



Perspective

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Dengue epidemic in Pakistan: Strategic management, efforts, and recommendations

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Throughout the months from mid-June to September, 2022, Pakistan has been struggling due to the extreme monsoon flooding. It is reported by the Office for the Coordination of Human Affairs that more than 33 million people have been severely affected, making up 14% of the total Pakistan population[1]. More than 1 700 deaths and 128 000 cases of injuries have been reported from Sindh, Baluchistan, and Khyber Pakhtunkhwa[2]. While Pakistan is working to manage the situation through national and international non-government organizations, currently, 7.9 million people are displaced, 8.62 million people struggle through food shortage and 130 000 pregnant women are suffering due to lack of health services[2]. These conditions make the population of Pakistan prone to further loss due to a pause in economic and political activity, difficulty in restoration, and most importantly increased disease prevalence. Waterborne diseases like typhoid fever, giardiasis, cholera, etc. have become prevalent as the civilians of Pakistan have been exposed to water that is contaminated with infectious microbes, metallic toxins, fecal matter, and factorial and household waste[3]. Open water bodies and accumulated flood water in the city give an environment for parasites to breed and grow. It has been reported by the National Institute of Health that within a single day, 1 900 cases of acute watery diarrhea, 200 cases of malaria, and 50 cases of dengue fever had been accounted for across the provinces[2]. It has become an alarming emergency that infections have been spreading like wildfire in Pakistan due to constant exposure and lack of medical attention.

Flooding has occurred in Pakistan as a result of unprecedented rainfall, particularly in the provinces of Baluchistan and Sindh[1]. Young children are living in the open with their families, with no drinking water, food, or a source of income, and are vulnerable to a slew of new flood-related dangers and hazards, including damage to structures and drowning in floodwaters[4]. The most common health repercussions of floods are gastrointestinal and respiratory infections, which are major causes of sickness and mortality in persons who have been displaced by natural disasters. Crowding and a lack of access to healthcare services increase the risk of mortality

from these illnesses. Floods can accelerate the spread of viral illnesses, particularly water-borne infections like diarrhea, hepatitis A and E, air-borne infections, and vector-borne diseases including yellow fever, West Nile fever, and dengue fever[5].

One of the most alerting diseases having reported mass prevalence in Pakistan is dengue. This year, due to monsoon flooding, more than 31 000 cases have been reported from all over Pakistan[6]. There have been 385 cases from Khyber Pakhtunkhwa, 193 cases in Punjab, 93 cases in Islamabad, and 336 cases in Sindh among which 264 new cases have been reported from the city of Karachi alone[6].

As the World Health Organization (WHO) states, dengue is a mosquito-borne viral disease that presents with a high fever alongside headaches, malaise, pain behind the eyes, joint and muscle pain, nausea, rashes, and swollen glands[7]. Arising from the virus of the Flaviviridae family, dengue is caused by the serotypes DENV-1, DENV-2, DENV-3, and DENV-4. It is transmitted by female vector mosquitoes named *Aedes aegypti* and *Aedes albopictus*. Dengue as a wide-spectrum disease presents in several forms such as dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS), of which, the latter is fatal to life[7]. DHF presents with extremely low levels of plates, chances of hemorrhage, plasma leakage, and febrile illness. In the febrile period, many blood patches are seen on multiple areas such as the skin and mouth of the patient. DHF occurs in stages I to IV, where IV is the most critical and it follows after the febrile period when the patient's temperature drops, followed by circulatory disorders[8]. DSS is the most life-threatening

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condition. After the febrile period, there is a sudden rapid yet weak pulse rate and low pulse pressure and the patient has a low temperature and is seen restless.

In managing the prevalence of dengue, Integrated Vector Management, and Integrated Disease Surveillance are a few of the many ongoing dengue control programs, supported by the WHO, which provide precautionary and treatment supplies, disease management, and vector control systems[9]. Many community awareness campaigns should address the precautionary measures, rapid spread, and effective management of dengue through information, education, and communication material[9]. In many flood relief camps and other areas where flood refugees are staying, healthcare providers have been putting efforts to manage and aware the public. The public must also be given awareness the of Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) test for serotyping dengue, as it is commonly available and used to confirm the onset of dengue infection effectively in a single step with high sensitivity and specificity. Currently, the treatment for dengue comprises providing paracetamol, intravenous or oral electrolytes, and hydration. It can be brought to the public's attention that such treatment can also be provided outside healthcare centers. The public must know of some symptoms of DHF as it can have a poor prognosis. The vector control is mostly handily spraying cold-fogging/ultra-low volume sprays and indoor residual sprays[10]. The general public must be discouraged to store water in household containers as these become sites of mosquito breeding. Other vector control methods include the closure of swimming pools, covering any opened water reservoir or ground access, and using insecticide tablets and mosquito fish[10]. It is also necessary that Pakistan develops an integrated Dengue Control Cell for proper management and control of vector-borne diseases as well as establishing a functioning method to provide vector control, conduct research, and other investigations to update vector control according to efficacy and requirement[10,11].

Conflict of interest statement

The authors declare that they have no competing interests.

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Authors' contributions

AN developed the theoretical formalism and conceptualization

of the project. Both KQ and AMS did the writing of the original draft. All authors contributed to the final version of the manuscript. Abdullah Nadeem supervised the project.

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