




# Dengue Outbreak in Pakistan: Impact on Global Mass Gathering Events?

Ramadan Abdelmoez Farahat, MBBCh <sup>1,\*</sup> , Sheharyar Hassan Khan, MBBCh <sup>2</sup> , Ziad A Memish, M.D <sup>3,4,5</sup> 

<sup>1</sup> Faculty of Medicine, Kafrelsheikh University, Kafrelsheikh, Egypt

<sup>2</sup> King Edward Medical University, Lahore, Pakistan

<sup>3</sup> Research and Innovation Center, King Saud Medical City, Riyadh, Saudi Arabia

<sup>4</sup> College of Medicine, Alfaisal University, Riyadh, Saudi Arabia

<sup>5</sup> Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, GA, USA

\* **Corresponding Author:** Ramadan Abdelmoez Farahat (MBBCh), Faculty of Medicine, Kafrelsheikh University, Kafrelsheikh, Egypt. Email: ramadan.med\_2587@med.kfs.edu.eg

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## DEAR EDITOR,

Worldwide, 100 to 400 million cases of dengue fever are reported every year, with most cases originating in the endemic regions of the Americas, Asia, Africa, Australia, and the Pacific (1). Among these countries, Pakistan has a significant burden of this disease and has been facing an increasing number of cases yearly, with the last major outbreak in 2019 when the country reported more than 53,000 cases and 95 deaths (2). The recent 2022 flood in Pakistan, with more than a third of the country under floodwater, led to outbreaks of waterborne and other diseases, including dengue. The substantial economic loss experienced by the Pakistani government is estimated to be US\$10 billion in damages, with more than 6.4 million people in need of immediate humanitarian assistance. Pakistan's National Institute of Health has recorded 25,932 confirmed dengue cases from 1 January to 27 September 2022 (6888 in Sindh province, 6255 in Punjab, 5506 in Khyber Pakhtunkhwa, and 3128 from Balochistan) (3). The infection risk is the highest in the monsoon in the country, where the stagnant water resources offer suitable breeding grounds for the vectors (4). The flood resulted in the loss of 1730 lives and left more than 8 million displaced people in desperate need of food, shelter, and health care and are now stranded and living in tents and makeshift camps (5). This year's flooding disaster is much worse than the

2010 flooding disaster and the 7.6-magnitude earthquake that hit Pakistan in 2005 (6).

Dengue fever spreads through mosquitoes of, primarily the *Aedes* genus, most particularly *Aedes aegypti*, which transmits the dengue virus from one person to another after feeding on an infected individual and carrying the virus to the healthy ones (7). Other methods of transmission reported are through infected blood products, organ donation, and vertical transmission (from mother to baby) (7).

Individuals infected with the dengue virus are primarily asymptomatic, with just a tiny fraction developing mild fever and self-resolving body aches (8). The incubation period lasts 4-10 days, while patients recover from symptoms after 2-7 days in most cases (8). However, a small percentage of patients may experience severe symptoms such as high-grade fever, joint and muscle pains, and mucosal bleeding, which can lead to more severe symptoms of shock (dengue shock syndrome) and hemorrhage (dengue hemorrhagic fever), which can result in end-organ damage and, in rare cases, death (8). There is no specific treatment for dengue fever (1). The milder symptoms of fever and pain are relieved by taking acetaminophen, adequate hydration, and rest (1). However, patients with complicated infections may require hospital admission and close monitoring per

disease severity (2). Dengvaxia® (CYD-TDV), produced by Sanofi Pasteur, is the only vaccine commercially available against all four phenotypes of the dengue virus and is recommended only for those with a previously confirmed dengue infection (7). Newer vaccines are under development (TAK-003 or DENVax) that are expected to become available soon. These vaccines are reported to be safe in patients with no prior dengue infection (7).

Despite having a significant burden of dengue cases every year in Pakistan, there is no commercially available vaccine or public sector program to provide vaccination. The mainstay of management of this infection in the country lies primarily in preventive measures and the symptomatic treatment of the patient (2).

Pakistan and Saudi Arabia share close political and cultural ties, and Pakistan has one of the highest numbers of pilgrims visiting for Hajj and Umrah services. Saudi Arabia has restricted the pilgrimage for Hajj since the Coronavirus disease 2019 (COVID-19); however, as the global COVID-19 situation is improved, the Saudi government has decided to reopen its borders in 2022 for the pilgrimage fully and has allocated Pakistan the second-highest quota for Hajj after Indonesia, allowing as many as 81,132 Pakistanis to perform Hajj in 2022 (9). Dengue disease and its vector are present in the Western regions of Saudi Arabia, in Jeddah and Mecca, and there are growing concerns about importing new dengue cases into the Hajj premises which could lead to an increase in case transmission among pilgrims, mainly due to the inflow of people from endemic countries like Pakistan, which is already seeing a spike in local cases. Besides disease dissemination inside Saudi Arabia, there is an increased risk of disease transfer to other nations since travelers can become infected and carry the disease to their respective countries, providing a higher public health concern in countries where the mosquito vector is present (10).

Saudi Arabia already has a robust infectious disease surveillance system in place for Hajj and Umrah (9); however, the health authorities in Saudi Arabia should be prepared for a possible surge in dengue cases as the pilgrims from Pakistan could arrive with asymptomatic or mild disease, where the dengue outbreak is already going on in the country, worsened by the current flood situation. The Saudi authorities need to intensify their vector control strategies in the western part of the country endemic for dengue and may need to add a dengue screening component to the existing screening and monitoring protocols. Concerned international parties should ensure screening from their side as well.

Precautionary measures for protection against mosquito bites, such as mosquito repellents, appropriate protective clothing, and insecticidal sprays, should be implemented during the housing and traveling of the pilgrims during Hajj and Umrah, and pilgrims should be educated about these necessary measures. Health services in Saudi Arabia, especially in Mecca and Medina, should remain prepared to tackle any worsening health crisis.

#### **ETHICS APPROVAL AND CONSENT TO PARTICIPATE**

Not applicable.

#### **AVAILABILITY OF DATA AND MATERIALS**

Not applicable.

#### **COMPETING INTERESTS**

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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#### **AUTHORS' CONTRIBUTIONS**

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#### **DECLARATION**

Not applicable.

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