accessed March 14, 2021. [https://www.gov.br/saude/pt-br/media/pdf/2021/fevereiro/01/boletim\\_epidemiologico\\_svs\\_3.pdf](https://www.gov.br/saude/pt-br/media/pdf/2021/fevereiro/01/boletim_epidemiologico_svs_3.pdf)
5. Almeida LS, Cota ALS, Rodrigues DF. Saneamento, Arboviroses e Determinantes Ambientais: impactos na saúde urbana. *Cien Saude Colet.* 2020;25(10):3857-3868.
6. Stringari LL, Souza MN, Medeiros Junior NF. Covert cases of severe acute respiratory syndrome coronavirus 2: an obscure but present danger in regions endemic for Dengue and Chikungunya viruses. *PLoS One.* 2021;16(1):e0244937.
7. Nunes M, Faria N, de Vasconcelos JM, et al. Emergence and potential for spread of Chikungunya virus in Brazil. *BMC Med.* 2015;13(1):102. <https://doi.org/10.1186/s12916-015-0348-x>
8. Guan W, Ni Z, Hu Y, et al. Clinical characteristics of Coronavirus disease 2019 in China. *N Engl J Med.* 2020;382(18):1708-1720.
9. Rodriguez-Morales AJ, Villamil-Gómez WE, Franco-Paredes C. The arboviral burden of disease caused by co-circulation and co-infection of dengue, chikungunya and Zika in the Americas. *Travel Med Infect Dis.* 2016;14(3):177-179.
10. Ahmad S, Tsagkaris C, Aborode AT, et al. A skeleton in the closet: the implications of COVID-19 on XDR strain of typhoid in Pakistan. *Public Health Pract (Oxf).* 2021;2(100084):100084.
11. Rosário MS, Siqueira IC. Concerns about COVID-19 and arboviral (chikungunya, dengue, zika) concurrent outbreaks. *Braz J Infect Dis.* 2020;24(6):583-584.
12. Cdc.gov. Accessed March 14, 2021. <https://www.cdc.gov/dengue/resources/factSheets/mosquito-control-dengue-chik.pdf>
13. Mosquitoes and Covid-19 are a ticking time bomb for Latin America. *Lse.ac.uk.* Published March 31, 2020. Accessed March 14, 2021. <https://blogs.lse.ac.uk/latamcaribbean/2020/03/31/mosquitoes-and-covid-19-are-a-ticking-time-bomb-for-latin-america/>
14. Huskisson EC, Hart FD. CHIKUNGUNYA. *Joint Disease.* Elsevier; 1987:22.