

# Deadly Flood and Landslides amid COVID-19 Crisis: A Public Health Concern for the World's Largest Refugee Camp in Bangladesh

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#### Abbreviations:

COVID-19: coronavirus disease 2019  
SARS-CoV-2: severe acute respiratory syndrome coronavirus 2

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Since the beginning of 2020, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)/coronavirus disease 2019 (COVID-19) pandemic brought unprecedented risk to global public health and devastated the global health system. In the absence of an available vaccine, the world has already witnessed multiple waves of this pandemic. Since the first case was recorded there on March 8, 2020, Bangladesh has endured eighteen months of infection without reaching zero cases.<sup>1</sup> The country is now experiencing a devastating second wave of the pandemic, caused mainly by the coronavirus Delta strain, which was first identified in Bangladesh on May 8, 2021 through a traveler from India.<sup>2</sup> Additionally, Hasan reported that the Delta variant caused 98% of detected COVID-19 cases during the second wave of the pandemic in Bangladesh.<sup>3</sup>

The current pandemic is particularly vulnerable to marginalized people (refugees) in low-middle income countries because of their poor living conditions and limited access to washing, sanitation, and hygiene facilities. The country has hosted one million Rohingya refugees residing in 34 camps in Cox's Bazar district who fled away from Myanmar on August 25, 2017.<sup>4</sup> The highly transmissible Delta strain is causing an infection epidemic throughout Bangladesh. Approximately 20,000 infections and 250 deaths were recorded in Cox's Bazar district, which borders Myanmar and is home to 34 refugee camps. As of September 19, 2021, 3,026 cases were reported, along with 32 reported deaths, representing a crude fatality rate of 1.1% in the Rohingya refugee camp.<sup>5</sup> Numerous factors, including prior sexual assault, inactivity, and substandard living circumstances, with ten or more people per space, make the Rohingya population vulnerable to non-communicable illnesses. In addition, thousands of older people and children live in the area. Many of them suffer from non-communicable and chronic illnesses that render them vulnerable to viruses. Thus, implementing preventive measures (eg, social distance) is difficult for Rohingya refugees living in congested camps (40,000 people per square kilometer).<sup>6,7</sup>

While the country struggles to cope with the increasing COVID-19 pandemic, the Rohingya camp in Cox's Bazar is further exacerbated by the negative impact of monsoon weather. The camp experienced over 300mm rainfall from July 27 - August 1, 2021, the highest ever in the last 20 years.<sup>8</sup> Additionally, the Cox's Bazar has experienced over 1300mm of rainfall from July 27 - September 1, 2021; over 200mm just from August 27-28. These days of heavy monsoon rains and strong winds pelted massive refugee sites, causing deadly flash floods and life-threatening landslides. The flood and landslide caused heavy damage to shelters, injured refugees, and impeded aid response by blocking them from accessing camp. As a result, 87,617 refugees were affected, 25,469 displaced, and ten refugees have died in the floods and landslides. In addition, 3,564 refugee shelters were partially damaged, 3,065 severely damaged, 2,489 fully damaged, and 15 were destroyed.<sup>9</sup> The situation has further worsened by the COVID-19 crisis since the country has undergone a nation-wide lockdown to halt the transmission of virus infection.

Severe health consequences could occur through direct contact with floodwater. It has been estimated that floods, landslides, and cyclonic hazards caused the direct death of approximately 658,770 people from 1970 through 2017 in Bangladesh.<sup>10</sup> However, the indirect effect of a flood is mainly unknown. Due to disruption in health services and lack of social support system, there is an increasing risk of further exacerbating people's illness with cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes after flooding.<sup>11</sup> Importantly, it is expected that communicable and emerging diseases, including

leptospirosis, malaria, cholera, gastrointestinal diseases, dermatological disease, and a substantial increase in psychological disorder could appear after flooding, in particular, the area with the poor hygienic condition and population displacement. In addition, direct contact with contaminated floodwater could cause eye and skin infection. Flood events are also responsible for triggering vector-borne diseases in endemic areas. For example, severe flooding in Peru in 2017 was linked with a significant dengue and chikungunya epidemic, with >19,000 dengue cases.<sup>3</sup> Since the severe floods devastated the refugee camp, the unsanitary conditions and risks of water-borne disease transmission, considering hundreds of acute watery diarrhea cases already reported in the camp, could be disastrous for Rohingya refugees.<sup>4</sup> Further, the Rohingya themselves have resisted moving to shelters that exacerbated the crisis due to their concerns about privacy, space, and loss of shelter plots, as well as disease transmission (COVID-19 and diarrhea in particular). However, approximately 5,000 refugee families were temporarily relocated to other community shelters. Thus, evacuating the people in safe places where a lack of maintaining proper social distancing could be another hub of source of SARS-COV-2 infection. Concurrent occurrence of natural disaster and COVID-19 crisis has placed an additional strain on the already fragile health care system in

Bangladesh. In this uncertain period, the increasing health demand on an already vulnerable health care system, COVID-19, emerging infections, emerging diseases, and two natural disasters transform the situations into a humanitarian crisis.

Considering the situation, the Government of Bangladesh and the international humanitarian organizations should respond quickly, assertively, and provide life-saving assistance and support to Rohingya refugees. Notably, the floods and the likely COVID-19 comeback should remind us not to give up, strengthen biosecurity measures, and offer social support to the refugee. Although Bangladesh and the international humanitarian community take some initiatives to reduce the immediate impact, this is insufficient.<sup>9</sup> Therefore, the Bangladesh Government, nongovernmental organizations, and the International Humanitarian Community should scale up their efforts to avoid further catastrophe. Under the nation-wide vaccination program, a total of 37,000 Rohingya refugees have been vaccinated until now, which could be a hope for reducing infection. However, natural disasters, lack of space, and permanent shelters remain an issue for refugees. Thus, an integrated action plan is needed and must be implemented immediately to reduce the risk of increased infection and reduce the impact of natural disasters.

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