

Dengue outbreak 2023: Awareness can lower the burden of dengue infection and mortality

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Dengue is a complex, global disease. World Health Organization (WHO) reports dengue (DENV) as the most widespread and rapidly increasing vector-borne disease. DENV belongs to the Flaviviridae family. Two species of Aedes mosquitoes, Aedes aegypti and Aedes albopictus, act as the vector for DENV. DENV-1, DENV-2, DENV-3, and DENV-4 are the four main serotypes. An individual can be infected with dengue more than once by different serotypes. While dengue infection can be asymptomatic or have mild symptoms, it can often manifest life-threatening conditions i.e., dengue hemorrhagic fever (DHF) and/or dengue shock syndrome (DSS) or even death. Dengue re-infection or co-infection features worse symptoms. Therefore, by preventing dengue, it is possible to reduce mortality and morbidity as well as social costs.

According to the Centers for Disease Control and Prevention (CDC), each year, an estimated 400 million people worldwide get infected with the dengue virus and about 100 million get sick, of which 40,000 die from severe dengue. World Health Organization estimates that the Southeast Asia region contributes to more than half the global burden of dengue.

Dengue fever first appeared in Bangladesh in the 1960s and was then called "Dhaka fever". The fever did not become an epidemic until the 21st century. In 2000, dengue, dengue hemorrhagic fever re-emerged, and outbreaks of this fever were observed throughout Bangladesh. In recent decades dengue outbreak has been rising worldwide and Bangladesh is no exception. According to published reports, the number of dengue cases in the last 5 years in Bangladesh was 10,148 (in 2018), 101,354 (in 2019), 1405 (in 2020), 28,429 (in 2021), and 62,382 (in 2022). Data for 2020 was limited due to COVID-19 Pandemic. Until 2022, Bangladesh experienced the largest dengue fever outbreak in 2019, recording 120 deaths. But the year 2023 has already marked the deadliest dengue year since the first outbreak and has broken all the previous records. Till mid-October, the estimated number of dengue cases is 244,698 with a toll of death count of 1190. Analysis ascribed this year's unusually high death toll is due to delayed hospitalization as well as reinfections with the same serotypes. Another important observation of this year is, of the estimated cases, only about 39% (93105) of incidence is within Dhaka. The rest of the detected cases are from outside Dhaka. Hospitals all over the country, especially in Dhaka, are struggling to accommodate patients with dengue symptoms.

Evercare Hospital Dhaka has been facing a similar surge of dengue patients in both OPD and IPD recording 280 indoor admissions till September. Among them, 324 admissions were in the months of August alone. Being a 450 bedded multispecialty tertiary care hospital, it has not been very easy for us to allocate our resources for such a huge number of dengue-infected patients alone in an efficient and effective manner. With the strategic management of existing capacity, diagnostic and therapeutic services, team Evercare Hospital has been successfully able to provide healthcare service to sick persons.

Vaccine development for the dengue virus is incredibly encouraging. Dengue Tetravalent Vaccine (Live), known as Dengvaxia® is the world's first vaccine, licensed in Mexico in December 2015 for use in individuals 9-45 years of age living in endemic areas and have been infected by dengue at least once and is now licensed in 20 countries. It is given as a 3-dose series on a 0/6/12-month schedule. The World Health Organization enlisted Dengvaxia® as essential medicine since April 2019. FDA has recently approved (June, 2023) Dengvaxia® vaccine for individuals 6-16 years of age with previous dengue infection and living in endemic areas. Two serious drawbacks of this vaccination are worsened infection in Seronegative individuals and lower vaccine efficacy against DENV2. On the other hand, TAK-003, also known as Qdenga, is a promising live-attenuated

vaccine with no safety concerns in seronegative individuals, with the highest vaccine efficacy against DENV2. It is already approved in the U.K., Brazil, Argentina, Indonesia, and Thailand. TV003 and TV005 vaccines are developed based on deletions in the 3 untranslated region and structural gene chimerization, which is currently in the phase 2 and phase 3 trials. V180, A subunit vaccine is also in phase I development. However, in Bangladesh, still there is no vaccine approved for use. Although it has been possible to successfully immunize some people living in areas with high dengue burden, the real scope of the dengue vaccination program for public use seems not to be on the immediate horizon due to safety concerns and insufficient clinical data. Therefore, dengue countermeasure development through awareness and adopting measures is the best way right now.

Until recently, Dhaka used to be the epicenter of dengue disease and this infestation would go out of Dhaka with the travel of infected patients alone. But this year, there is a simultaneous rise of dengue cases both within Dhaka and outside districts having almost equal prevalence. Climate change, humidity, temperature, and rapid unplanned urbanization have created an imbalance in the environment which has resulted in a favorable atmosphere for the intense breeding of the Aedes mosquito. At this point, the transmission chain needs to be destroyed. The following measure will certainly help in this process.

Awareness and measures:

- Keep mosquito inhabitants low by preventing mosquito breeding by disposing of standing water regularly on roofs, in yards, unused car tires, indoor refrigerators, and under air conditioners.
- Regular cleaning of the trash around the construction sites and structures.
- Insecticide fogging around the year in a systemic fashion considering the monsoon & prevalence peak.
- Using mosquito nets on doors and windows during the day and night.
- Using mosquito nets during the day and at night while sleeping.
- When going outside, wear long-sleeved shirts/dresses, long pants/trousers, and socks if possible.
- Using mosquito repellent creams, sprays, and lotions indoors and outdoors.
- Keeping a member of the family with dengue fever inside a mosquito net. Because studies have shown that the Aedes mosquito can spread the infection to the rest of the family up to 12 days after the first symptoms appear.
- Avoid travel to risky areas where dengue outbreaks have been reported.
- Be aware of dengue symptoms. If symptoms of dengue occur, seek medical attention immediately.

Prevention and control of dengue in Bangladesh is not possible by any single person, organization, or ministry. Proactive and efficient action planning and implementation with intensive awareness can reduce the number of infections, consequently hospital admission and dengue deaths.