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Zika Virus

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Introduction

Zika virus (ZIKV) is a member of the Spondweni serocomplex within the genus Flavivovirus, family flaviviridae (Weaver et. al, 2012). ZIKV is related to dengue, West Nile, and yellow fever viruses (Lazear et. al, 2016). ZIKV was first discovered in Uganda, but since then outbreaks have been reported in Africa and Southeast Asia.

In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infection in Brazil, where it began to rapidly spread throughout the region (CDC, 2016). Recently, the World Health Organization (WHO) declared the ongoing outbreak of Zika virus and associated complications in the Americas, the Caribbean, and the Pacific a Public Health Emergency of International Concern (Coyle, 2016, p. 22). It is believed that the Zika virus will likely continue to spread to new areas (CDC, 2016).

ZIKV outbreak is very concerning, due to the fact that there currently is not a vaccine or antiviral treatment and it has been linked to fetal mortality, Guillain-Barre syndrome (GBS), and encephalopathy (Johnson, 2016). This is also a growing concern since many individuals will be traveling from all over the world to Brazil, who had their first case of ZIKV last May, for the 2016 Summer Olympics.

The purpose of this subject matter is to educate and spread awareness of the disease process to help prevent the disease from continuing to spread throughout the world.

Signs and Symptoms

According to Coyle (2016), eighty percent of those infected with Zika virus will have no symptoms, and those who are symptomatic typically show signs that include:

Low-grade fever
Maculopapular Rash
Conjunctivitis
Myalgia
Arthralgia
Headache
Malaise
(Weaver et al, 2016)

For the twenty percent that do exhibit these symptoms, it is important to know that the symptoms typically only last for two to seven days.

Figure 1. Sick with chikungunya, dengue, or Zika? By Centers for Disease Control and Prevention, 2016

Underlying Pathophysiology

Zika virus is an arthropod-borne virus (arbovirus); arthropod vectors include mosquitoes, ticks, and fleas. Once a mosquito is infected with the virus, the virus replicates in the mosquito's gut, and passes the virus onto a human with its bite (Coyle, 2016, p. 22). Following a mosquito bite from an Aedes aegypti or Aedes albopictus, keratinocytes and dendritic cells in the skin are presumed to be the initial targets of ZIKV infections. Studies have also showed that the phosphatidylserine receptor AXL can act as a ZIKV entry receptor and for cellular autophagy in enhancing ZIKV replication. This replication of ZIKV leads to activation of an antiviral innate immune response and production of type 1 interferons in infected cells (Hamel et. al, 2015). After the initial bite , viremia develops 1 to 5 days later, and the virus is thought to be cleared within 2 weeks. ZIKV has a positive-sense, single stranded RNA genome approximately 11 kilobases in length. The genome contains 5' and 3' untranslated regions flanking a single open reading from (ORF) that encodes a polyprotein that is cleaved into three structural proteins: the capsid (C), premembrane/membrane (prM), and envelope (E), and seven non-structural proteins (Haddow et al, 2012).

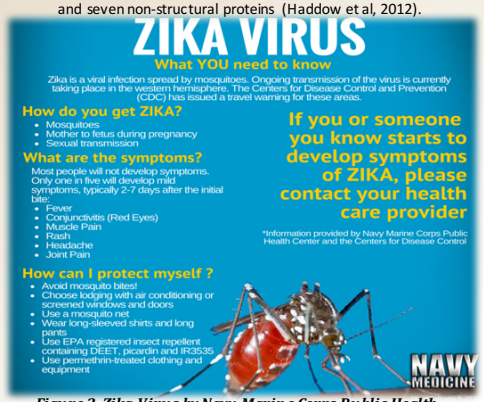

Figure 2. Zika Virus by Navy Marine Corps Public Health Center and the Centers for Disease Control

Significance of Pathophysiology

Although the pathophysiology of ZIKV is not completely understood, the complications that can arise from the virus are extremely alarming. Recently, ZIKV has been linked to fetal immortality, microcephaly, and Guillain-Barre syndrome.

Microcephaly:
- Decreased occipitofrontal circumference
- Abnormal brain development
- Developmental delay; seizures; and speech, hearing, and vision deficits

Infant mortality
- Fetal loss in first trimester
- Live births with rapid demise

Guillain-Barré syndrome
- Autoimmune disease – attacks peripheral nervous system – triggered by virus
- Progressive limb weakness and often flaccid paralysis
- Can be reversible, lead to long-term disability, or mortality

(Johnson, 2016)

Implications for Nursing Care

Advanced practice nurses (APNs) could vastly impact this issue by teaching the population ways to prevent the virus from continuing to spread to new areas. Preventing the disease from spreading can be achieved by educating others.

Prevention:

Avoid mosquito bites – while traveling and after returning for 3 weeks
- Wear insect repellent
- Wear long sleeved shirts and pants & spray with permethrin
- Sleep indoors
- Outdoors use mosquito bed net
- Avoid areas with standing water

Sexually Responsibility
- Use condoms for 8 weeks after traveling to areas with Zika to mitigate possible sexual transmission, if the individual develops symptoms a condom should be used for 6 months
- Abstinence

(Coyle, 2016)

APNs must educate the population on the different modes of transmission. This is important because it helps inhibit individuals and mosquitos from acquiring the virus. This will prevent the virus from being spread to new areas and to more individuals.

Modes of Transmission:
- *Aedes* Mosquito species bites – Mosquitos can transmit to humans and non-infected mosquitos can acquire virus from infected human
- Sexual contact
- Blood transfusion
- Crossing placental barrier

(Coyle, 2016)

Another way APNs can help prevent Zika from continuing to spread is by educating the population on the different symptoms that are associated with the Zika virus. It is important to recognize these symptoms and contact your physician, where he/she may test urine or blood for Zika.

Prevention is pivotal for controlling the spread of Zika, due to the fact that there is not an antiviral or other specific treatment available to treat the Zika virus. However, APNs can offer supportive care for symptom management (CDC,2016).

Supportive Care:
- Rest
- Fluids
- Antipyretics
- Analgesics

(Coyle, 2016)

For those who are infected, APNs can offer counseling services regarding, fetal mortality, GBS, and microcephaly

Conclusion

The Zika virus is a growing concern for the world, as it continues to spread. The fact that it is now linked to microcephaly, fetal immortality, and Guillain-Barre syndrome is worrisome. Since there is not a vaccine or antivirals available for the Zika virus, education and public awareness are vitally important to help prevent the virus from continuing to spread throughout the world.

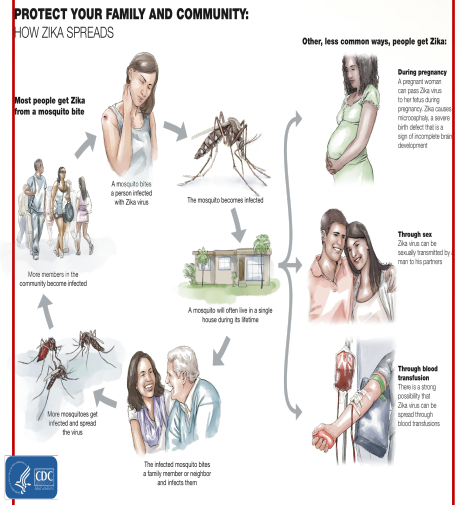

Figure 3. Protect your family and community: How Zika spreads. By Centers for Disease Control and Prevention, 2016

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