

This accepted version of the article may differ from the final published version. This is an Accepted Manuscript for *Disaster Medicine and Public Health Preparedness* as part of the Cambridge Coronavirus Collection
DOI: 10.1017/dmp.2020.493

Natural disasters and the dengue epidemic during COVID-19 outbreak are a deadly combination for public health threats in Bangladesh

Rumana Sultana¹ and Md. Shafiul Alam^{2,*}

¹*Center for Sustainable Development, University of Liberal Arts Bangladesh(ULAB),
Dhanmondi, Dhaka, Bangladesh*

²*Department of Geography and Environmental Studies, University of Rajshahi,
Rajshahi-6205, Bangladesh*

*Corresponding Author: Md. Shafiul Alam; Email: shafiul.geo@gmail.com

The outbreak of coronavirus disease 2019 (COVID-19) impacted the world's public health and economy tremendously, including Bangladesh. The first confirmed cases were reported in Bangladesh on 8 March 2020, and as of 26 August 2020, the total number of positive COVID-19 cases were 302,147, with 4,082 dead (Figure 1). The extremely diverse cases were between 21 and 40 years of age (55%), while those over 60 years of age (48%) were fatal, where the average fatality rate was only 1.33%.¹ As a low-income, developing, densely populated country, Bangladesh is at a higher risk of the pandemic due to fragile health systems, poor socio-economic conditions, frequent natural disasters, an increasing number of older adults, migrants, refugees, dense cities, and other infectious diseases. According to the Directorate General of Health Services (DGHS) Bangladesh, as of 13 August 2020, only 564 ICU beds are available in the Government hospitals and 992 physicians, 825 nurses, 572 supporting staffs, other (not elsewhere classified) 263 staffs, 212 medical technologists, 163 field staffs, 06 dental surgeons, and 02 ayurvedic specialists are working for COVID-19 health services in the whole country.^{2,3} The number of COVID-19 medical team members and ICU beds are inadequate to support over 160 million people. To combat this pandemic, the Government has decided to recruit more than 2,000 physicians and 4,000 nurses to the COVID-19 medical team. Besides, religious and cultural faith, personal hygiene practice, attitude towards contagious disease, misinformation, and pre-existing comorbidities make people more vulnerable to the COVID-19 pandemic. In April 2020, more than 100,000 people attended the funeral rites of a senior leader of the Islamist party violating government lockdown rules without maintaining social distancing.⁴ Throughout the country, people are moving outside without any need, even in the lockdown areas during the pandemic. The importance of following general guidelines of non-pharmaceutical interventions

(frequently hand wash, mask use, stay at home, social distancing) are hard to convince many vulnerable social groups (i.e., older adults, pregnant women). Also, the knowledge about COVID-19 cannot be fully understood by older adults, particularly women, due to lower exposures to mass media and lack of awareness activities that may make them more vulnerable to the pandemic.⁵ Moreover, natural disasters and dengue add fuel to the fire to exacerbate the risks of the COVID-19 pandemic.

Bangladesh is a disaster-prone deltaic country. As a developing country, the current challenge is how to deal with the COVID-19 pandemic in response to natural disasters and other infectious diseases. Natural disasters may have a rapid onset, extensive effects, and generate several factors that function synergistically to increase the risk of morbidity and mortality resulting from infectious diseases.⁶ Currently, Bangladesh is facing a catastrophic monsoon flood. One-third of Bangladesh is underwater and affected a total of over five million people.⁷ This year, floods are happening when Bangladesh is recovering from cyclone Amphan and working hard to control the spread of the COVID-19. Over two million people were evacuated during cyclone and flood disaster to the shelters, where social distancing made it more difficult due to the crowded environment.

Moreover, salty water is entering the coastal community through the broken dam owing to unexpected tidal height and heavy precipitation since the 3rd week of August 2020. This situation may increase the risk of rapid spread of COVID-19 among vulnerable social groups. The consequence of these disasters without the COVID-19 will be felt with very little life and property damage. On the other hand, natural disasters amid COVID-19 would have a more

significant adverse effect on the Country's livelihoods, properties, products, services, and food security.

Between May to September, Bangladesh usually faces the highest degree of susceptibility to infectious disease outbreaks such as dengue, chikungunya, and malaria. Over 100,000 people were diagnosed with dengue fever last year that took some 200 lives.⁸ All attention of people in the healthcare sector is currently concentrated on handling the COVID-19 emergency. Due to fever being a common symptom of both COVID-19 and dengue, people's focus also goes on only COVID-19. In this situation, if dengue continues to affect people amid COVID-19 during this monsoon, the current health crisis will escalate further and create other health emergencies.

Natural disasters and other infectious diseases, including dengue, may result in excess mortality, social crisis, poverty, lack of food security, and increased stress on limited health care. Combining preparatory and mitigation measures in the long and short term should be implemented on an emergency basis to save the vulnerable social groups from the adverse effect of cyclone, flood, and dengue amid the COVID-19 pandemic. That includes the renovation of the broken dams, effective early warning message dissemination, initiation of separate geriatrics units at public and private hospitals, and a combined natural and biological disaster preparedness program. Also, isolation shelters and dedicated ambulance and boat services should be arranged in disaster-prone areas to transport suspected COVID-19 or dengue patients to the nearest healthcare centers during the pandemic and catastrophe. Furthermore, policymakers and stakeholders should promptly prepare for the management of post-COVID-19 adverse effects on vulnerable people.

References:

1. IEDCR(Institute of Epidemiology, Disease Control and Research). COVID-19 Status Bangladesh-2020. <http://old.iedcr.gov.bd/>. Accessed August 26, 2020.
2. DGHS (Directorate General of Health Services). COVID-19 dash board Bangladesh-2020. <http://dashboard.dghs.gov.bd/webportal/pages/covid19.php>. Accessed August 13, 2020.
3. Rahaman KR , Mahmud MS, Mallick B. Challenges of Testing COVID-19 Cases in Bangladesh. *Int. J. Environ. Res. Public Health*. 2020; 17(18), 6439. <https://doi.org/10.3390/ijerph17186439>
4. Mahmud, A. 100,000 gather for funeral in Bangladesh, defying lockdown and sparking outbreak fears. *CNN*. <https://edition.cnn.com/2020/04/19/world/bangladesh-funeral-cornavirus/index.html>. Accessed November 20, 2020.
5. WASH (Water Sanitation and Hygiene) project. Older persons and WASH response during COVID-19. *WASH*. https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/200531_older_persons_and_wash_response_during_covid-19_final_0.pdf. Accessed November 19, 2020
6. Waring C, Brown BJ. The Threat of Communicable Diseases Following Natural Disasters: A Public Health Response. *Disaster Management & Response*. 2005; 3(2):41-47. <https://doi.org/10.1016/j.dmr.2005.02.003>
7. BRCS (Bangladesh Red Crescent Society). Bangladesh: Monsoon Flood-2020 Situation Report 4. *BRCS*. <http://www.bdracs.org/reports/monsoon-flood-2020-situation-report-4>. Accessed August 10, 2020.
8. Mamun A, Misti M, Griffiths D, Gozal D. The dengue epidemic in Bangladesh: risk factors and actionable items. *The Lancet*. 2020; 394:10215, P2149-2150. [https://doi.org/10.1016/S0140-6736\(19\)32524-3](https://doi.org/10.1016/S0140-6736(19)32524-3)

Figure 1: COVID-19 confirmed cases, deaths and distribution as of 13 August 2020. (a) Number of confirmed cases distribution by districts, (b) Number of deaths distribution by divisions, (c) Daily number of confirmed COVID-19 cases, and (d) Daily number of COVID-19 deaths.

