Brazil at the Center of Chikungunya Outbreaks

Sir,

Since it was first isolated in Tanzania in 1952, the chikungunya virus (CHIKV) has caused a devastating spread of a rheumatic disease known as chronic chikungunya arthritis (CCA). CCA is considered a sequel to chikungunya fever (CHIKF), a disease caused by CHIKV infection, transmitted through the bite of mosquitoes of the genus Aedes and characterized by abrupt high fever, symmetrical polyarthralgia/polyarthritis, maculopapular skin rash, fatigue, nausea, vomiting, diarrhea, and headache.[1] It is estimated that 40% of CHIKV-infected patients have some form of inflammatory rheumatism (arthritis, musculoskeletal pain, or nonspecific arthralgia lasting >2 months and no history of previous rheumatologic disease) at 18-month follow-up. The estimate for CCA (rheumatoid arthritis-like, unspecific or postviral arthritis-like, and seronegative spondylitis-like) is 14%.[2] There is no existing consensus as to how CCA should be treated, and there are no vaccines available against CHIKV infection.[1,2]

CHIKV caused sporadic outbreaks and epidemics in several countries on the African continent, including Uganda, Nigeria, Angola, the Democratic Republic of the Congo, and Kenya between 1960 and 1990.[3] Beginning in 2004, CHIKV spread to several islands in the Indian Ocean, Southeast Asia, and India after a large outbreak in Kenya that infected nearly half a million people.[3,4] Outbreaks in the French island of La Réunion (2005–2006) stand out with 47,000 cases, in Mauritius (2006) with 13,500 cases, and in India (2005–2006) with 1.3 million cases.[5] In 2013, CHIKV was reintroduced in the Americas with the first confirmed cases on the island of San Martin, overseas territory of France, and the Netherlands.[3]

Since the reemergence of CHIKV in the Americas, Brazil has become the major center of outbreaks and epidemics worldwide. According to the Pan American Health Organization (PAHO), between 2013 and 2022, almost 1.5 million CHIKF cases were reported in Brazil. This represents 45% of all reported cases in the American continent in the past 10 years.[6] In the same period, cases reported in all other continents, Asia (660,000), Africa (124,000), Europe (1800), and Oceania and the Pacific (70,000) add up to just over 850,000 [Table 1].[7-9] In 2022, while countries as populous as the United States, China, and India did not report major CHIKF outbreaks, Brazil reported 98.8% of all chikungunya cases in the Americas.[6] PAHO, the European Center for Disease Prevention and Control and World Health Organization keep their websites updated on the number of reported CHIKF cases; however, there is incomplete information for some countries.[10]

As CCA often causes severe pain and associated disability, and its mosquito vector is present in virtually all continents, CHIKV has become a major arboviral public health threat. Brazil should take advantage of the fact that it concentrates on the largest number of CHIKF cases around the world and study this debilitating disease in-depth.[1,5] Meanwhile, global surveillance with early recognition in combination with appropriate vector control measures is needed to decrease the overall disease burden.

Table 1: Number of chikungunya cases reported between 2013 and 2022 worldwide

Region/Country	Number of cases reported										Total
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
America											3,195,974
Brazil	0	2095	16,411	558,542	195,962	87,687	178,147	98,117	132,587	265,289	1,436,720
Dominican Republic	0	524,381	14,869	112	*	*	*	*	*	*	539,362
Colombia	0	0	275,907	17,779	1145	663	535	160	70	94	296,353
Costa Rica	0	74,566	102,644	3989	458	146	145	51	34	25	181,928
Guadeloupe	3	135,383	7946	34	56	*	*	*	*	49	143,471
Honduras	0	76	76,791	17,692	*	185	219	55	31	44	95,093
Asia											661,932
Africa											124,125
Oceania and the pacific											70,849
Europe											1790
World											4,054,670

*Data not available

Research quality and ethics statement

The authors followed applicable EQUATOR Network (https://www.equator-network.org/) guidelines, notably the CARE guideline, during the conduct of this report.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

J. Kennedy Amaral, Peter C. Taylor[1], Robert T. Schoen[2]

Department of Rheumatology, Institute of Diagnostic Medicine of Cariri, Juazeiro do Norte, Ceará, Brazil, [1]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, UK, [2]Clinical Professor of Medicine, Section of Rheumatology, Yale University School of Medicine, New Haven, Connecticut, USA

Address for correspondence: Dr. J. Kennedy Amaral, Institute of Diagnostic Medicine of Cariri, Juazeiro do Norte, Ceará, Brazil. E-mail: kennedyamaral@ufmg.br

References

1. Amaral JK, Taylor PC, Teixeira MM, Morrison TE, Schoen RT. The clinical features, pathogenesis and methotrexate therapy of chronic chikungunya arthritis. Viruses 2019;11:289.
2. Rodríguez-Morales AJ, Cardona-Ospina JA, Fernanda Urbano-Garzón S, Sebastian Hurtado-Zapata J. Prevalence of post-chikungunya infection chronic inflammatory arthritis: A systematic review and meta-analysis. Arthritis Care Res (Hoboken) 2016;68:1849-58.
3. Wahid B, Ali A, Rafique S, Idrees M. Global expansion of chikungunya virus: Mapping the 64-year history. Int J Infect Dis 2017;58:69-76.
4. Sergon K, Njuguna C, Kalani R, Ofula V, Onyango C, Konongoi LS, *et al.* Seroprevalence of chikungunya virus (CHIKV) infection on Lamu Island, Kenya, October 2004. Am J Trop Med Hyg 2008;78:333-7.
5. Zeller H, Van Bortel W, Sudre B. Chikungunya: Its history in Africa and Asia and its spread to new regions in 2013-2014. J Infect Dis 2016;214:S436-40.
6. Pan American Health Organization. Cases of Chikungunya Virus Disease; 2023. Available from: https://www3.paho.org/data/index.php/en/mnu-topics/chikv-en/550-chikv-weekly-en.html. [Last accessed on 2023 Jan 12].
7. European Centre for Disease Prevention and Control. Outbreak Reports on Chikungunya; 2023. Available from: https://www.ecdc.europa.eu/en/chikungunya/threats-and-outbreaks/outbreak-reports. [Last accessed on 2023 Jan 12].
8. National Vector Borne Disease Control Program, Ministry of Health and Family Welfare, Government of India. Chikungunya Situation in India; 2023. Available from: http://www.nvbdcp.gov.in/index4.php?lang=1&level=0&linkid=486&lid=3765. [Last accessed on 2023 Jan 12].
9. Bin C, Qiulan C, Yu L, Di M, Zhe W, Mantong Z. Epidemiological characteristics of imported chikungunya fever cases in China, 2010–2019. J Dis Surveill 2021;36:539-43. [doi: 10.3784/jbjc. 202105080246].
10. World Health Organization (WHO) Africa. Outbreaks and Emergencies Bulletin; 2023. Available from: https://www.afro.who.int/health-topics/disease-outbreaks/outbreaks-and-other-emergencies-updates. [Last accessed on 2023 Jan 16].

Access this article online

Quick Response Code:

Website: www.jgid.org

DOI: 10.4103/jgid.jgid_21_23

How to cite this article: Amaral JK, Taylor PC, Schoen RT. Brazil at the center of chikungunya outbreaks. J Global Infect Dis 2023;15:131-2.

Received: 31 January 2023 **Accepted:** 29 March 2023
Published: 12 July 2023