Zika, an emerging zoonosis, vector-borne and sexual transmission disease, a multifaceted threat to future generations

Abstract

Zika, is considerd as an zoonotic, emerging vector-borne and sexual trasmission disease, a threat to the next generation . The objective is to collect all the current infromations about zika for providing aguideline for disease control.An intensive search of scientific literature was done in “PubMed”, “Web of Knowledge”, “Scopus”, “Google Scholar”, “SID".Result showed that this vector-borne disease also transmitted by sexual transmission and mainly affect on the forthcoming generation.Due to novel method of transmission of disease to human, global collaboration about disease control is required.

Keywords: Zika, Aedes, sexual transmission, control

Introduction:

In nuclear medicine, which helps to understand various physiological and functional events in the human body, the way to obtain images is provided by keeping the radioactive material in the target organ [30,31]. Zika disease is a Zoonotic disease. The vector is *Aedes* (family: culicidae).transmission by female *Aedes* mosquito between sunrise and sunset, lays eggs on surface of the stagnant water, the eggs can abide in unfavorable conditions for long time (months). Several species of mosquitoes belonging to the subgenus *Stegomyia* and *Dicerimyia* of *Aedes* are probably enzootic vectors in Asia and Africa. *Ae.albopictus & Ae.aegypti* are the main vectors (Fig.1). *Stegomyia*, black and white pattern, tiger Mosquito, tropical and subtropical areas, feeds the blood meal during the day, prefer to live close to human habitations.The breeding place of larvea are: pottery jugs, water storage tanks, empty pots, broken bottles. *Aedes aegypti* has high

vectorial capacity, feeds frequently on human, bite multiple human in a single meal, has an imperceptible bite, lives in nearby humans habitation community, It has been the main vector of American ZIKV outbreak. "*Aedes albopictus*was founded in Asia at the first, a suitable vector for 22 arboviruses, despite the short flight it has spread well, spread throughout tropical and subtropical areas by commercial trades and can exist in more temperate areas than *Ae.aegypti.* Several *Aedes* spp. have been implicated, including *Ae. aegypti*, *Ae. africanus*, *Ae. hensilli, and Ae. Albopictus"*(1-4)."Aedes mosquitoes are widely distributed globally, and native habitats of most species are warm tropical and subtropical regions" (5-7). Other nonvector modes of Zika virus transmission include congenital (8), perinatal (9), and sexual (10,11). Possible transmission by blood transfusion (12,13), animal bite and laboratory exposure has been described.

Fig.1. Vectors of Zika:*Aedes aegypti, Ae. albopictus*

Results:

Life cycle of zika in mosquito:

Mosquitos bite the infected patient, an then take the combination of Zika virus , pass through the epithelial midgut cell, settlement in the salivary gland, incubation is 5-10 days, find in the saliva, and then can infect the human. Zika transmission routesispresented in fig. 2.

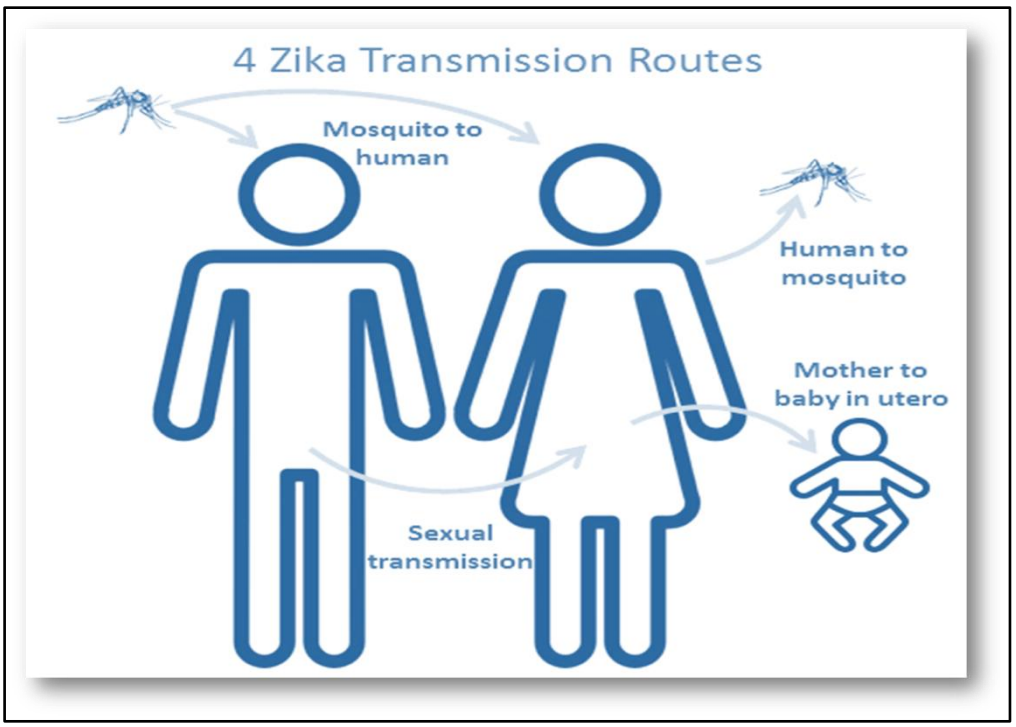

Fig.2. Zika transmission routes

The disease has sylvatic cycle which is Monkey-mosquito-monkey by *Aedes* mosquito. Urban cycle is human-mosquito-human by *Ae.aegypti* *Ae.albopictus*, *Ae.hensilii* (Fig.3).

Life cycle of virus in human:

Feeding blood by infected mosquito and then Inject the zika to skin, effect of derma and epidermal cell, pass through the lymphatic, get to blood stream and finally infect the organs and tissue

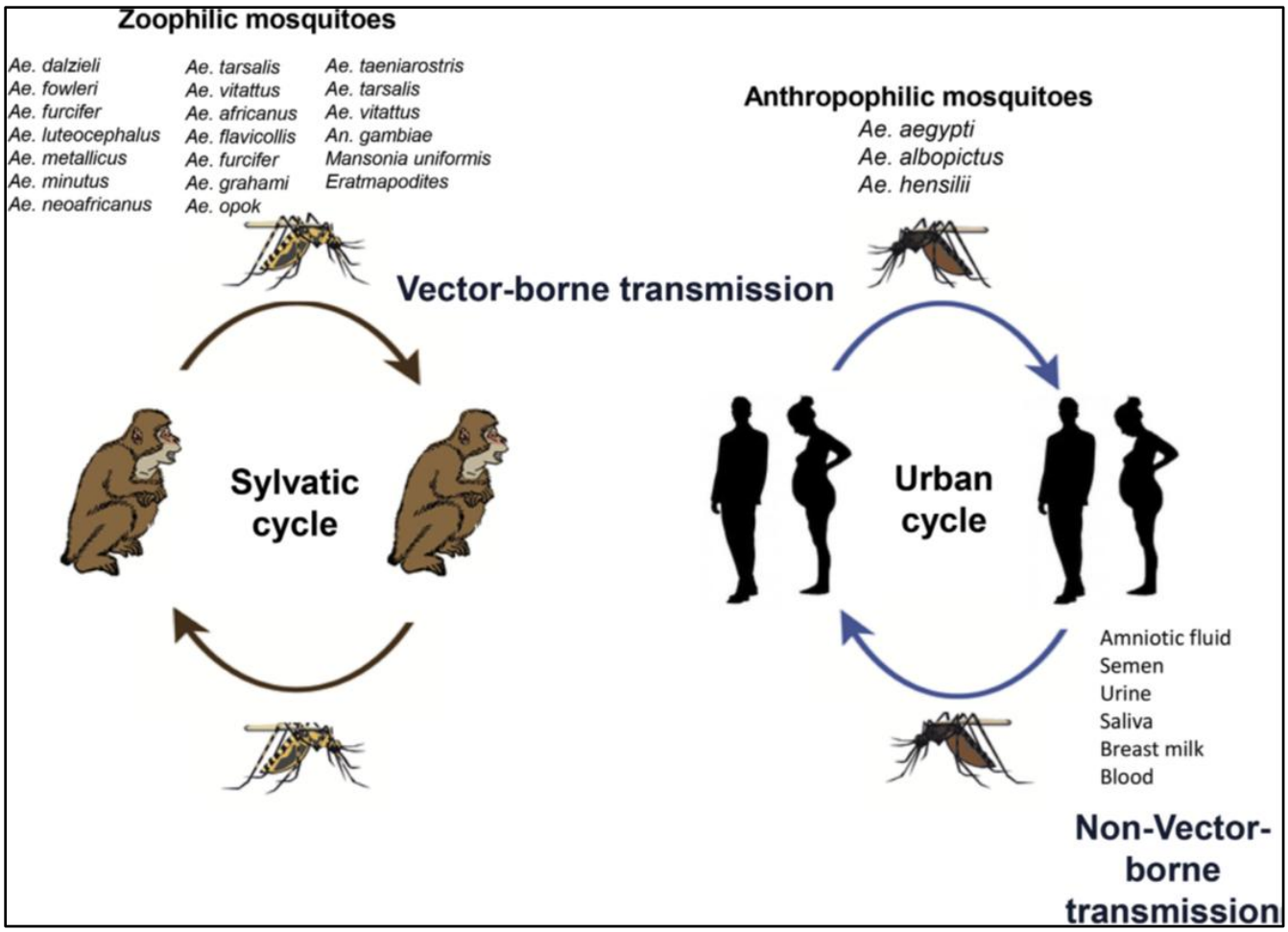
Zoophilic mosquitoes
Ae. dalzieli
Ae. fowleri
Ae. furcifer
Ae. luteocephalus
Ae. metallicus
Ae. minutus
Ae. neoafricanus
Ae. tarsalis
Ae. vitattus
Ae. africanus
Ae. flavicollis
Ae. furcifer
Ae. grahami
Ae. opok
Ae. taeniarostris
Ae. tarsalis
Ae. vitattus
An. gambiae
Mansonia uniformis
Eratmapodites
Anthropophilic mosquitoes
Ae. aegypti
Ae. albopictus
Ae. hensilii
Vector-borne transmission
Sylvatic cycle
Urban cycle
Amniotic fluid
Semen
Urine
Saliva
Breast milk
Blood
Non-Vector-borne transmission

Fig.3. Zika disease cycle

The Agent is Flavivirus (family:flaviviridae).Flavivirus closely related to other flaviviruses, Dengue, Yellow fever, Japanese encephalitis. It is first detected was in 1947 in the zika forest(Uganda). The zika virus was isolated on several occasions from *Ae.africanus* in 1948 . By 2000 only 12 cases of human disease had been reported, which fortunately were declared safe.

Symptoms of Zika

20% of patients show the clinical symptoms, similar to other arboviruses (as Dengue or Chikungunya), it has low grade fever, rash, arthralgia, myalgia, conjunctivitis. Its can be effect on adult, fetus and children.Clinical symptoms are: fever, rash, myalgia. Clinical symptom in18% of patients have been observed. First

endemic transmission in Brazil 240000-1300000 suspected cases. Microcephaly (Figs.4,5) .It could be infected the monkeys and others mammalian.

Fig.4. Symptoms of Zika

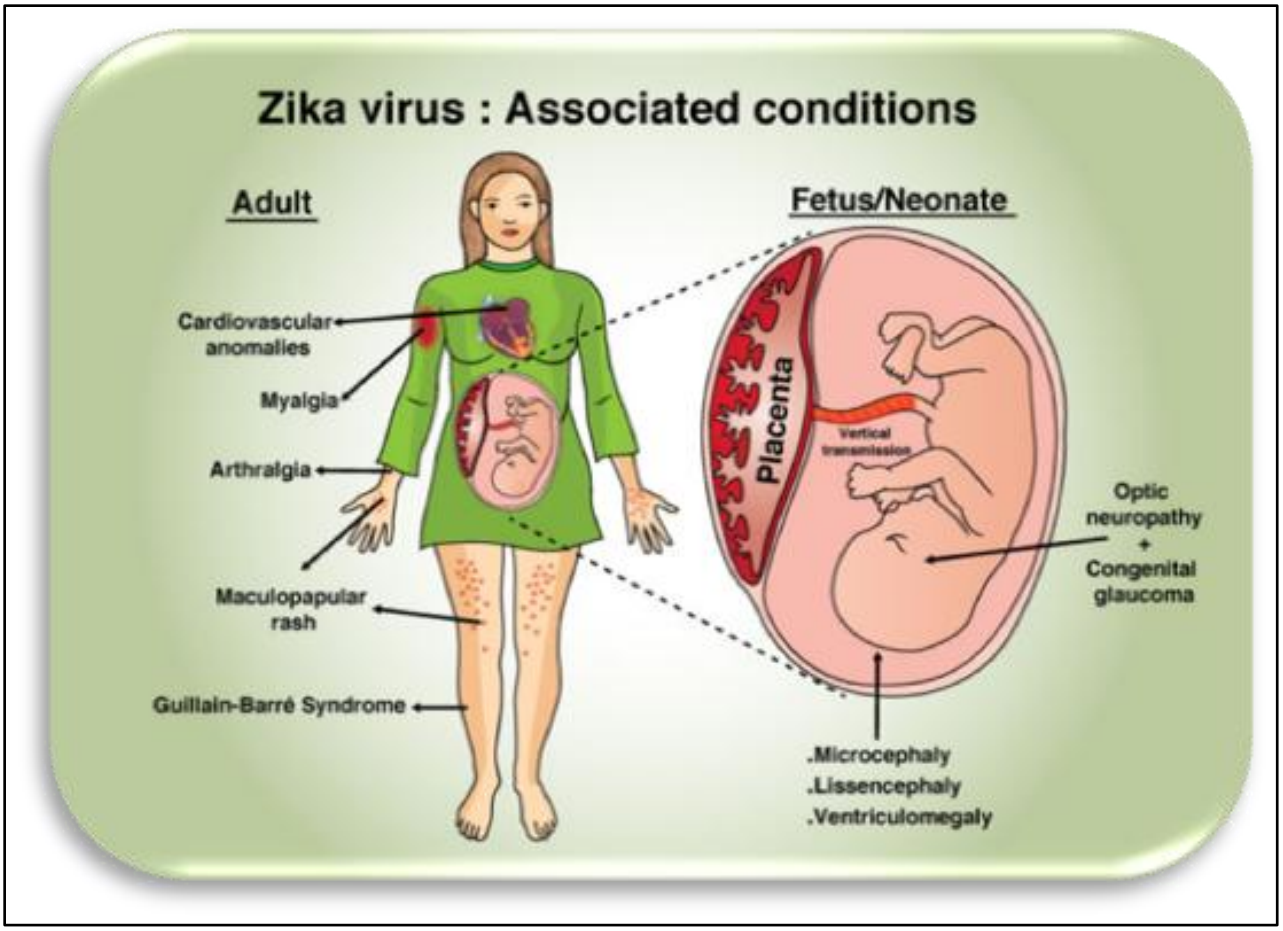

Fig.5. Symptoms of Zik

Global distribution of Zika

Global distribution of Zika is shown in Fig.6.

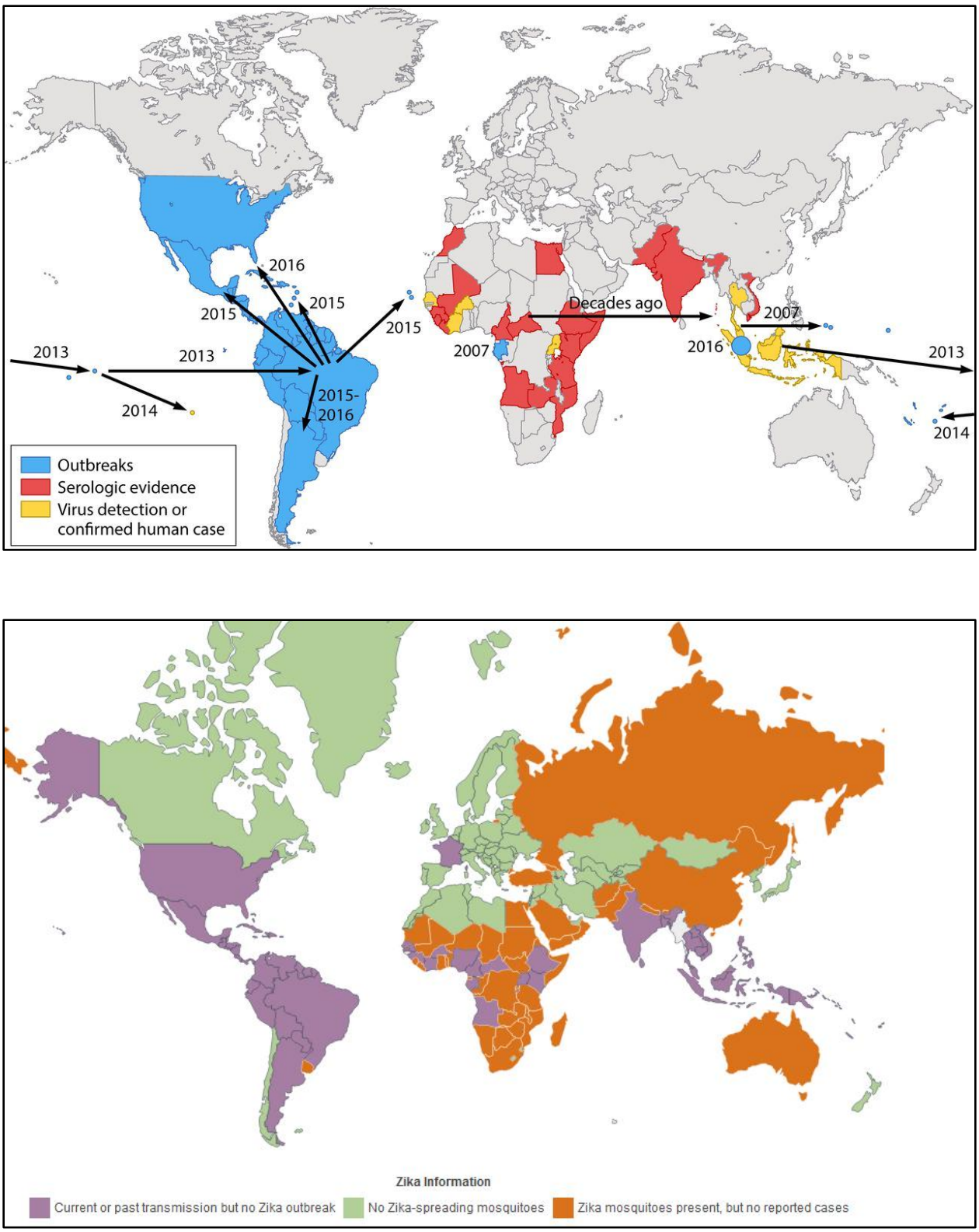

Fig.6. Global distribution of Zika

The strategy of treatment

There is no Zika virus vaccine so far. Vaccine candidates could be: nucleic acid vaccines live attenuated vaccines, inactivated whole virus vaccines and using antivirus drugs.

Personal protection

Avoidance mosquito bite, using impregnated bednets,using permethrin insecticide for clothes, using insect repellents, and using screens on windows and doors.

Discussion and conclusion:

Global strategy for disease control:

"Most precarious threats for ZIKV infection are mosquitoes including their reproducing localities. Their encounter with humans must be reduced in order to control and prevent their outspread. This can be employed by using mosquito repellents, mosquito nettings and closing the entrances and openings. Insect killing sprays**.** recommended by the WHO Pesticide Evaluation Scheme should be used as larvicides"(14, 15). "Insect repellents should not be used for babies under two months, mosquito nets should be used to protect babies from insect bite. Centre of disease control recommends mosquito repellents with active ingredients picaridin, DEET, eucalyptus oil, IR3535, oil of lemon and para-menthane-diol. These are safe for pregnant and lactating mothers"(16). "Repellants containing eucalyptus oil, lemon oil and paramenthane- diol should be avoided for children below 3 years of age. Mosquitoes should be killed using indoor mosquito killing sprays which contain active ingredient Imidacloprid and β-Cyfluthrin available in market" (17). "Flying insect fogger can also be used against the mosquitoes containing active

ingredients Tetramethrin and Cypermethrin. Tests against ZIKV infection should be performed before blood transfusions to prevent transfusion related transmission. Pregnancy must be avoided in the high risk ZIKV infection prone areas before complete eradication or extra care must be exercised as microcephaly is associated with ZIKV infection"(18)**. "**Other strategies include the use of intracellular bacteria *Wolbachia*, which acts as a biopesticide to control mosquito population"(19).Rapid suppression of new populations, expansion and amplification of monitoring of these mosquitoes, establishment of quarantine system, regular and more accurate inspection of entry from native of such disease (20-29).

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