

Epidemiological Review of Emerging Zika Virus Disease

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Abstract

It is a critical arthropod-borne disease transmitted the Zika virus and spreads globally in various regions including Asia, Africa, America and the Pacific region. The mosquito is the main vector of the virus to humans. Both the incubation period and the period of short infection, the disease can be treated according to the symptoms associated with the disease, the reason is no specific treatment and difficult to prevent and control, many scientists are currently seeking to produce an effective vaccine against the virus. Therefore, relevant efforts should be combined to avoid possible neurological complications that arise after exposure to the virus, including Guillain-Barre syndrome in adults and cases of microcephaly in newborns.

Keywords: *Emerging Disease; Zika Virus; Arthropod-borne Disease; Insect; Microcephaly; Pregnancy*

Introduction

It is a critical arthropod-borne disease transmitted by a virus (arbovirus) that was first isolated from rhesus monkeys in the Ugandan Forest of Zika in 1947. The first case of a human epidemic of this virus was recorded in 2007, in the city of Yap, in the federal State of Micronesia, after which another epidemic occurred in October 2013 in French Polynesia [1] and then recurrent in 2015 [2]. This virus spreads globally in different regions including Asia, Africa, America and the Pacific regions [1,2]. This virus is transmitted to humans as a result of being exposed to a mosquito bite infected with Zika virus called the Aedes mosquito, which is the same mosquito that transmits dengue fever and chikungunya [2].

National health authorities have reported possible neurological complications that arose after infection with the virus including Guillain-Barré syndrome in adults living in French Polynesia and cases of microcephaly in Brazilian newborns [2,3]. Clinical presentation of this disease is not specified and can be wrongly diagnosed as other diseases that refer to the arboviruses [3]. The number of cases infected with the Zika virus was estimated at 30,000 [3]. Public health officials have highlighted the virus because it is strongly suspected linking with mother-fetal transmission causing microcephaly in newborns [4]. Since the travel and transportation of the Brazilians to other countries of the world will increase the risk of infection with the Zika virus [4]. Although this disease recorded a low mortality rate it still causes microcephaly and congenital syndrome in countries and regions where the Zika virus is endemic [4]. Finally, in short, it's difficult to prevent and control the Zika virus disease and the important thing is to work to minimize contact with mosquitoes as much as possible, with the advice of pregnant women not to visit and travel to the endemic regions [5].

Objective of the Study

To review the Zika virus disease epidemiologically to provide detailed information in a streamlined form to researchers and those interested in the medical field.

Detailed information about the disease

Geographical distribution

Zika virus disease spreads geographically in many continents of the world; in Africa, it distributed in Senegal, Uganda, Tanzania, Egypt, Central Africa and Ethiopia [6]. And in Asia, the disease is distributed in many countries, including Pakistan, India, Philippines, Cambodia, Malaysia, Japan, Thailand, and Vietnam, but in the Pacific, the region is distributed geographically Micronesia, South Pacific, New Caledonia, and Polynesia French and some others' countries [6]. The disease was distributed in Germany as a first infection in Europe [7]. In America, it was distributed in Brazil, Columbia, French Guiana, Ecuador and the population of El Salvador, Guatemala, British Virgin Islands and the Argentina [6].

Causative agent

It is a positive-sense RNA, single-strand and non-segmented virus related to family Flaviviridae and the genus Flavivirus [6].

Vectors and reservoir

- Monkeys: The monkeys are the main host of the Zika virus [8].
- Humans: Humans have also been considered as another host of the virus [9].
- Mosquito: Aedes mosquitoes play an important role as a vector and reservoir of the Zika virus [10].
- Additional species: Despite the presence of antibodies to the virus in the blood of some animals such as sheep, horses, goats, and cows in addition to ducks, deer, dogs, cat, rabbits, rodents and some species of the birds [8,10].

Life cycle

It is believed that the Zika virus is preserved in Aedes mosquitoes within the sylvatic cycle involving non-human transmission like Ae. Africanus, Ae. Aegypti and some other species as a mosquito vector [7]. While human infection occurs after exposure to the infected mosquito bite in the endemic areas, a secondary sexual transmission has recently been reported [11].

Incubation period

The incubation period until now is unclear but takes a few day [2,3,9] and it was estimated at 3 - 14 days [12,13].

Period of communicability

The length of the infectious period may be from the onset of pathological symptoms until the patient recovers about 1 - 2 weeks, and the presence of the virus in the blood (Viremia) is usually observed within 3 - 4 days after the onset of symptoms [1].

Mode of transmission

Zika virus has many modes to transmit the infection, including the bite of an Aedes mosquito after injecting the virus through saliva and this considers the most common way to transmit the disease [14]. The other modes are the vertical transmission of the virus from the infected mother to her fetus via the placenta [15]. Blood transfusion contaminated with the virus, sexual intercourse through the vagina, mouth, and anus [14].

Symptoms

Symptoms of Zika virus disease are characterized by a rapid observation of the infected patient [3]. The first symptoms of the disease among infected adults are usually characterized by high body temperature (fever), headache attacks, pain in the joints, occurrence of skin rash which most often is maculopapular, inflammation of the eye conjunctiva with redness, and a rare disturbance of the nervous system, which causes temporary paralysis and deposition of amounts of calcium in the cells of the brain [4,7]. In the case of pregnant infected with the virus, her fetus will usually be affected by a small head (microcephaly) and congenital malformations of the brain [16]. Not all cases

show symptoms of the disease because the researches have widely reported that Zika virus infection accounts for almost 80% without symptoms [17].

Diagnostic procedures

The pathogen is detected either by direct detection of RNA or by detecting the response of antibodies to the virus after taking a sample of blood or other bodily fluids in addition to body tissues or urine [6]. The disease can also be diagnosed with the molecular testing technique of the virus. For example, using the technique of reverse-transcription polymerase chain reaction [8]. The serological diagnosis is difficult to detect and it is not preferable because the virus can be cross-react with other viruses such as the yellow fever virus and the dengue fever [9].

Treatment

There is no specific treatment for the disease [3]. But pregnant women can be encouraged to consume more fluids and taking a bed rest [14]. And avoid taking nonsteroidal anti-inflammatory agents that may increase the risk of bleeding risk [6].

Preventive measures

The basic something to prevent disease depends on reducing the contact between people and mosquitoes as much as possible by using the technique of physical barriers such as installing nets on windows of the house and avoid sleeping in the open areas and stay away from the breeding sites of mosquitoes [6]. It is necessary to empty, clean or covers all containers filled with water to prevent the spread of mosquitoes near them [2]. Mosquito insecticides need to be sprayed during a disease outbreak while avoiding travel to endemic places, especially pregnant women [2].

Control measures

- 1) Monitoring homes and common sites to eliminate the presence of mosquito vectors, e.g. water storage reservoir and sewage pipes.
- 2) Cleaning of garbage collection sites regularly.
- 3) Use of advanced chemical and physical methods or both to control the breeding sites of mosquitoes.
- 4) Use of modern and effective insecticides as recommended by the World Health Organization (WHO).
- 5) Work to Fumigation all cargoes at ports and borders to prevent and avoid transporting mosquito larvae in different ways to other countries [4].

Complications

Here, complications of the disease can be divided into fetal/neonatal complications such as the microcephaly (small head) in newborns who are born from mothers infected with Zika virus during pregnancy and neurological complications in adults such as the occurrence of the Guillain-Barré syndrome [18]. In addition to reporting other complications such as preterm birth and exposure to miscarriage [19].

Prognosis

The prognosis of most newborns born with the microcephaly associated with the Zika virus is unclear [20].

Immunization

Currently, no vaccine against the Zika virus is available [1-4]. However, a large group of scientists around the world is working hard to develop an effective vaccine against the Zika virus [1,4]. And this vaccine should include pregnant mothers and their newborn babies [18].

Conclusion

Zika virus disease is not fatal, complications associated with it particularly in fetuses and pregnant women can affect the quality of life, they can be prevented by taking appropriate preventive ways and properly manage health. It is not easy to prevent or control the disease,

currently, no specific antiviral agent or effective vaccine is available, more studies are seeking to develop an effective vaccine against the disease.

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