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EDITORIAL

Arbovirus hit the capital

Since May, 2017 Chikungunya was spreading rapidly in the capital of Bangladesh. A total of 13,176 possible Chikungunya (CHIK) patients got treatment in different hospitals in Dhaka city from 12 May 17 to 07 September 17.¹ However 984 cases had been confirmed as CHIK by serological test in ICDDR, B. During the same period, only 52 cases were diagnosed as probable CHIK cases from 17 districts outside Dhaka. A control room for public health emergency operation [chikungunya disease control room] was launched on July 03 at the Institute of Epidemiology, Disease Control and Research (IEDCR).²

Amid the spread of Chikungunya, another mosquito borne disease, dengue has silently struck the city. According to experts, global climate change contributes to variation of rainfall pattern in the South Asia, including Bangladesh, resulting in early outbreak of such viral diseases. Interestingly, when the disease is fading out from Bangladesh. Dengue outbreak started in the neighboring West Bengal in October, 17 and nearly 100 people died from it in the same month.

Arthropod-borne viruses (Arboviruses-Dengue, CHIK, Zika, Yellow fever) present a substantial threat to human and animal health worldwide.³ The diseases share some clinical signs and can be misdiagnosed in areas where they are common.

Historically, the name Chikungunya came from the word 'Makonde' meaning bending up, referring to the stooping posture developed as a result of the arthritic symptoms of the disease, thereby locally also named as 'Langra Jor'.⁴ It was first identified in 1952 in Tanzania. Periodic outbreaks occurred in Africa and Asia since 1960s. In the last decade-India, Indonesia, Maldives, Myanmar & Thailand reported more than 1.9 million cases. In Bangladesh two outbreaks were reported in 2008 and in 2011 and the first case was found in 2008 in northern Rajshahi - Chapainawabganj district. In Dhaka, IEDCR noticed the presence of the disease later in 2011.

Chikungunya fever is caused by Chikungunya **virus** which is a RNA virus that belongs to the Alphavirus genus of the Togaviridae, the family that comprises a number of viruses that are mostly transmitted by arthropods.⁵

The **vector** for CHIK virus is Aedes mosquitoes (Aedes Aegypti & Aedes albopictus). Aedes aegypti is more closely associated with human habitation and uses indoor breeding sites, including flower vases, water storage vessels, disposables, and concrete water tanks in bathroom, as well as the same artificial outdoor habitats as Aedes albopictus. The species Aedes albopictus thrives in a wider range of water-filled breeding sites than Aedes aegypti including coconut husks, bamboo stumps, tree holes and rock pools, in addition to artificial containers such as vehicle tyres and saucers beneath plant pots. This diversity of habitats explains the abundance of Aedes albopictus in rural as well as peri-urban areas and shady city parks.⁴

They are principally day biters. Eggs of these vectors have the ability to withstand desiccation for more than a year. This could result in the remains of virus in nature for a long period and cause outbreak. Flight range of these vector mosquitoes are less, making the outbreaks to occur in clusters, especially in congested localities. Recently, it has also been shown that viraemia are quite high in infected mosquitoes and it could transmit the disease to more than one person since small amount of blood in the proboscis carry large quantity of virus.

In the South-East Asia region, CHIK virus is maintained in the human population by a human-mosquito human **transmission** cycle that differs from the sylvatic (nonhuman) transmission cycle described in the African continent. CHIK fever epidemics display cyclical and seasonal trends. There is an inter-epidemic, period of 4-8 years (upto 20 years). Like dengue, its transmission is also related to rainfall and temperature. Outbreaks are most likely to occur in post-monsoon period when the vector density is very high- Human beings serve as the CHIK virus reservoir during epidemic periods. During inter-epidemic periods, a number of vertebrates have been identified as reservoirs. These include monkeys, rodents, birds and small mammals.

Like the other arthropod borne viruses (arboviruses) - dengue, yellow fever and zika, humans are not the dead-end hosts for CHIK virus but rather serve as part of the transmission cycle by efficiently infecting *Aedes aegypti* mosquitoes. In the mid-1950s, several authors isolated the "breakbone fever" viruses and called them "dengue viruses", and the former "dengue became "chikungunya" following the 1952-53 outbreaks.³

Clinical triad for CHIK fever is sudden onset of high fever debilitating joint pain and rash. Epidemiological criteria is residing or having visited epidemic areas. CHIK fever is classified into three categories- mild, moderate and severe based on severity of clinical presentation.⁵

The incubation period can be 2-12 days, but is usually 3-7 days. Acute CHIK fever typically lasts for a few days to a couple of weeks, but some patients suffer from protracted course lasting several weeks. Additionally, some patients have reported incapacitating joint pain, or arthritis which may last for weeks or months. Co-circulation of dengue fever persists in many areas. No deaths, neuro-invasive cases, or hemorrhagic cases related to CHIK virus infection have been conclusively documented in the scientific literature.³

Acute symptoms typically resolve within 7-10 days. Some patients might have relapse of rheumatologic symptoms (e.g., polyarthralgia, polyarthritis, tenosynovitis) in months following acute illness. Rare complications include - uveitis, retinitis, myocarditis, hepatitis, nephritis, bullous skin lesions, hemorrhage, meningoencephalitis, myelitis, Guillain-Barre syndrome, and cranial nerve palsies. Some of the diseases which should be considered in differential diagnosis are- dengue fever, reactive arthritis, rickettsial disease, rheumatic fever and leptospirosis.

To **differentiate** from dengue, CHIK virus mostly cause high fever, severe polyarthralgia, arthritis, rash, and lymphopenia while, dengue virus more likely to cause neutropenia, thrombocytopenia, hemorrhage, shock, and death- Patients with suspected CHIK should be managed as dengue until dengue has been ruled out.

Zika, dengue and chikungunya, have some common character. All of them spread to people through the bite of an infected *Aedes aegypti* or *Aedes albopictus* mosquito. There are no vaccines or medicines for these diseases. Once a person is infected with one of these viruses, he or she is likely to be protected from future infections.

Confirmation of **diagnosis** requires at least one of the following tests in the acute phase: Virus isolation by cell culture; presence of viral RNA by real time RT-PCR (Within 5 days of onset of illness); presence of viral specific IgM antibody in single serum sample collected within 5 to 28 days of onset fever; four-fold rise of IgG antibody in samples collected at least three weeks apart (1st sample after 7 days).⁵

There is no cure for the disease. **Treatment** is focused on relieving the symptoms. Mild and moderate cases can be managed at home. Severe cases should be managed at hospital. Home management includes plenty of water with electrolytes; paracetamol tablets during periods of fever; cold compression on joints and refraining from exertion.⁵ Self medication with aspirin or NSAIDs should be avoided in acute phase but antihistamines can be used for itching. Admission in hospital is suggested if the person develops hemo-dynamic instability, oliguria, altered sensorium, bleeding manifestations and disabling arthritis.

Apart from climate change, urbanization, human travel, viral adaptation, lack of effective control measures, and spread of new vectors likely have contributed to recent re-emergence of virus. **Control** of mosquito-transmitted viruses is relied heavily upon efforts aimed at reducing mosquito populations. These control activities focus on eliminating mosquito larval habitat and adulticiding. However, because *Aedes aegypti* and *Aedes albopictus* mosquitoes are container-breeding species that will lay eggs in nearly any water habitat, larval control efforts are a challenging task. Prevention efforts aimed at reducing adult mosquito populations also fail, because aerial pesticide applications do not reach many adults, which rest and bite indoors. Indoor residual pesticide spraying might be effective, but is impractical in large urban areas.³

An alternative control measure is the development of a CHIK **vaccine**. Several options have been explored ranging from virus-like particles, live attenuated variants, virus-vector products, subunit vaccines, DNA vaccines, or inactivated products. However, the likelihood of a product reaching a commercial market is slim, due to the unpredictable nature of CHIK virus outbreaks.³

As because vaccines and specific antiviral therapies for CHIK virus are not yet available, the only means for controlling its spread are reductions in *Aedes* populations and limiting human contact with this vector. Community participation is absolutely necessary for taking appropriate control measures in the hospital and home. House hold members acquire CHIK infection as they share the same environment. Hence, there is no need to isolate the patient or to segregate the patient. The recently launched coordinated multisectoral approach 'one health strategy' could be rewarding in Bangladesh because of its high population density, vulnerable food safety, fragile economy and close human-animal contact.

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