



# AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: <http://www.ajptr.com/>

## Zika Virus Disease-Epidemiology, Diagnosis, Prevention and Treatments

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### ABSTRACT

Zika virus is a member of the Flavivirus family which was discovered in Uganda in 1947. Zika virus was widely spread in areas of Africa & Asia in 2007. The first Zika virus infection is confirmed in Brazil. This virus transmitted via infected mosquito belonging to *Aedes* mainly of type *Aedes aegypti*. It may be suspected from symptoms of the patient but detection of Zika virus disease can only be done by laboratory testing for presence of Zika virus RNA in the blood or other body fluids such as urine or saliva. This disease shows symptoms like Yellow fever, joint pain, and headache & skin rashes. ZVD (Zika Virus Disease) is usually mild but don't have specific treatment. The ZVD patient should take rest, drink enough fluid & treat pain & fever with common medicines. As there is no vaccine on this disease the person should take prevention to stay away from ZVD.

**Keywords:** Zika Virus Disease, Endemic, Epidemic, Flavivirus, Microcephaly.

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Received 24 June 2016, Accepted 28 July 2016

Please cite this article as: Jamkhandi CM *et al* Zika Virus Disease-Epidemiology, Diagnosis, Prevention and Treatments . American Journal of PharmTech Research 2016.

## INTRODUCTION

There is currently an ongoing outbreak of Zika virus infection in South and Central America and Caribbean, and increasing evidence that infection in pregnancy may be associated with fetal microcephaly and other central nervous system abnormalities. Zika virus infection is typically mild and short-lived in most individuals, but particular is required for travel associated risk in women are pregnant or who are planning a pregnancy<sup>1-3</sup>.

This guidance summarizes key advice for those working in primary care, since they may be consulted by patient, including pregnant women, who are travelling to or returning from countries that are part of this outbreak (that is, those countries with active Zika transmission.)

Zika virus diseases is caused by an RNA virus transmitted to human by *Aedes mosquitoes*, especially by the *Aedes aegypti* species, Up to eighty percent of Infection are asymptomatic Symptomatic infection are characterized by a self Limiting febrile illness for duration of 4-7 days which accompanied by maculopapular rash, arthralgia, conjunctivitis, myalgia and headache. Zika virus has not been noted to cause death in the past, nor has it been linked to intra-uterine infection and congenital CNS anomalies. Nor has Zika virus infection been linked to GBS before 2014 when a possible association between Zika virus Infection and GBS was reported during and outbreak in French Polynesia (Figure 1). There is no vaccine to prevent Zika virus Infection or specific anti-viral treatment available<sup>5-8</sup>.

### Pathogen Profile of Zika Virus Vector

#### Aedes Mosquitoes

- Aedes species mosquitoes
  - *A aegypti*: more efficient vectors for humans
  - *A albopictus*: found in some parts of NYS
- Also transmit dengue and chikungunya viruses
- Lay eggs in domestic water – holding containers
- Live in and around households
- Aggressive daytime biters

### Modes of Transmission

- Mosquito Bite
  - From infected to uninfected humans and primates by bite of mosquito primates by bite of a mosquito
- Other possibilities

- Sexual
- Blood Transfusion
- Theoretical
  - Organ or tissue transplantation
  - Breast Milk

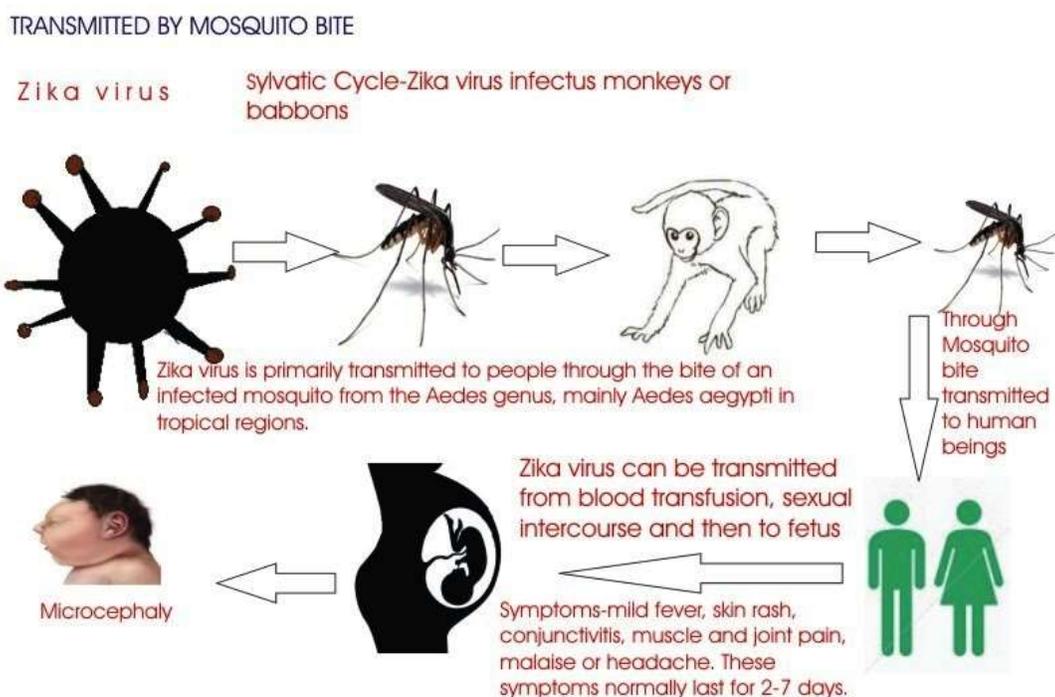
### Zika Virus Epidemiology

- First isolated from monkey in Uganda in 1947
- Prior to 2007, only sporadic human disease cases reported from African and Southeast Asia
- In 2007, first outbreak reported on Yap Island ,Federated States of Micronesia
- In 2013-2014,>28,000 suspected cases reported from French Polynesia

### Zika Virus Incidence and Attack Rates

- Infection rate : 73 % (95% CI 68-77)
- Symptomatic attack rate among infected ;18%(98%CI 10-27)
- All age group affected
- Adults more likely to present for medical care
- No serves disease, hospitalization, of deaths

## TRANSMISSION AND SYMPTOMS OF ZIKA VIRUS



**Figure 1: Transmission and symptoms of Zika Virus Disease**

## Zika Virus Clinical Disease Course and Outcomes

- Clinically illness usually mild
- Most common symptoms are a maculo or papular rash, fever, arthralgia, conjunctivitis, myalgia, and headache
- Symptoms last several days to a week.
- Severe disease requiring hospitalization uncommon
- Fatalities disease rare, typically only with co morbidities
- Guillain-Barre syndrome reported in patient following suspected Zika virus infection
- Relationship to Zika virus infection is not known

## Symptoms

- Most people infected with Zika virus won't even know they have the disease because they won't have symptoms. The most common symptoms of Zika are fever, rash, joint pain, or conjunctivitis (red eyes). Other common symptoms include muscle pain and headache. The incubation period (the time from exposure to symptoms) for Zika virus disease is not known, but is likely to be a few days to a week.
- See your healthcare provider if you are pregnant and develop a fever, rash, joint pain, or red eyes within 2 weeks after traveling to a place where Zika has been reported. Be sure to tell your health care provider where you traveled.
- The illness is usually mild with symptoms lasting for several days to a week after being bitten by an infected mosquito.
- People usually don't get sick enough to go to the hospital, and they very rarely die of Zika. For this reason, many people might not realize they have been infected.
- Zika virus usually remains in the blood of an infected person for about a week but it can be found longer in some people.
- Once a person has been infected, he or she is likely to be protected from future infections.
- Zika virus remains in the blood of an infected person for about a week but it can be found longer in some people.
- Pregnant women symptoms like fever, rash, joint pain, or red eyes within 2 weeks after travelling to a place where Zika has been reported
- Symptoms usually begin 3-12 days after being bitten by an infected Mosquito and last several days to a week.
- Hospitalizations and death from Zika are rare.

- About one and five people develop symptoms and infection usually mild<sup>9-14</sup>.

### **Differential Diagnosis for Zika Virus Disease in Returning Travelers**

- Dengue
- Chikungunya
- Leptospirosis
- Malaria
- Rickettsia
- Parvovirus
- Group A streptococcus
- Rubella
- Measles
- Adenovirus
- Enterovirus

### **Laboratories for Diagnostic Testing**

- No commercially- available diagnostic tests
- Testing performed at NYSDOH's Wadsworth Center and CDC
- CDC is working to expand laboratory diagnosis testing to other states
- Health care providers should contact their local health department to facilitate diagnostic testing at Wadsworth
- Real time PCR assay to detect viral RNA in serum and urine collected  $\leq 7$  days after illness
- Serological assays to detect either IgM or IgG in serum collected  $\geq 4$  days after illness onset. Detects both Zika-specific and cross-reactive antibody
- Plaque reduction neutralization test (PRNT) to detect a  $\geq 4$ -fold rise in Zika virus-specific neutralization antibodies in paired sera

### **Risk associated with Zika Virus**

Zika can be spread from a pregnant woman to her unborn baby. There have been reports of a serious birth defect of the brain call Microcephaly and other poor pregnancy outcomes in babies of mothers who were infected with Zika while pregnant. Until more is known about the link between Zika and these outcomes CDC recommends the following special precautions

Women who are pregnant (in any trimester)

- Consider postponing travel to any area where Zika virus transmission is ongoing.

- If you must travel to one of this area, talk to your doctor first and strictly follow steps to prevent mosquito bites during your trip.

Women who are trying to become pregnant:

- Before you travel, talk to your doctor about your plan to become pregnant and the risk of Zika virus infection.
- Strictly follow steps to prevent mosquito bites during your trip.

#### **Risk associated with Citizens residing in area with active local transmission**

- Traveler visiting countries where there is active transmission of Zika virus should be made aware of the ongoing outbreak of Zika virus infection.
- Travelers visiting this countries and EU citizens residing In this countries should take major to prevent mosquito bites indoors and outdoors ,especially from sunrise to sunset when *Aedes mosquitos* Vector are most active in Biting this major include ,
  - The use of Mosquito repellent in accordance with the instructions indicated on the product label
  - Wearing long –Sleeved shirts and long trousers especially during the hours when the type of mosquito transmit the Zika virus (*Aedes*)is most active
  - Sleeping or resting in screened or air conditioned rooms, otherwise use mosquito nets, even during the day.
- Travelers with Immune disorders or severe chronic illnesses should concern there doctor or seek advice from a travel clinic before travelling, particularly on effective prevention measures (Figure 2).
- Traveler showing symptoms compatible with Zika virus disease within two weeks of return from an affected area advise to contact healthcare provider and mention their recent travel<sup>15-23</sup>



**Figure 2: Global Status of Zika Virus (courtesy WHO report 21 April 2016)**

## TREATMENT OF ZIKA VIRUS:

### Allopathic Treatment:

- Taking medicine such as Acetaminophen or Paracetamol to relieve fever and pain.
- Aspirin and other Non – Steroidal anti- inflammatory drugs, like Ibuprofen and Naproxen should be avoided until dengue can be ruled out to reduce the risk of increased bleeding<sup>24</sup>.

### Ayurvedic Treatment:

Ayurveda, 5000 year old medical science based on natural system, has some excellent preventive and curative solutions to all diseases. The most significant aspect of this measures is that a entirely based on natural substance and therefore totally safe on the human body without causing any kind of side effects.

#### ○ Prevention

- Maintain a safe distance from people that show evident signs of nasal congestion or flu symptoms.
- Do not share food, glasses .forks.
- Open and Ventilate enclosed rooms.
- Keep kitchen counter tops and bathrooms disinfected with bleach disinfect toys, Phones door knobs and any contact surface with alcohol.
- Visit your doctor immediately if you experience sudden high fever and cough with headache and muscle pain.
- Avoid sudden temperature change
- Eat fruits and vegetables rich in Vitamin A and C (Carrots ,Papaya, Orange, Lime Lemon and Pineapple)
- Frequently wash hand thoroughly with plenty of soap and water.

#### ○ **Treat the Symptoms**

- Get plenty of rest.
- Drink fluids to prevent dehydration.
- Do not take aspirin or other non-steroidal anti-inflammatory drug.
- If you are taking medicine for another medical condition, talk to your health care provider before taking additional medication<sup>25-28</sup>.

### Home remedies to cure Zika infection naturally

- **Kwatha(Decoction):** Take 5 Tulasi(basil) leaves , 4 kali mirch (whole black pepper) beads , 3 laung (clove) , buds and 1 teaspoonful of fresh grated Adraka (ginger). Mix

them in a glass of water and boil the entire mixture until the quantity of water is halved. Filter and add a teaspoonful of honey. Your ayurvedic decoction is ready. Take this decoction twice daily.

- **Golden milk:** Add teaspoonful of turmeric powder in a glass of warm milk. Drink it every night.
- **Herbs:** Mix to 1 teaspoonful of sitopaladi churna with 1 teaspoonful of honey and have it twice a daily.

**Madhuparni tablet:** **Madhuparni** is one of the best herbs to prevent. It has been claimed that madhuparni is one of the greatest herbal remedies for the prevention of any kind of viral infection. It is a great Immuno modulator. It strengthens the immune system and builds resistance in the body of fight diseases. Madhuparni is also a very good remedy to treat fevers especially fevers from unknown reasons.

#### **Homeopathic Treatment:**

- Homeopathic medicine Eupatorium perfoliatum, Belladonna, Rhus Tox can be safely used in Zika virus infection treatment.
- These medicines come to closest in treating the symptoms of Zika virus infection.
- In an epidemics when a huge number of person are attacked by acute and similar suffering from similar cause homeopathic can be of great prophylactic he

#### **Preventive Measures:**

- Mosquitoes and their breeding sites pose a significant risk factor for Zika virus infection. Prevention and control relies on reducing mosquitoes through source reduction (removal and modification of breeding sites) and reducing contact between mosquitoes and people.
- This can be done by insect repellent regularly; wearing clothes that cover as much of the body as possible; using physical barriers such as window screens, closed doors and windows; and if needed additional personal protection such as sleeping under mosquito nets during the day.
- It is extremely important to empty, clean or cover container to regularly that can store water, such as buckets, drums, pots etc.
- Other mosquitoes breeding sites should be cleaned or removed including flower pots, use tyres and roof gutters.

- Repellents should contain DEET (N, N-diethyl-3-methylbenzamide), IR3525 (3-[N-acetyl-N-butyl]-aminopropionic acid ethyl ester).
- Product label instructions should be strictly followed. During outbreaks, health authorities may advise that spraying of insecticides be carried out.

#### **Response of WHO in prevention and control of Zika Virus:**

- Define and prioritize research into Zika virus disease by convening expert and partner.
- Enhance surveillance of Zika virus and potential complications.
- Strengthen capacity in risk communication to help countries meet their commitments under the International Health Regulations.
- Provide training on clinical management, diagnosis and vector control including through a number of WHO collaborating centers.
- Strengthen the capacity of laboratories to detect the virus.
- Support health authorities to implement vector control strategies aimed at reducing Aedes mosquito populations such as providing larvicide to treat still water sites that cannot be treated in other ways, such as cleaning, emptying, and other covering them.
- Prepare recommendations for clinical care and follow-up of people with Zika virus, in collaboration with experts and other health agencies.

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