

Newly born baby from a Zika virus affected mother



KANTI BHOOSHAN PANDEY

The Zika virus is spreading explosively and may infect up to four million people all over the world.

Fright of Zika

THE explosive spread of the Zika virus has caught the world unawares. Infected mothers are giving birth to babies with an abnormally small head having neurological disorders like microcephaly and reduced life expectancy. In the past few weeks, the disease has gone viral.

The World Health Organization (WHO) has declared Zika virus infection a public health emergency of international concern. Till date no vaccine or any specified medicine is available to treat Zika virus infection. In 2007, the first large outbreak of Zika virus was reported on Yap Island in Micronesia, however at that time these viruses were not widely studied. Researchers at that time believed that the strain of Zika virus had mutated from an original virus found at that place with overexpressed virulence.

All of that changed in 2013 when the Zika virus was once again in the news with large outbreaks in French Polynesia and subsequently Brazil in 2015 when Health Authorities reported potential neurological as well as auto-immune complications of the Zika virus infection.

The Discovery

It was a Rockefeller Foundation-funded yellow fever outpost, which later evolved into the Uganda Virus Research Institute (UVRI), whose researchers in the mid-1940s during conduct of yellow fever experiments in the middle of Zika forest, realized that different mosquitoes are active at different elevations.

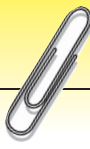
They constructed a massive steel structure in the middle of the forest to conduct further experiments in this direction. The lead in the view was obtained by a Scottish medical entomologist named Alexander Haddow in April 1947 who first identified Zika viruses in rhesus monkey suffering from fever. Blood samples revealed an unknown virus that, as protocol dictated, was named Zika after the forest in which it was first identified. Zika forest is near Lake Victoria in Uganda.

The first evidence of Zika virus infection in humans came in 1952 which was the result of serological surveys in Uganda and Nigeria during an outbreak of yellow fever. Antibodies against Zika virus were identified in people of the area during investigation of jaundice suspected to be yellow fever. It was observed that a

10-year-old Nigerian girl with headache, low fever and with other symptoms of yellow fever recovered within three days. The blood of the victim girl was injected into the laboratory mice brains and after subsequent studies. It was not until 1954 that the successful isolation of Zika virus from a human was published based on this study.

The Zika virus belongs to the family *Flaviviridae* and genus *Flavivirus*. *Flaviviridae* is the same family to which the virus for dengue fever belongs. With single-stranded, positive-sense RNA as genetic material, Zika virus is enveloped and icosahedral in structure.

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FEATURE ARTICLE

Some researchers are also claiming that Zika virus can live in the urine and saliva samples of infected person.

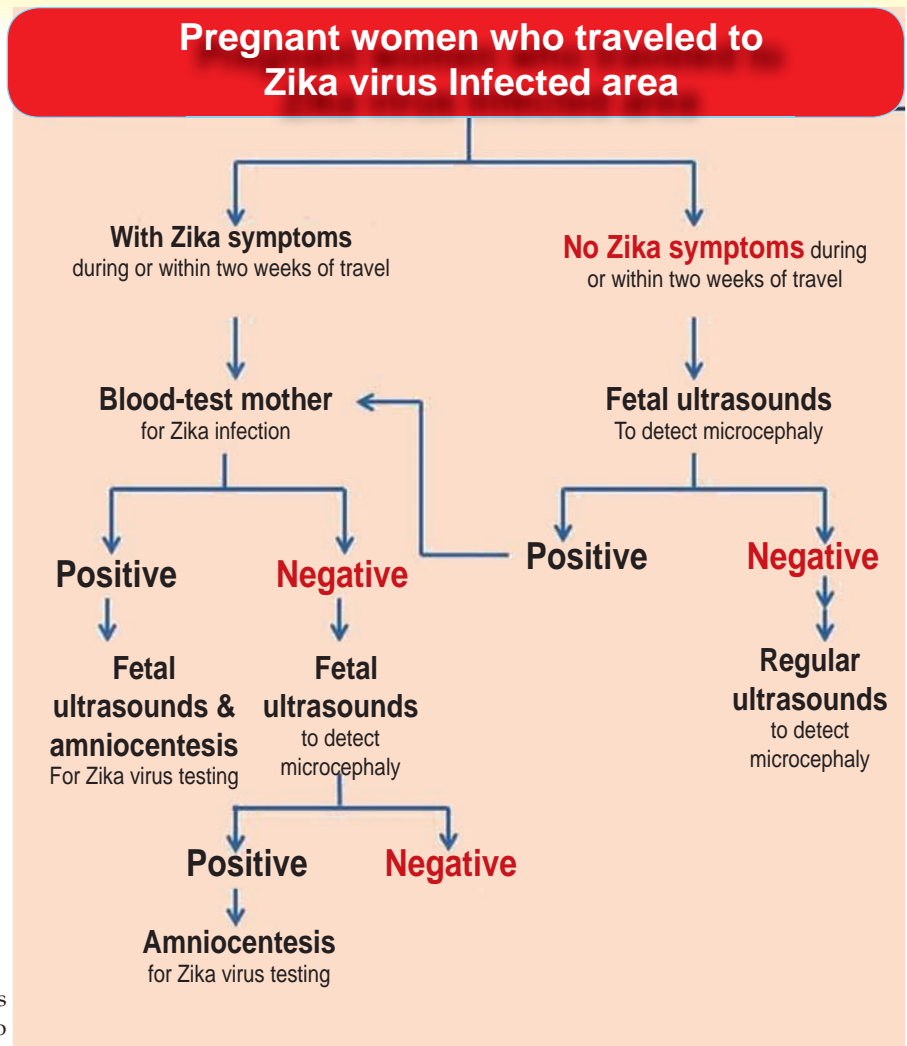
However, no scientific evidence has been provided yet. It is assumed that a combination of broad geographical distribution of mosquito species, lack of immunity against viral infections and unavailability of both vaccine/mediation and reliable rapid diagnostic tests raise the concerns that Zika virus infection may spread globally.

Way of Transmission

Zika virus uses *Aedes aegypti* mosquitoes as vector to spread. It is transmitted to people through the bite of an infected *Aedes* mosquito in tropical regions. Actually, Zika virus follows an enzootic mosquito-monkey-mosquito cycle with occasional transmission to humans.

When first identified, the virus was only proven to infect monkeys. Before beginning of the current pandemic in 2007, Zika virus was very rarely reported to cause infections in humans. Incredibly well adaptation to thrive alongside the humans makes the *Aedes* mosquito a unique vector to carry the viruses, threatening humans. In addition, *Aedes* can breed and rest in small pools of water and moist environment around people's homes.

There is also growing concern about the transmission of Zika virus through sexual contact. Authorities have reported that an American biologist was thought to have transmitted Zika to his wife through intercourse after returning from Senegal, a Zika affected place in 2008, however this claim is under investigation.



The U.S. Centers for Disease Control and Prevention (CDC) has issued guidance on how to care for pregnant women during Zika outbreak and whether to get tested for Zika (graphical chart).

Starting in 2015 from Brazil, Colombia and Africa, within a few months more than 24 countries have reported sporadic Zika virus infections indicating rapid geographic expansion of this virus. As per a report of the WHO, a number of travellers infected with Zika virus are moving around the world. The current environmental conditions of most countries are not favorable to *Aedes* to grow, however with the onset of spring and summer, the risk that Zika virus will spread may increase.

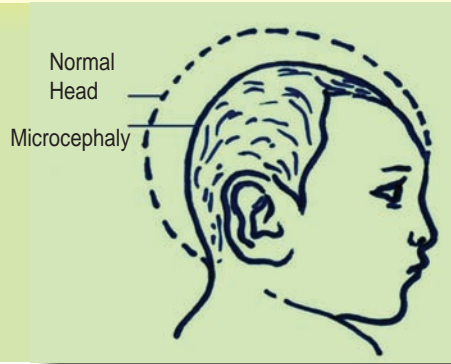
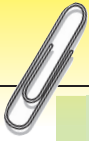
Danger of Zika Virus

Zika virus is not considered dangerous to anyone apart from pregnant women. In vast majority of cases, Zika virus infection causes no symptoms at all, that is often people who get infected do not even realize it and therefore never seek any

medical attention. About one out of five people infected with Zika virus become ill.

The symptoms of Zika virus infection vary from person to person. However, some common symptoms are fever, muscle pain, headache, conjunctivitis, joint pain and rashes around three to twelve days after being bitten by a mosquito. The more rarely observed symptoms include digestive problems such as abdominal pain, diarrhea, constipation, mucous membrane ulcerations (aphthae), and pruritus. All the symptoms remain temporary and within 3-4 days the rash starts fading and fever and pain resolves.

Recently, scientists noted that some people infected with Zika virus were later diagnosed with Guillain-Barre, a neurological condition when people's immune system damages their own



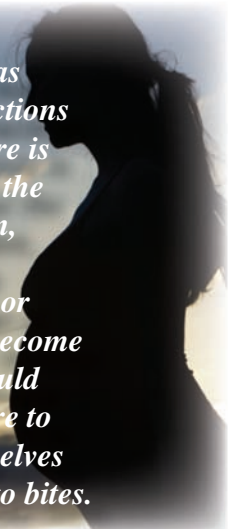
nerve cells leading to muscle weakness. However, this is rare and whether such autoimmune disorders originate in people diagnosed with Zika virus infection or due to any other reason, is not yet clear.

The Zika virus remains in the blood of the infected person for about a week but it can be found longer in people with compromised immunity. The initial symptoms of Zika virus infection are quite similar to dengue and chikungunya, the viral diseases spread through the same mosquito which transmits the Zika virus. The incubation period of Zika virus is not yet exactly clear, but is likely to be a few days.

Pregnant Women at High Risk

The serious concern of Zika virus infection is pregnancy. Pregnant women who become infected with Zika virus can transmit the disease to their unborn babies, with potentially serious consequences. The infected mothers give birth to babies with abnormally shrunken head and incomplete brain development with complications like microcephaly – a congenital disorder.

The WHO has issued instructions that until more is known about the Zika infection, women who are pregnant or planning to become pregnant should take extra care to protect themselves from mosquito bites.



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An infant with microcephaly possess below average head size because of impaired development in the mother's womb. Babies with microcephaly depending upon severity can have a range of health problems including intellectual disability, movement imbalance, hearing loss and vision problems. Microcephaly affected babies have feeding problems, such as difficulty in swallowing. These problems can range from mild to severe and are often life-long. There is no known cure or standard treatment for microcephaly and due to complications the affected babies have a reduced life span.

Zika virus affected countries including countries of Latin America, Brazil, France and El Salvador. The WHO has issued instructions that until more is known about the Zika infection, women who are pregnant or planning to become pregnant should take extra care to protect themselves from mosquito bites. In some severely affected countries, women are being told to avoid pregnancy for months or years because of Zika virus.

Information is Protection

No vaccine or any specified medicines are available to treat Zika virus infection till date, only symptoms are being treated. Plenty of rest and drinking excess fluids to avoid dehydration and taking 'acetaminophen' based medicines to relieve the fever and pain, are the recommended prescriptions for the infected. Taking aspirin or other non-steroid anti-inflammatory drugs are strictly prohibited in Zika virus infection since these drugs may cause bleeding.

The best form of prevention from Zika viruses is protection against mosquito bites. Mosquitoes and their breeding sites pose a significant risk factor for Zika virus infection. Since Aedes mosquitoes are more active during day time, the chance of being infected is throughout the day. Control relies on reducing mosquitoes through source reduction. People in vulnerable areas are advised to wear full armed clothing that covers as much of the body as possible. Use of insect repellent, hanging mosquito nets and keeping windows and doors

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closed to restrict entrance of mosquitos are the other suggested safely measures.

India is Vulnerable

The outbreak of Zika virus started in Brazil and some parts of Latin America but has now spread to many countries. As per WHO warning, the Zika virus is spreading explosively and may infect up to four million people all over the world.

India has ideal atmospheric conditions for the growth and spread of Aedes mosquitoes. Many people live in communities with lack of sanitation and drainage that makes the condition perfectly hospitable for Aedes. Assumptions are that, if Zika virus enters the country, it will spread explosively and the situation would be critical to handle.

Many questions related to Zika virus are still to be answered including the period during pregnancy when women are most at risk, beyond knowing what time the brain develops. Since the virus has been found in the amniotic fluid of the pregnant women carrying babies with birth defects, the frequency of these defects are also a major concern.

In addition, some researchers are also claiming that Zika virus can live in the urine and saliva samples of infected person. However, no scientific evidence has been provided yet. It is assumed that a combination of broad geographical distribution of mosquito species, lack of immunity against viral infections and unavailability of both vaccine/mediation and reliable rapid diagnostic tests raise the concerns that Zika virus infection may spread globally.

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