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Commentary

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A catastrophic flood in Nigeria, its impact on health facilities and exacerbations of infectious diseases

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Abstract

Flooding is one type of meteorological occurrence that is becoming more frequent and severe due to global climate change. One-half of all weather-related disasters with significant effects on nations have been recorded to be flooding. Since June 2022, Nigeria has battled the worst flood disaster in over a decade. Extreme rainfall and the release of water from the Lagdo Dam in neighboring Cameroon were the leading causes of the extensive flooding. Worries about disruptions to the food supply have grown as a significant tract of farmland covering at least 340,000 hectares and thousands of kilometers of roads wholly washed away. Further, while the death toll linked to the disaster has surpassed 600 people, existing fragile health infrastructure has been damaged. Despite

the efforts and plans put in place by the Nigerian authorities and their partners, the disaster continues to spread to other parts of the country, with reports of casualties increasing daily. It is, therefore, necessary to create highly effective strategies to lessen the impact of disastrous flooding. Long-term and short-term actions should be part of mitigating and preventive measures.

Commentary

Flooding has been a major natural disaster affecting over 2.8 billion people during the last three decades, touching many households in several ways [1]. Flooding is responsible for half of the economic losses attributed to natural disasters [2]. It affects humans, animals, plants, and many sectors, such as education, housing, agriculture, health, power, tourism, and transportation. In 2016 alone, over 74 million people were affected by floods, resulting in 4,720 deaths and significant economic loss globally [3]. Nigeria had unprecedented floods with disastrous results. One of the most devastating effects is the submergence of houses, hospitals, schools, farmlands, livestock, religious centres, and other economically valuable facilities. Flooding is commonly caused by severe rainfall on flat terrain, reservoir failure, volcano eruptions, melting snow and glaciers, and other factors [2].

Flooding, like other natural disasters such as floods, tsunamis, earthquakes, tropical cyclones, and tornadoes, has been secondarily described with lots of infectious diseases outbreaks not limited to diarrheal diseases, acute respiratory infections, malaria, leptospirosis, measles, dengue fever, viral hepatitis, typhoid fever, meningitis, as well as tetanus and cutaneous mucormycosis. When flooding occurs, displaced victims are kept in public facilities, exposing them to disease outbreaks due to overcrowding and inadequate safe water, food and hygiene [4,5]. Floodwater serves as a breeding ground and means of transportation for pathogens and vectors, resulting in the spread of infectious diseases such as cholera, malaria, Lassa fever, typhoid, and paratyphoid fever [1,6]. Furthermore, environmental submersion destroys many houses, bridges, roads, and healthcare facilities. This complicates any emergency medical response [2].

In the last couple of months, floods spanned every part of Nigeria, affecting more than 30 out of the 36 states, with unprecedented recorded deaths, house destructions, health facilities destructions, and agricultural produce damages. The authorities have called the flood the worst in more than one decade, which has cut off some affected communities from the other parts of the country. In this article, we looked at the recent flooding in Nigeria, which killed over 600 people and affected more than 1.3 million people [7]. We also discussed the role of flooding in spreading infectious diseases and its effect on healthcare delivery. We provided some recommendations with a view to mitigating its impact and averting future occurrences.

Recurring flooding in Nigeria: floods are the most common natural disaster occurring yearly, resulting in loss of life and property worth billions of Naira [2]. Nigeria experienced numerous overwhelming floods that test the government's efforts annually; illustrious is the 1963 Ibadan flood from the Ogunpa River, which resurfaced in 1978, 1980, and 2011. Following the flood of 1963, one of the worst recorded floods occurred in July 2012, affecting over 30 states in Nigeria and over 7 million people, attributed to runoff water from the Lagdo Dam in Cameroon [7]. Nigeria endured its worst floods in more than ten years between June and October 2022, with over 600 people killed and 1,500 injured across the country´s 32 states, including Abuja. As a result, 790,000 persons were forced to abandon their homes, with 1,400,000 people affected across the country [5].

Flooding could occur due to several factors, including heavy rain, dam failure/release, ocean storms, deforestation, upstream land degradation, burst water pipes, a lack of adequate drainage systems, and poor agricultural practices [6], but

heavy rain is primarily blamed for floods in Nigeria and around the world [1]. Floods in Nigeria are classified into four types: river floods, flash floods, coastal floods, and urban floods [2]. Flash floods and urban floods are the most common in Nigeria. River floods are caused by the overflow of riverbanks caused by heavy rainfall over a long period, resulting in significant damage to economically valuable properties. Flash floods are caused by fast-moving waters caused by heavy rains that can move anything in their path, including trees and rocks. Coastal floods are caused by powerful waves generated by strong winds or storms, primarily in low-lying areas. Urban floods are caused by obstruction and failure of drainage systems in a city due to heavy rainfall [7]. Authorities in Nigeria have linked the ongoing flood disaster in Nigeria to extreme rainfall and the water release from neighbouring Cameroon's Lagdo Dam. Rapid urbanisation, inadequate spatial planning, and poor solid waste management, particularly the exploitation of drainage systems as dump sites, are other causes of floods in Nigeria.

Devastating health impacts of flood in Nigeria: like other natural disasters, flooding has devastating, health-related socioeconomic, ecological, and cultural consequences. It plays an essential role in the transmission of infectious diseases, both directly and indirectly affecting healthcare services. In Nigeria, a lack of safe drinking water and sanitation remains a significant cause and transmission of diseases, particularly water-borne diseases such as cholera and diarrhoea, which can be mild or severe, resulting in massive deaths, mostly among children under the age of five [1]. Over 100 disease-causing organisms, such as bacteria, viruses, and parasites, can be found in flood waters [8]. Flood water provides ideal conditions for pathogens and their vectors, resulting in the spread or outbreak of infectious diseases when flood victims come into contact with the vectors and contaminated water via drinking or food preparation [2,7]

Furthermore, relocation of flood victims to refugee camps makes them more vulnerable to water-borne diseases and other forms of infectious diseases like vector-borne and rodent-borne, air-borne diseases due to overpopulation, lack of safe drinking water, lack of good hygiene practices, shortage of suitable shelter and clothing and many other factors in the camps. Similarly, due to the paucity of essential personal hygiene equipment such as razor blades, hair cutters, and so on, sharing these sharp objects may result in transmitting blood-borne diseases such as hepatitis. Sexual assaults such as rapes and unprotected sex among flood victims may occur in flood victims´ camps, leading to sexually transmitted infections such as HIV, gonorrhoea, and chlamydia [2]. Rodent-borne diseases spread during and after floods are Hantavirus pulmonary syndrome, leptospirosis, hemorrhagic fever with renal syndrome, and vector-borne diseases such as malaria, West-Nile fever, and yellow fever [1,8]. Unfortunately, several disease outbreaks have been reported due to ongoing flooding, which has continued ravaging parts of Nigeria.

As of September 14, 2022, many Borno, Adamawa and Yobe States regions have reported cholera outbreaks, with 586,110 and 320 cases, respectively, and nearly 300 have died. Over 14,000 people were displaced from these three states. At the same time, other states like Kogi, Anambra and Katsina States are at high risk of contagious disease outbreaks [9]. These outbreaks are particularly concerning, especially as the world is witnessing a shortage of the cholera vaccine, brought about by an increase in cholera outbreaks globally, which has forced the International Coordinating Group (ICG), which oversees emergency vaccine supplies, to temporarily halt the standard two-dose vaccination regimen in cholera outbreak response campaigns in favour of a single-dose strategy [10].

Other impacts of flooding include the destruction of farmland and food production, leading to hikes in food prices, which alters eating patterns and causes a variety of nutritional deficiencies,

especially in children more vulnerable to infectious diseases due to malnutrition [6]. Loss of life and infrastructure destruction can bring about psychological and emotional suffering. For example, the recent flood in Nigeria has affected over 1.3 million people, claimed over 600 lives, more than 300,000 hectares of farmland destroyed, and over 200,000 houses destroyed [7]. This has put an enormous economic and psychological burden on the victims and their relatives. In addition, internally displaced persons frequently experience emotional and psychological distress due to congregating in camps and being cut off from their loved ones and ancestral places.

Impact of flooding on health facilities and vaccination efforts: the consequences of flooding are not limited to the destruction of farmlands and houses, as it also affects healthcare facilities and disrupts services. This can worsen the fragile health system and potentially reserve the gains recorded in routine immunisation programs. Immunisation and vaccination are the two cost-effective ways to prevent morbidity and mortality in children from contagious diseases such as polio, measles, tuberculosis and diphtheria. Vaccines and facilities have prescribed shelf life and optimal conditions, which, when altered, will lead to their loss of functions and potential deleterious consequences when put into use. Similarly, evacuation or displacement of people from their homes impacts regular immunization cycles and schedules and healthcare service output in general [2].

Since August, in Jigawa State alone, one of the state´s worst hit by the flooding, at least 257 schools and medical facilities have been destroyed, according to Michael Banda, the UNICEF Senior Education Manager. Over 200 facilities have been severely impacted, with varying degrees of damage, and a total of 30 health facilities have been inundated and are currently unusable. As a result, the afflicted population's health needs, particularly those of expectant and nursing mothers, are not attended to, Banda added [9]. As worrying as this is, unfortunately, it reflects what is likely to be seen in other affected states. Although the local authorities have made some moves in communicating early warnings and providing relief materials, more needs to be done regarding disaster preparedness, especially at the state and local government levels. The Nigerian minister of humanitarian affairs has confirmed by recently criticizing subnational governments for not doing enough to prepare for the extreme floods despite the forecasts, urging them to prepare for additional flooding by moving people living in flood plains to higher ground and distributing tents, humanitarian supplies, and medical equipment to localities. Nigeria´s population size, weak health systems and poor disaster preparedness are some of the factors which aggravate flood disasters in Nigeria. There is also a lack of compliance to earlier warnings on the part of people living in flood-prone areas and a lack of enforcement from the authorities.

Recommendations: as the flooding continues to spread to other parts of the country, it is a matter of priority that clean drinking water and other essentials are provided to the displaced victims. National health authorities and other stakeholders in Nigeria should continue to ensure that access to high-quality healthcare services is not disrupted during and after flooding. Where disputed, alternative mobile facilities should be provided. Camps should be furnished with portable toilets, treated water, hygiene materials such as soaps and hand sanitisers, and regular fumigation to prevent the development of disease vectors such as mosquitos and rodents. Immediate post-flood vaccine facilities provision, vaccination implementations, and assessments of flood-affected persons should be conducted in Nigeria. This can go a long way in reducing the unforeseen menace of emerging and re-emerging infectious diseases in affected regions. Along with the need to improve hospital quality in response to emergencies like floods, isolated areas of the nation with limited access to preventive facilities

also require additional attention. It is crucial to ensure that those at flood risk effectively adopt the recommended adaptive behaviours from public health professionals to protect themselves against the threat of floods.

In the long term, it is essential to adopt contemporary technology that employs geospatial infrastructure to locate and map out locations vulnerable to flooding. It should guide the right course of action for rescue, recovery, and disaster preparation. Early warning systems, disaster preparedness plans, and better local, national, and worldwide flood surveillance should be developed, as this will help to prevent the future occurrence of flooding and to mitigate the impact on health sectors. Governments must work together to enforce compliance with early disaster warnings. A culture of flood preparedness, prevention, mitigation, response, and recovery would be encouraged by public education campaigns in the media and community-based organizations.

Conclusion

Flooding, the most prevalent and fatal catastrophe worldwide, is made more frequent and severe by climate change. Due to the conditions for pathogens and vectors to multiply, floods have a substantial impact on infection epidemics. Although Nigeria experiences flooding every year, this year´s disaster is accompanied by unprecedented implications, including the deaths of over 600 people, the destruction of infrastructure and health facilities, and the outbreak of diseases have been reported. To mitigate the impact of the disaster, both long and short-term measures should be taken.

Competing interests

The authors declare no competing interests.

Authors' contributions

All the authors have read and agreed to the final manuscript.

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