

Zika Virus - An International Public Health Emergency

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Abstract

Zika Virus is a member of the virus family flaviviridae and the genus flavivirus. It is spread by day time active Aedes mosquitoes, such as *A. aegypti* and *A. albopictus*. This is the same mosquito that spread and causes dengue, chikungunya and yellow fever. The first known case of Zika fever was reported in a sentinel rhesus monkey stationed on a tree platform in the Zika Forest in Uganda in 1947. Sexual transmission of Zika virus from men to women has been witnessed in at least 4 cases. Zika virus has also been isolated from semen samples. Cases of vertical perinatal transmission, from mother to the baby during pregnancy have been reported. WHO declared the couple of microcephaly and Guillain-Barré syndrome (GBS) cases reported in Brazil are strongly suspected to be associated with the Zika virus outburst. Thus, World Health Organisation (WHO) declared that a coordinated and an organized international response is required to improve surveillance, identification of infections, congenital malformations, and neurological complications, to heighten the control of mosquito populations at risk, and to execute the development of diagnostic tests and vaccines to secure people from this international public health emergency.

Keywords: Aedes, Flavivirus, Guillain Barre Syndrome, microcephaly, Zika Virus

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Introduction

Zika Virus is a member of the virus family flaviviridae and the genus Flavivirus¹. It is spread by daytime active Aedes mosquitoes, such as *A. aegypti* and *A. albopictus*¹. This is the same mosquito that spreads and causes dengue, chikungunya and yellow fever^{1,2}. As early as August 2014, physicians in Natal in northeastern Brazil began to investigate an outburst of illness character-

ized by a flat pinkish rash, blood shot eyes, fever, joint pain and headaches. While the symptoms resembled dengue fever, testing excluded dengue and several other potential causes. By March 2015, the illness had propagated to Salvador, Bahia and had turned up in three different states³. Then, in May 2015, researchers finally realized, using the RT-PCR technique, that the illness was an outbreak of Zika virus⁴.

Sexual transmission of Zika virus from men to women has been witnessed in at least 4 cases. Zika virus has also been isolated from semen samples⁵. Cases of vertical perinatal transmission, from mother to the baby during pregnancy have been reported. Therefore, women with Zika fever should not conceive at least for 8 weeks after they start having symptoms of disease^{6,7}. The first known case of Zika fever was reported in a sentinel

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rhesus monkey stationed on a tree platform in the Zika Forest in Uganda in 1947⁸. Zika Virus was later found in humans with febrile illnesses in West Africa in 1954⁹. After that it propagated to South East Asia, and in the late 1970s it was established in Pakistan, India, Malaysia, Indonesia¹⁰, Micronesia, Thailand, Philippines, French Polynesia and Easter Island-South Pacific in 2014¹¹. Zika Virus was not documented on mainland South America until the first report of endemic transmission in Brazil in May 2015. There was an assumption at that time that Zika Virus was introduced into Brazil during the 2014 World Cup Football¹². This was not supported due to the fact that no Pacific countries with reported Zika Virus had participated in the World Cup competition. However, Pacific countries had competed in the August 2014 Va'a World Sprints canoe championship which was held in Rio de Janeiro, suggesting that introduction of Zika Virus into Brazil could have occurred after that¹³. On 28th January 2016, indigenous cases of Zika Virus infection have been reported from 26 countries in the Americas: Barbados, Bolivia, Brazil, Colombia, Curacao, Dominican Republic, Ecuador, El Salvador, French Guiana, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Martinique, Mexico, Nicaragua, Panama, Paraguay, Puerto Rico, Saint Martin, Suriname, Venezuela, Virgin island¹⁴.

No endemic Zika Virus transmission has been reported from European countries, and an intensified state of global alert is in place in Europe and USA to screen for travelers with fever returning from Zika Virus endemic countries¹⁵. The first travel associated Zika Virus disease case among United States travelers was reported in 2007. From 2007 to 2014, a total of 14 returning U.S. travelers had positive Zika Virus testing performed at UC-Centers for Diseases Control(CDC). In 2015 and 2016 at least eight U.S. travelers have had positive Zika Virus testing performed at CDC¹⁶. As of early 2016, an extended outbreak of Zika fever, caused by the Zika virus, is ongoing, chiefly in Latin America and the Pacific Islands. The outbreak which initiated in Brazil has propagated to other countries in South

America, Central America, Mexico, and the Caribbean. In January 2016, the World Health Organization (WHO) stated that the virus was likely to spread throughout most of the Americas by the end of the year¹⁷ and in February 2016, the WHO declared the couple of microcephaly and Guillain-Barré syndrome (GBS) cases reported in Brazil were strongly suspected to be associated with the Zika virus outbreak¹⁸. Most cases are asymptomatic, but when present, symptoms are usually mild and can resemble dengue fever. Symptoms generally last not more than seven days¹⁹. Symptoms may include fever, red eyes, joint pain, headache, and a maculopapular rash. It has not caused any reported deaths during the initial infection.

It is seen that 1.5 million people have been infected by Zika virus in Brazil. Newly in Brazil, local health authorities have noticed a rise in Guillain-Barré syndrome, a neurological disorder that could lead to paralysis and death, which occurred at the same time with Zika virus infections in general public. About 3,500 cases of babies born with microcephaly have been reported between October 2015 and January 2016, that is they are born with unusually small heads in northeast Brazil^{20,21}.

It is hard to diagnose Zika virus infection based exclusively on clinical signs and symptoms due to overlaps with other arboviruses that are common to similar areas²². The methods obtainable to test for Zika antibodies cross-react with dengue antibodies. An IgM-positive result in a dengue or Zika ELISA test can only be considered significant of a recent flavivirus infection. Plaque-reduction neutralization tests can be prosecuted and may be specific²³. The Zika virus can be isolated by RT-PCR in acutely ill patients²⁴. Mosquitoes and their breeding sites present a substantial risk factor for Zika virus infection. Prevention and control depends on reducing mosquitoes through removal and restriction of breeding sites and reducing contact between mosquitoes and people. This can be done by using insect repellent on regular basis; wearing clothes that cover most of the body, using physical barriers such as window screens, closed doors and windows,

sleeping under mosquito nets during the day. It is urgently required to empty, clean or cover containers regularly that can store water, such as buckets, drums, pots etc. Other mosquito breeding sites should be cleaned or removed including flower pots, used wheels of vehicles and roof gutters. Communities must support the local government to minimize the density of mosquitoes in their areas²⁵. People sick with Zika virus should get plenty of rest, drink enough fluids, and treat pain and fever with common medicines. If symptoms get worse, they should seek medical care and advice. At present, there is no vaccine available²⁶.

Conclusion

WHO has declared Zika virus as an international public health emergency therefore, a coordinated and an organized international response is required to improve the surveillance, identification of infections, congenital malformations, and neurological complications, to heighten the control of mosquito populations, and to execute the development of diagnostic tests and vaccines to secure people at risk, especially during pregnancy.

Conflict of Interest

Authors have no conflict of interests and no grant/ funding from any organization for this study.

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