

EDITORIAL

Zika virus in India: A Cause for Concern

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ABSTRACT

Zika virus is an emerging arbovirus transmitted by Aedes mosquito which is also responsible for diseases like Dengue, Chikungunya and yellow fever. The disease originated from a forest in Uganda and has spread to countries in Africa, Latin America and Asia, due to rapid globalization, urbanization, abundant presence of vector and increased travel. On 22nd October 2021, Kanpur, Uttar Pradesh reported a positive case of Zika Virus Disease (ZVD) and a multidisciplinary team was rushed for control and containment of disease. Since the epidemiological triad of agent, host and environment are all conducive to the spread of Zika in India, there is a great threat that it might become a public health threat in our country. We need appropriate public health strategies at the earliest to deal with the risk of a major Zika outbreak.

Key Words: Zika virus, Dengue, Chikungunya, Yellow fever, Covid-19, Epidemiology

Introduction

Zika virus is an emerging arbovirus transmitted by Aedes mosquito which is also responsible for diseases like dengue, chikungunya and yellow fever. The disease originated from a forest in Uganda and has spread to countries in Africa, Latin America and Asia, due to rapid globalization, urbanization, abundant presence of vector and increased travel. On 22nd October 2021, Kanpur, Uttar Pradesh reported a positive case of Zika Virus Disease (ZVD) and a multidisciplinary team was rushed for control and containment of disease. Since the epidemiological triad of agent, host and environment are all conducive to the spread of Zika in India, there is a great threat that it might become a public health threat in our country. We need appropriate public health strategies at the earliest to deal with the risk of a major Zika outbreak.

Zika virus is an emerging arthropod borne virus transmitted to humans by the Aedes group of mosquitoes, sexual contact with infected person, blood transfusion as well as blood products and transplacental transmission.¹ This virus belongs to the genus Flavivirus, family Flaviviridae and is closely related to other flaviviruses of public health importance including dengue fever, Chikungunya and yellow fever.² Zika virus was first isolated from a rhesus monkey in the Zika Forest of Uganda, in 1947 and later identified in humans in 1952 in Uganda and United Republic of Tanzania. For many years, the virus was responsible for causing sporadic human infections in Africa and Asia.³

The first recorded outbreak of Zika virus disease (ZVD) was reported from the Island of Yap (Federated States of Micronesia) in 2007. This was followed by a large outbreak of Zika virus infection in French Polynesia in 2013 and other countries and territories in the Pacific.

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In March 2015, Brazil reported a large outbreak of rash illness, soon identified as Zika virus infection, and found association between Zika virus infection and Guillain-Barré syndrome and Microcephaly. Outbreaks and evidence of transmission soon appeared throughout the Americas, Africa, and other regions of the world. To date, a total of 86 countries and territories have reported evidence of mosquito-transmitted Zika infection.^{3,4} Zika virus disease was declared a Public Health Emergency of International Concern on the 28th of January 2016 by the World Health Organization (WHO).⁵

In India Zika was first reported in 2017, followed by significant outbreaks in 2018, which included 159 confirmed cases from Rajasthan, which included 63 pregnant women, 130 from Madhya Pradesh, and one from the state of Gujarat.⁶ The more recent outbreaks of Zika virus in India are a major cause for concern.

On 22nd October 2021, a 57-year-old male from Kanpur, Uttar Pradesh tested positive for ZVD and centre rushed a multi-disciplinary team comprising of entomologist, public health specialists and gynecologist for control and containment measures.⁷ Till date close to 100 confirmed cases of Zika including 17 children were reported from Uttar Pradesh.⁸ Earlier in the month of July Kerala reported the first case of ZVD confirmed through RT-PCR. Close to 70 cases including four pregnant women were confirmed in the region. Following this Maharashtra state also reported its first lab confirmed case from Belsar, Pune district. So far, no cases of microcephaly and/or Guillain-Barre syndrome (GBS) have been linked with this outbreak.⁹ The incubation period of Zika virus disease is estimated to be 3–14 days. The majority of people infected with Zika virus do not develop symptoms. Symptoms are generally mild including fever, rash, conjunctivitis, muscle and joint pain, malaise, and headache and usually last for 2–7 days. Zika virus infection can trigger of Guillain-Barré syndrome, neuropathy and myelitis, particularly in adults and older children. Zika virus infection during pregnancy is a cause of microcephaly and other congenital abnormalities in the developing fetus and newborn. It can also result in pregnancy complications such as fetal loss, stillbirth, and preterm birth.^{9,10}

Infection with Zika virus may be suspected based on symptoms of persons living in or visiting areas with Zika virus transmission and/or Aedes mosquito vectors. A diagnosis of Zika virus infection can only be confirmed by laboratory tests of blood or other body fluids, such as urine or semen. There is no treatment available for Zika virus infection or its associated diseases and only symptomatic treatment is administered. Protection against mosquito bites is a key measure to prevent Zika virus infection, with special attention to prevention of mosquito bites among pregnant women, women of reproductive age, and young children.

Risk assessment

Zika virus can cause large epidemics with a substantial demand on the public health system including surveillance, case management, and laboratory capacity to differentiate ZVD from illness due to co-circulating mosquito-borne viruses like dengue and chikungunya.⁹ Although majority of cases are asymptomatic or only have mild symptoms, Zika virus can cause microcephaly, congenital Zika syndrome and GBS. However, if the disease becomes endemic in India, there could be possibility of a cohort of persons with microcephaly and/ or other neurological disorders that would require long term rehabilitation/ psychosocial care.

Moreover, although Zika virus is primarily transmitted by Aedes species mosquitoes, it can also be transmitted from mother to foetus during pregnancy, through sexual contact, transfusion of blood and blood products, and organ transplantation. The absence of population immunity in newly affected countries and high mobility of population along with cross-border movement of travelers with infections may lead to rapid spread of the disease. Also, Limited lab capacity, cross reactivity of diagnostic flavivirus antibody assays and co-infection with diseases with similar presentation may mask the actual number of cases.

In India, the overall risk is currently assessed as moderate, given that:

- the actual Zika virus transmission might be higher due to the undetermined population immunity and the asymptomatic clinical presentation in most of the infections;
- the primary vector is established in the area in high densities, and the ecological conditions are favourable along with our inability to control mosquito breeding in the past for dengue outbreaks;
- with government relaxing the travel restrictions because of Covid-19 pandemic and people travelling irresponsibly, the exportation within India and to other states and countries cannot be ruled out due the presence of competent vector (*Ae. aegypti*) in other states where mosquitos can become infected by biting infected returning travellers leading to potential further spread of the disease;
- Underfunded and inadequate infrastructure on already overburdened healthcare system in India due to covid-19 pandemic, resulting in inadequate outbreak control response along with poor surveillance system.

Public Health Response

The central government has sent a multidisciplinary team for control and containment measures of the Zika virus disease. The team will assess the ground situation and ensure that Union Health Ministry's Action Plan for Zika Management is being implemented. The government along with health department has implemented following response activities for managing the rising number of cases of Zika virus:

- Enhanced surveillance after development of micro-plan in the area.
- Information, Education and Communication activities pertaining to ZVD have been strengthened immediately throughout the state.
- Sensitization and training activities across the State for health care workers are ongoing.
- All ultrasound scanning centres have been directed to report incidences of microcephaly during regular antenatal scans to the Reproductive and Child Health Officer
- Measures to ensure strict deferral of blood donors with a history of fever in the previous two weeks, have been undertaken
- The state laboratories are being equipped and strengthened to perform RT-PCR testing for Zika Virus infection. If the number of samples exceeds its surge capacity, samples will be shipped to other nearby laboratories or to NCDC, Delhi or NIV, Pune depending upon geographic proximity.
- Multiple rounds of reviews are being conducted by state government and all the districts are been alerted to carry out active surveillance, mosquito control and information, education, and communication activities related to control of Zika virus
- In areas with a cluster of ZVD cases, intensified vector control activities have been conducted for a week including; extensive fogging, spraying, use of larvicides, source reduction and sanitization of the surrounding areas.
- Also, field teams are visiting each household to conduct active case finding, ensure elimination of mosquito breeding sites, and sensitize the community to preventive mosquito control measures and identification of Zika virus disease symptoms to seek timely medical assistance.

- WHO was requested to support the country's updates on standard operating procedures and guidelines for: syndromic and case-based surveillance; laboratory surveillance; vector surveillance; enhanced surveillance among antenatal women; microcephaly surveillance; surveillance of Acute Flaccid Paralysis (AFP) and GBS.

Recommendations

With the Covid-19 pandemic the exhausted healthcare system cannot afford another outbreak in our country. Hence, public health awareness and vector control measures are the most cost-efficient options available to us. The following actions are recommended for containment of large spread of disease and before it becomes endemic in India:

Development of a micro-plan to detail out the surveillance and response activities along with human resource component.

Enhanced Surveillance: This will include intensification of fever surveillance by state IDSP, along with notification of all suspected cases of Zika for confirmation through lab diagnosis, active entomological surveillance, surveillance of pregnant women for febrile illness and surveillance for acute neurological illness/GBS/congenital Zika syndrome.

Laboratory support: Zika virus is diagnosed through polymerase chain reaction and virus isolation from blood samples. Diagnosis by serology can be difficult as the virus can cross-react with other flaviviruses such as dengue and yellow fever. Reverse transcriptase-polymerase chain reaction (RT-PCR) is the primary means of diagnosis, while virus isolation is largely for research purposes.

The identified laboratories will be strengthened and activated to test for Zika. If need be, clinical samples will be re-distributed depending upon geographic proximity. NIV, Pune will be responsible for logistics and monitoring.

Clinical Management & Hospital Facility: All laboratory confirmed Zika positive cases should be admitted for 2 weeks in an identified health facility with isolation wards that are mosquito proofed. In case of large outbreak, mild symptomatic patients can be treated under domiciliary treatment. Hospitals with requisite specialties and equipments will need to be identified for providing clinical diagnosis and critical care management for patients reporting with GBS/ other neurological syndromes.

Integrated Vector Management: *Aedes aegypti*, widely prevalent in India, is the main vector species of Zika Virus Disease. Any outbreak will require sustained and intensified campaign for source reduction for vector control. The objective will be to decrease the rate of *Aedes aegypti* infestation to less than 1% of all municipalities / corporations in the affected area in 6 months, in order to reduce the number of cases of illnesses transmitted by the mosquito. The key to control it is adoption of a comprehensive approach by way of regular vector surveillance and integrated management of the *Aedes* mosquitoes through biological and chemical control that are safe, cost effective; and environmental management, legislations as well as action at household and community levels.

Vector surveillance will involve larval as well as adult surveys with the help of commonly used indices. For larval surveys, House index, container index, Breteau and pupae index and for adult surveys, landing/biting counts per man hour and resting collection will need to be monitored. There shall also be simultaneous surveillance of insecticide resistance to guide evidence-based vector control activities.

Risk Communication: it is necessary to boost up risk communications to address population concerns, enhance community engagement, improve reporting, and ensure integrated vector management.

Public information education and communication campaign shall target schools, colleges, work place, pregnant women. Awareness will be created among the community through print and visual media, mass SMS etc. by providing timely and accurate information on Zika virus disease, for reporting febrile cases, about possible health problems related to the disease, source reduction activities for mosquito control, personal protection against mosquito bites, and information to reduce risk through sexual transmission and transmission in pregnant women.

Inter-sector convergence and Co-ordination: A coordinated response between government, public health care system and community is needed to minimize the threat and reduce the risk of an epidemic. Interagency Coordination at National level will be done by EMR division. The IHR focal point will keep WHO informed about the outbreak to facilitate understanding of the disease, for control measures, and to prioritize further research and development at national and international level.

Conclusion

The recent outbreak of Zika virus in India is a major cause for concern, since the epidemiological triad of agent, host and environment are all conducive to the spread of Zika in India. The key strategies are public health preparedness, enhanced surveillance, vector management and early diagnosis. We need to adopt these public health strategies to deal with the risk of a major Zika outbreak at the earliest.

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