



## Short Communication

## Dengue in Bangladesh

Atia Sharmin Bonna<sup>a,1</sup>, Shahed Rafi Pavel<sup>b</sup>, Tajnuva Mehjabin<sup>c</sup>, Mohammad Ali<sup>c,d,e,1,\*</sup><sup>a</sup> Department of Public Health, North South University, Dhaka, Bangladesh<sup>b</sup> Department of Public Health, Bangladesh University of Health Sciences, Dhaka, Bangladesh<sup>c</sup> Hasna Hena Pain, Physiotherapy and Public Health Research Center, Uttara, Dhaka, Bangladesh<sup>d</sup> Department of Physiotherapy and Rehabilitation, Uttara Adhunik Medical College and Hospital, Dhaka, Bangladesh<sup>e</sup> Department of Physiotherapy, International Institute of Health Sciences, Dhaka, Bangladesh

## ARTICLE INFO

## Keywords:

Aedes  
Bangladesh  
Dengue  
Global warming  
Public health  
Vector

## ABSTRACT

Dengue is one of the prominent public health concerns in tropical and subtropical regions globally. The dengue epidemic was first observed in the 1780 s, mainly in Asia, Africa, and America; however, this virus was found in Bangladesh in 1964. Rapid and unplanned urbanization, global warming, and prolonged rainy season promoted dengue outbreaks in recent years in Bangladesh. Additionally, household hazards contribute to producing an increased number of Aedes mosquitoes. The presence of four sub-types of dengue viruses intensified the dengue outbreak and fatalities, especially since the re-emergence of dengue virus 4 caused more death in 2022. Dhaka city and Rohingya refugee camps witnessed the highest prevalence of dengue patients and fatalities. Furthermore, the cocreation of the dengue outbreak and COVID-19 pandemic-related hazards overwhelmed the health system in Bangladesh. The measures previously taken by the Bangladesh government and City Corporation authorities proved inadequate to face the surge of dengue patients during the pandemic. The government of Bangladesh should stress the proper management of a high volume of dengue patients and raise public concern to fight mosquito proliferation in hot spots such as Dhaka city and Rohingya refugee camps.

## Introduction

Dengue is a viral infection transmitted to humans through an infected mosquito bite. This vector-borne disease is common in tropical and subtropical regions, mainly in urban and semi-urban locations. The leading carriers of the disease are Aedes aegypti mosquitoes; however, the Aedes albopictus mosquitoes can carry the germ of dengue [1]. Dengue virus (DENV) in Bangladesh was found in 1964; however, the life-threatening dengue hemorrhagic fever occurred in 2000. Four sub-types of DENV are available in Bangladesh [2]. Dengue patients suddenly surged in 2022 mainly due to mosquito proliferation due to heavy rainfall, high humidity, and extended rainy season [3]. Like other tropical regions, dengue has become a significant public health concern in Bangladesh. Atmospheric changes, high-density population, rapid and unplanned urbanization, and the maximum number of dengue sub-types lead to frequent and more intense dengue outbreaks in Bangladesh. This commentary aimed to describe the current situation, the

severity of dengue in recent years, and recommendations to prevent this burning public health problem. Fig. 1.

## Recent dengue status in Bangladesh

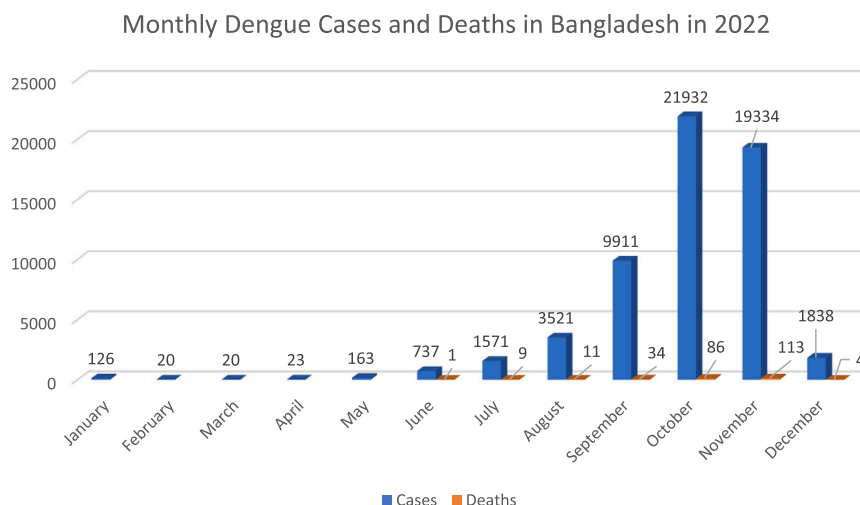
There were 59,196 dengue cases between January and December 2022, including 258 deaths [3]. Dhaka division witnessed 70% of patients and 61% of fatalities; however, the Chattogram Division reported 14% of patients and 23.64% of deaths in 2022. Dhaka city recorded 63% (n = 41,321) of the total cases and was one of the most affected regions in 2022 [3]. The double blow of the COVID-19 pandemic [4] and dengue overwhelmed the healthcare system of Bangladesh.

Regarding the number of patients, 2022 witnessed the second-largest outbreak, not surpassing the number of patients in 2019 (101,354 cases) [3]. However, the number of fatalities in 2022 was much higher than in 2019 (164 vs 258). Evidence suggests that re-infection and multi-infection are responsible for higher dengue patient fatalities [1].

\* Corresponding author at: Hasna Hena Pain, Physiotherapy and Public Health Research Center, Uttara, Dhaka, Bangladesh.

E-mail address: [mohammad.ali@latrobe.edu.au](mailto:mohammad.ali@latrobe.edu.au) (M. Ali).

<sup>1</sup> Atia Sharmin Bonna and Mohammad Ali contributed equally and will be considered the first authors.



**Fig. 1.** Monthly dengue cases and deaths in Bangladesh in 2022.

Therefore, the fatality rate of 2022 indicates a more intense outbreak of dengue in Bangladesh thanks to multiple sub-types of DENV. Furthermore, the re-emergence of DENV strain DENV-4 became responsible for causing recurrent infections and severe symptoms, such as internal bleeding followed by death, which may worsen the situation in 2022. To make the situation complex, reports in 2022 suggested that there has been a dramatic increase in dengue cases in the Rohingya refugee camps in Cox's Bazar district. Reports indicated that the prevalence of dengue cases was 3.5 times higher in the forcibly displaced Myanmar nations than in the Bangladeshi population [5].

The significant dengue outbreak in the urban regions may be due to high population density, rapid and unplanned development, insufficient surveillance operations, contempt for dengue protective behavior, and climatic change. However, dengue is becoming more common nationwide. This is due to the improvement of Bangladesh's trade and communication system. People, including dengue patients, are traveling back and forth throughout the country. An increased number of abandoned litter, vehicle tires, and household pots around the living areas that preserve clean rainwater produces favorable hatching of *Aedes* mosquitoes. Furthermore, the government's initiatives, such as killing only mature mosquitoes by fogging, are inadequate for controlling mosquito proliferation. In addition, the public's negligence toward mosquito proliferation and dengue fever makes the situation complicated and favorable to spread the disease nationwide in Bangladesh.

#### Yearly unmatched number of dengue cases in Bangladesh

Climate change leads to heavy rainfall and prolonged rainy season every alternative year in Bangladesh; consequently, dengue is outbreaking after a favorable proliferation year for the *Aedes* in Bangladesh [6]. Even though the number of cases could be very high one year, things might improve the following year. And there might be another rise next year. A longitudinal study discovered that the Bertheau Index was strongly associated with the mean relative humidity and mean rainfall [6]. The mean rainfall and the mean lag rainfall were significantly related to the Container Index. Overall, a significant association between increased mean rain and the longer dengue seasons in Bangladesh was reported, which might be responsible for the unmatched pattern of yearly dengue cases in Bangladesh. A research study in Bangladesh calculated the monthly growth factor of dengue cases discovered in 1 month by dividing the number of cases discovered in the month before [7]. April through July, a seasonally set peak, and July through September are regarded as the dengue outbreak period in Bangladesh.

The sudden rise of dengue infections in 2022 has put more stress on the Bangladesh healthcare system, which has been overburdened due to the COVID-19 pandemic [8,9]. The number of dengue patients seeking care at various hospitals has increased and prolonged than in previous years, making the situation critical for dengue and COVID-19 patients.

#### Preventing and control measures for dengue

Recent guidelines suggest eliminating mosquito vectors is the principal strategy for limiting or stopping the spread of DENV [1]. Thus, effective vector control is essential for preventing and managing dengue disease. The World Health Organization advocates integrated vector management (IVM), a tactical strategy for reducing mosquito vectors, mainly the *Aedes* mosquito species. To eliminate potential breeding places, cut down on vector numbers, and limit individual exposure, IVM should be improved. However, City Corporation authorities in Bangladesh mainly focused on mature mosquito killing. A few City Corporation authorities, such as Dhaka City Corporation, have taken awareness programs to push citizens to drain household clean water every week.

Nonetheless, these measures are inadequate and only urban-centric. No activities in rural Bangladesh to limit the dengue outbreak are seen. Bangladesh's government should strictly implement the IVM plan created in 2021 into practice. Controlling vectors should be intensified in densely populated areas, workplaces, schools, and hospitals. Mosquito eradication programs for intercity transporters such as buses, trains, and aircraft should be introduced to reduce the spread of infected mosquitoes to new areas. Dengue patients should also be encouraged not to travel so that they cannot spread the disease among mosquitoes and humans.

Education programs for the citizens, such as weekly draining and cleaning of household water storage containers, should be intensified. Electronic and print media and social networks like Facebook, Twitter, etc., should be used to promote awareness. The insecticide can be sprayed targeting the hatcheries of *Aedes*. For water storage in outdoor containers, chlorination and using proper larvicides and insecticides should also be considered. The government should initiate and implement appropriate and designed urbanization to reduce dengue occurrence in the long run.

Generalized prevention approaches can be taken while participating in outdoor activities, such as wearing long sleeves and pants. Indoor protection can be achieved with home pesticide spray solutions or mosquito coils. Window and door screens can help lessen the likelihood of mosquitoes entering the home. Furthermore, mosquito nets while sleeping can offer good protection from mosquito bites.

Furthermore, dengue is challenging to diagnose as it is sometimes misdiagnosed by influenza, typhoid, malaria, or Zika. Health ministry should provide a cheap confirmatory testing system in the health care centers for early diagnosis and proper treatment to reduce fatalities. Rapid confirmatory tests, such as DENV NS1 antigen detection tools, should be available at every doorstep to reduce diagnostic delays and allow for early management.

### Conclusion and recommendation

The rise of new stereotypes and current changes in the rainfall and hot weather trigger the extended dengue seasons in Bangladesh and cause re-infection and death. Social organizations and electronic and social media should be used to increase awareness among the general population against Aedes proliferation to fight perceived intensified challenges shortly. Particular attention should be paid to the dengue patient management and control of Aedes mosquito proliferation in the hotspots such as Dhaka city and Rohingya refugee camps.

### Ethical approval

The applicable.

### Author contributions

All authors participated in the collection and analysis of existing literature. Atia Sharmin Bonna and Mohammad Ali participated in writing various versions of the paper. All authors have read and approved the final manuscript.

### Declarations of competing interest

The authors have no competing interests to declare.

### Consent

The applicable.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### References

- [1] Rezza G. Dengue and chikungunya: long-distance spread and outbreaks in naïve areas. *Pathog Glob Health* 2014;108:349–55. <https://doi.org/10.1179/2047773214Y.0000000163>
- [2] Shirin T. Dengue fever in Bangladesh. *Bangladesh Med Res Counc Bull* 2019;45:214–5. <https://doi.org/10.3329/bmrcb.v45i3.44656>
- [3] World Health Organization. Dengue – Bangladesh, <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON424>; 2022 [accessed 09 December 2022].
- [4] Ali M. Factors associated with COVID-19 fear among healthcare professionals in Bangladesh. *Dialog- Health* 2022;1:100037. <https://doi.org/10.1016/j.dialog.2022.100037>
- [5] The Business Standard. Rohingya camps Report 3.5-time more dengue cases than in entire country, <https://www.tbsnews.net/bangladesh/rohingya-camps-report-35-time-more-dengue-cases-entire-country-476078>; 2022 [Accessed 27 January 2023].
- [6] Islam S, Haque CE, Hossain S, Hanesiak J. Climate variability, dengue vector abundance and dengue fever cases in Dhaka, Bangladesh: a time-series study. *Atmosphere* 2021;12. <https://doi.org/10.3390/atmos12070905>
- [7] Haider N, Chang YM, Rahman M, Zumla A, Kock RA. Dengue outbreaks in Bangladesh: historic epidemic patterns suggest earlier mosquito control intervention in the transmission season could reduce the monthly growth factor and extent of epidemics. *Curr Res Parasitol Vector Borne Dis* 2021;1:100063. <https://doi.org/10.1016/j.crpvbd.2021.100063>
- [8] Ali M. Severe acute respiratory syndrome coronavirus 2 infection altered the factors associated with headache: evidence from a multicenter community-based case-control study. *PAIN Rep* 2022;7:e1051. <https://doi.org/10.1097/PR9.0000000000001051>
- [9] Ali M, Uddin Z, Ahsan NF, Haque MZ, Bairagee M, Khan SA, et al. Prevalence of mental health symptoms and its effect on insomnia among healthcare workers who attended hospitals during COVID-19 pandemic: a survey in Dhaka city. *Heliyon* 2021;7:e06985. <https://doi.org/10.1016/j.heliyon.2021.e06985>