

ZIKA VIRUS AND ITS PATHOGENICITY

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ABSTRACT

Viral diseases are very severe and its spread is always very fast and spreads across the globe in a very short span of time. Zika virus is a disease which is mainly caused by the virus which is primarily transmitted by the Aedes mosquitoes. People suffering from the infection of Zika virus usually have the symptoms which include mild fever, skin rashes, conjunctivitis, muscle and joint pain, malaise or headache. Zika virus mainly bites during the daytime. The major symptoms of the infection last only for two to seven days. Zika virus and its infection especially during the period of pregnancy can cause the infants to be born with microcephaly and other birth-related anomalies.

KEYWORDS: *Zika Virus, The Infants to be Born with Microcephaly*

INTRODUCTION

The mode of transmission of Zika virus is primarily by the aedes mosquitoes. Zika virus is a mosquito-borne flavivirus which was first isolated in Uganda in the year 1947 among the monkeys through a network which monitored yellow fever. The spread of infection from the pregnant mother transplacentally to the foetus is very dangerous. This virus can also spread through sexual contact. There are many evidence and supporting studies which report that the virus can also spread through the blood transfusions. The outbreaks of Zika virus is especially noted in the United States, Africa, Southeast Asia, the Pacific islands parts of the Caribbean, and Central and South America.

HISTORY OF ZIKA

Zika virus was first discovered in 1947 and is named after the Zika Forest in Uganda. The first incidence of Zika virus among the humans was identified in 1952, in Uganda and the United Republic of Tanzania. During the period from the 1960s to 1980s, the human outbreaks of Zika have been reported in tropical Africa, Southeast Asia, and the Pacific Islands typically accompanied by mild illness. The major outbreak of the Zika virus was reported from the island of Yap. Before 2007, at least 14 cases of Zika had been documented, although other cases were likely to have occurred but may not have been reported. The major reason for Zika virus to remain unnoticed and unreported was due to the symptoms of Zika virus which are basically similar to those of many other diseases, many cases may not have been recognized. In 2015, in Brazil reported an association between Zika virus infection and Guillian-Barre syndrome.

World health organization has declared the Zika virus infection has a Public Health Emergency of International Concern (PHEIC) on 1st February 2016.

About the Zika Virus (ZIKV)

- Zika virus belongs to the member of virus family Flaviviridae.
- Its name comes from the Zika Forest of Uganda, where the virus was first isolated from the blood of a sentinel rhesus monkey from the Zika forest in Uganda in 1947.
- The symptoms of Zika virus has a similar association related to the dengue, yellow fever, Japanese encephalitis, and West Nile viruses.
- The outbreak of Zikar virus is especially noted across the narrow equatorial belt from Africa to Asia.
- During the period from 2007 to 2016, the spread of the virus was noted across the eastward, the Pacific Ocean to the Americas, leading to the 2015–16 Zika virus epidemics.
- It is mainly known to occur and spread by the bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*). These mosquitoes especially bite during the day and rarely in the night time.
- Zika virus can be passed transplacentally to the growing foetus. A newborn baby can have certain birth defects such as microcephaly.
- As of till now there has been no advancement and we don't have vaccine or medicine to fight against Zika virus. The death with the virus is infection is rarely rare.
- Once a person is infected with the Zika virus, he or she is likely to be protected lifelong.
- The virus has an incubation period of 2-7 days but may extend to a few weeks.

MODE OF TRANSMISSION

Zika can be transmitted

- Through the bites of infected mosquitoes such as *Aedes africanus*, *Aedes luteocephalus*, *Aedes aegypti*.
- From the infected pregnant woman to her growing fetus.
- Through sex.
- Through blood transfusion (very likely but not confirmed).

Pathogenesis

Zika virus primarily replicates within the midgut and epithelial cells of mosquito and then spreads gradually to the salivary gland cells. After 5–10 days, the virus can also be found in the mosquito's saliva. If the mosquito's saliva is inoculated into human skin, Zika virus especially infects the epidermal keratinocytes, skin fibroblasts in the skin and the Langerhans cells. The pathogenicity of the virus is believed or assumed to continue with a spread to lymph nodes and the bloodstream. Flaviviruses are known to replicate in the cytoplasm, but Zika antigens have been found in infected cell nuclei

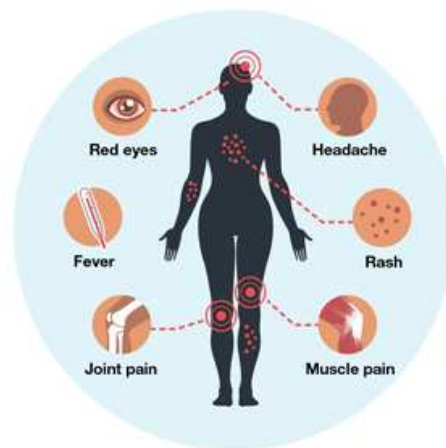


Figure 1: Symptoms of Zika

Symptoms

Many people infected with Zika virus won't have symptoms and remains asymptomatic. Infected peoples usually have mild symptoms. The most common symptoms of Zika virus are

- Zika fever which is afebrile or sub-febrile illness which is caused primarily by the Zika virus.
- Rashes across the skin which is typically known as a maculopapular rash.
- Acute onset of fever.
- Headache.
- Joint pain.
- Red eyes.
- Muscle pain.
- Conjunctivitis.
- Low back pain.

Symptoms usually last for several days to a week. People usually don't get sick enough to go to the hospital, and they very rarely die of Zika virus infection. Once a person has been infected with Zika, they are likely to be protected from future infections.

Complications

- Zika virus infection during pregnancy can result in severe birth defects known as microcephaly and other severe fetal brain defects.
- There are various reports which suggest the linkage between the Zika virus and miscarriage, stillbirth, and other birth defects.

- Various research studies and reports suggest that Guillian-Barre Syndrome, an uncommon common sickness of the nervous system is also mainly affected by the Zika virus.

Prevention

There is no vaccine available till now to prevent Zika virus. The best way to prevent disease is to prevent the spread by mosquitoes and to protect self, family, and community from the mosquito bites.

Clothing



Figure 3: Clothing for Zika Prevention

- It is advisable to wear the full sleeved shirts and long pants to prevent the bite of mosquitoes.
- All the dress materials and clothing need to be treated with permethrin or the clients can buy pre-treated dresses to prevent infection from the virus.

Insect Repellent



Figure 4: Insect Repellent

- The key method to control the Zika virus infection is by the adoption of a comprehensive approach by doing regular vector surveillance and integrated management of the Aedes mosquitoes.
- Biological and chemical control of Aedes mosquitoes is safe and cost-effective.
- The Environmental Protection Agency (EPA) is a registered insect repellent with one of the following active ingredients such as DEET, picaridin, IR3535, oil of lemon eucalyptus or para-menthane-diol, or 2-undecanone. Always follow the instruction label of medicine use.
- When the insect repellents are used as directed are proven to be safe and effective even for pregnant and breastfeeding women.
- Do not use insect repellents on babies younger than 2 months old. Do not use products containing oil of lemon eucalyptus or para-menthane-diol on children younger than 3 years old.

At Home

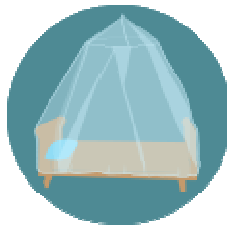


Figure 7: Mosquito Nets

- Avoid allowing the standing of water in outdoor containers like flower pots, bottles, etc so that they do not become the mosquito breeding sites.
- Take the steps to prevent the breeding of mosquitoes inside and outside your home.
- Proper air conditioning, windows and door screens are advisable to prevent the bites of mosquito.
- Mosquito nets are the best and advisable, especially for the babies and children. It is best to sleep under mosquito nets.
- Sexual transmission: Prevent sexual transmission of Zika by using condoms or not having sex.
- It is advisable to carry out the spraying of insecticides in areas where the infection of Zika virus is common.
- Gambusia fish is found to fight Zika virus mosquitoes.

Diagnosis

- Zika virus usually remains in the blood of an infected person for about a week.
- Infection of Zika virus is usually suspected based on the person's recent travel history where Zika virus is common, symptoms, and test results.
- A blood or urine test can isolate the Zika Virus.
- Zika virus is also isolated from the vaginal fluids, saliva or semen.
- Symptoms of Zika virus are similar to other illnesses which spread through mosquito bites, like dengue and chikungunya.

Treatment

The infection of Zika virus is relatively mild and requires no specific treatment. There is no specific medicine or vaccine available for Zika virus. The symptoms of Zika virus is managed by the following interventions:

- A client should be advised of the benefits of plenty of rest.
- Drink plenty of fluids to prevent dehydration.
- Symptomatic treatment is advised by prescribing acetaminophen or paracetamol to reduce fever and pain.

- Antihistamines are given to manage pruritic rashes
- Do not take aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs).
- If you are taking medicine for another medical condition, talk to your healthcare provider before taking additional medication.

Caring for Affected Persons

The steps need to be taken which are necessary to prevent exposure from the infected person's blood and body fluids. Pregnant women should take care and avoid traveling to the infection-prone areas and follow these steps

- Do not touch blood or body fluids or surfaces without gloves.
- Wash hands with soap and water immediately after providing care.
- Immediately remove and wash clothes if they get blood or body fluids on them. Use laundry detergent and water temperature specified on the garment label. Using bleach is not necessary.
- Clean the sick person's environment daily using household cleaners according to label instructions.
- Immediately clean surfaces that have blood or other body fluids on them using household cleaners and disinfectants according to label instructions.

If you visit a family member or friend with Zika in a hospital, you should avoid contact with the person's blood and body fluids and surfaces with these fluids on them. Helping the person sit up or walk should not expose you. Make sure to wash your hands before and after touching the person.

CONCLUSIONS

Zika is a disease caused by the Zika virus that is spread to people mainly from the bite of an infected *Aedes* species mosquito. About one in five people infected with Zika will get sick. The illness is usually mild with symptoms lasting for several days to one week. Most people will not realize they have been infected. Proper timely prevention and treatment can keep away us from Zika impacts.

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