

**NEGLIGENCE OF ASIANS ON DENGUE FEVER**

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**Abstract**

Dengue is a virus carried by mosquitoes, and it has recently expanded quickly in most Asia countries. The virus is spread mostly by female Aedes Aegypti mosquitoes among the Asian people. Due to high negligence among Asians, the virus was transmitted among everyone till late. Dengue fever is the most widespread arthropod-borne virus impacting humans today, corresponding to public health issues. Because of human negligence, the virus has spread widely to the present day. As a result, dengue fever cases keep increasing. Several reasons contribute to the spread of dengue fever among Asians, primarily their fear of the virus's repercussions. Additionally, increasing migration of people and environmental changes have accelerated the rate of viral propagation. This article discusses the causes, types of dengue fever, modes of transmission, risk factors, clinical symptoms, complications, diagnosis, incubation period, previous years' dengue fever statistics in a few Asian countries, treatments/vaccines, and preventions and controls associated with dengue virus that everyone should know to prevent and stop the virus transmission not only in Asia but all over the world are.

Keywords: Dengue fever, Prevention and control.

### **Types of dengue fever**

Dengue Fever is a mosquito-borne arboviral infection mainly caused by a flavivirus (positive-strand RNA viral genus belonging to the Flaviviridae family) transmitted by *Aedes aegypti* or *Aedes albopictus* mosquitoes while ingesting a blood meal which results in febrile illness. There are four types of dengue virus:

- DENV-1
- DENV-2
- DENV-3
- DENV-4

One DENV serotype infection confers lifetime immunity to that serotype but does not confer lifetime protection to other DENV serotypes. Consequently, a person can contract the disease up to four times, one from each serotype. Many infections are asymptomatic, but these 4 DENV viruses result in two defined syndromes: Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS). DHF is a severe and occasionally fatal illness, whereas DSS is a severe aftereffect of dengue infection with a high mortality rate. Pathogenic dengue virus strains cause DHF or DSS. On the other hand, an alternative idea contends that DHF or DSS is caused by exaggerated and atypical host immune responses by the production of cross-reactive dengue virus antibodies that elevate the infection.

### **Cause of dengue fever**

Dengue virus is caused by infected mosquitoes of *Aedes* species such as *Aedes aegypti* or *Aedes albopictus*, mosquitoes as mentioned above. Illness of this virus is mainly caused by areas with high potential risk, which aids in developing the growth of *Aedes* mosquitoes.

Due to human carelessness, the virus has spread highly over till today. As a result, the cases of dengue fever still rise. Many factors contribute to the spread of dengue fever among Asians, mainly due to their avidness of the consequences of that virus. Furthermore, rapid movement of people and changes in the environment have increased the rate of spreading the viruses. High rates of population growth, insufficient water supplies and poor storage techniques, inadequate sewer, and waste management systems, an increase in international trade and tourism, global warming, changes in public health policy, and the emergence of hyper-endemicity in urban areas are some of the factors that contribute to the spread and expansion of dengue mosquito vector and viruses. After all, the public health sector plays its role as well to make sure to stop spreading the viruses in all areas and put them under control with all the necessary measurements taken in the list. The present scenario of a high burden of dengue cases in the ASIAN countries is accompanied by a lack of comprehensive sustainable vector control and efficient treatment.

### **Mode of transmission**

i) Mosquito-borne transmission: The virus is spread to humans by biting female mosquitoes (*Aedes aegypti*/ *Aedes albopictus*). Mosquitoes get infected by biting DENV-viremic individuals and transmit the infection to another individual by biting them and while ingesting their blood meal. Due to 7 days of Viremia in the human body, transmission of blood-borne would be possible via exposure to infected blood, tissues, and organs. Dengue fever cannot be transmitted from human to human directly.

ii) Maternal transmission: Dengue infection can be transmitted from mother to fetus, especially during the near-term pregnancy period. On the other hand, it is incredibly harmful and can result in low birth weight, premature birth, or even miscarriage.

### **Risk factors of dengue fever**

People are at higher risk of getting infected by dengue fever or more severe forms of the illness when they travel to tropical countries such as Malaysia, India, and Bangladesh because countries with higher temperatures increase the risk of people being exposed to dengue. Next, people with a history of dengue fever are at higher risk of having severe symptoms when they get infected by the dengue fever again. On the other hand, areas with poor hygiene and low maintenance, such as discarding empty containers, wastes, plastic bags, and Tyres in public and uncovered water tanks in residential areas, increase the breeding of Aedes mosquitoes.

### **Symptoms of dengue fever**

Dengue Hemorrhagic fever (DHF)

The four World Health Organization (WHO) criteria listed below presently serve as the definition of DHF:

- Fever of current history of fever lasts between 2 to 7 days
- Increased vascular permeability
- Hemorrhagic sign
- Thrombocytopenia: Platelet count is  $<100,000/\text{mm}^3$

The most frequent mild hemorrhagic symptoms are:

- Cutaneous hemorrhages such as Petechiae and Hematomas
- Gingivitis
- Microscopic hematuria
- Tourniquet test (positive)
- Epistaxis

The most severe types of hemorrhagic symptoms are:

- Melena
- Vaginal bleeding
- Intracranial hemorrhage
- Hematemesis

WHO is currently reviewing the clinical case definition for dengue fever and DHF. Studies from many nations have documented dengue complications that can be fatal when one or more of the existing DHF criteria are unmet. Contrary to its name, the crucial characteristic that separates DHF from dengue fever is not the hemorrhage but rather the plasma leakage brought on by increased vascular permeability.

Dengue Shock syndrome (DSS):

Occurs when all the four criteria of DHF are met, including symptoms of:

- Rapid, weak pulse as well as narrow pulse pressure below or equal to (20 mmHg)
- Cold
- Akathisia
- Hypotension

- Clammy skin

The fatality rate of patients with Dengue Shock Syndrome (DSS) is  $\geq 10\%$ , but with early diagnosis and treatment, it can be  $\leq 1\%$ . Both children and adults can develop DHF and DSS. On the other hand, classic dengue fever, also known as "break-bone fever," is an acute onset fever lasting 3 to 14 days caused by biting an infected mosquito. It causes a high fever of  $40\text{ }^{\circ}\text{C}$  with the following symptoms:

- Leukopenia
- Myalgia
- Nausea
- Rashes (appear with a second temperature rise and after a period of afebrile)
- Anorexia
- Frontal lobe headache
- Optic neuritis
- Retro-orbital pain
- Arthralgia
- Generalized lymphadenopathy
- Hemorrhagic symptoms

Acute symptoms last for a week, but anorexia and asthenia persist longer. Most dengue infections result in no symptoms or minor symptoms, especially in children who have never been infected by dengue in their past history.

### **Complications**

- In Dengue Hemorrhagic fever (DHF), increased vascular permeability results in shock and intravascular volume depletion.
- Dehydration and febrile seizures are typical dengue fever's complications and medical side effects.
- Persistent shock and metabolic acidosis are early warning indicators of severe dengue, which will become a complication if left untreated.

### **Diagnosis**

Method of viral isolation

The virus might be isolated from the blood in the early stages of illness. Therefore, the gold standard is a variety of reverse transcriptase-polymerase chain reaction techniques, which require specialized instruments and training of medical professionals to execute these examinations. Testing for the NS1 protein generated by the virus can also detect the virus.

Nucleic acid amplification tests (NAATs):

This is preferable for patients with symptoms or suspected of having dengue fever. This test should be performed on the specimen of serum samples collected 7 days or less after the symptom onset. A single acute-phase specimen of serum collected early in the disease (7 days or less following the beginning of the fever) can be used for laboratory confirmation by rRT-PCR detection of viral genomic sequences or immunoassay detection of the dengue non-structural protein 1 antigen.

#### Serologic test

Serological diagnosis using an IgM antibody-capture enzyme-linked immunosorbent assay to detect dengue IgM antibodies (MAC-ELISA) 4 days or less after fever onset. Diagnostic testing for individuals who come during the first week of developing a fever should include an IgM and rRT-PCR test for the dengue virus. Even though NS 1 is reported positive 12 days after fever onset, IgM detection would be most useful for the patients who present 1 week after fever onset. Suppose the individual gets infected in areas with other cross-reactive flavivirus such as Japanese Encephalitis, Zika, and yellow fever. In that case, IgM in a single serum sample is assumed to be confirmation of dengue fever. Both molecular and serologic diagnostic tests for dengue and other flaviviruses should be carried out if it is suspected that the infection took place in areas where other cross-reactive flaviviruses are present. Cross-reactive flavivirus antibodies may be produced by individuals exposed to or vaccinated against other flaviviruses, leading to false-positive results in serologic tests of dengue diagnosis.

#### **Intubation Period**

Dengue fever infects a person through the blood system when the mosquito bites the person. Dengue fever starts after an incubation period of 5-7 days (between 3-10 days) and can last up to 14 days. There are 3 stages of dengue fever: febrile, critical, and convalescent. Generally, the fever persists 2-7 days. The fever can be biphasic. Symptoms tend to develop after the body is incapable of fighting the virus.

Many people wrongly assume that dengue is more contagious as the condition progresses. However, the virus has already been recognized since the infected individual is still in the incubation period.

Usually, the dengue fever incubation period is divided into:

##### Extrinsic Incubation Period

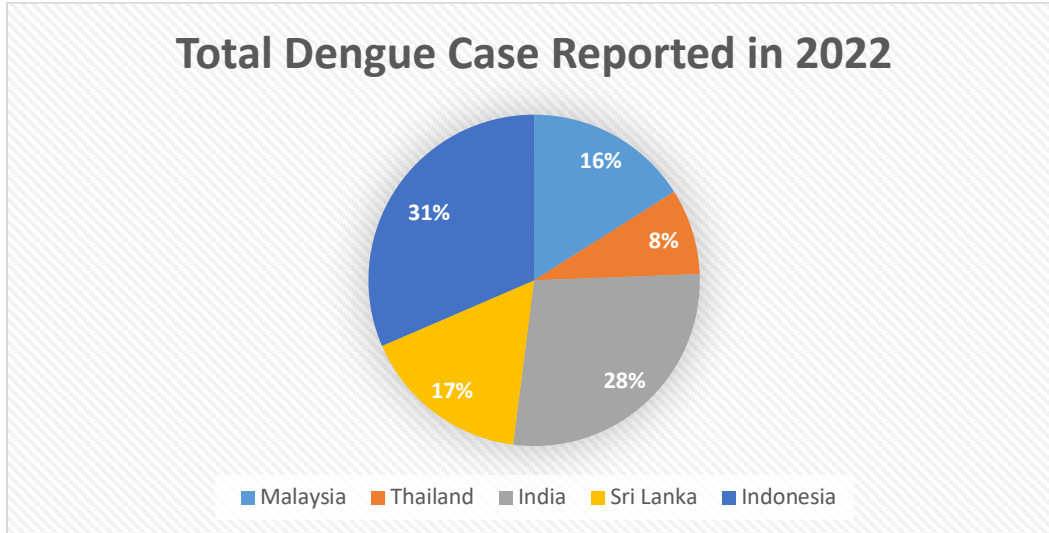
The mosquito ingests the dengue virus in a blood meal. Dengue virus replicates in mosquitoes 8-12 days before being able to transmit dengue virus to a person.

##### Intrinsic Incubation Period

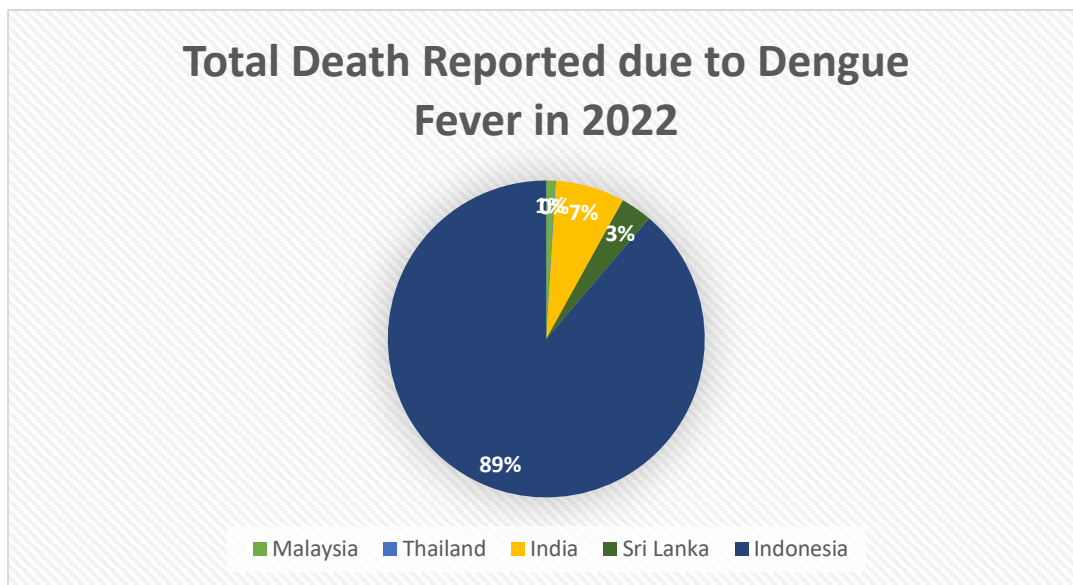
An infected mosquito bites another person and transmits dengue virus. Dengue virus replicates in person 3-14 days before symptoms onset.

**Analysis of dengue fever in Asian countries (Malaysia, Thailand, India, Sri Lanka and Indonesia).**

**Charts**



*Chart 1: Shows total dengue cases reported in 2022 (Malaysia, Thailand, India, Sri Lanka and Indonesia)*



*Chart 2: Shows total deaths reported due to dengue fever in 2022 (Malaysia, Thailand, India, Sri Lanka, and Indonesia)*

### **Treatment**

Dengue fever has no specific treatments. Therefore, physicians can do the following for infected dengue patients:

- Encouraging the patients to stay hydrated by drinking more fluid and get plenty of rest
- Keep monitoring the hydration status of the patients during the febrile stage
- Administering antipyretics acetaminophen and giving sponge baths to keep the patient's temperature in control
- Administering painkillers and paracetamol if the patients have symptoms of myalgia
- Educate the patients and their guardians about dehydration signs and monitor the output of their urine
- Introducing Intravenous (IV) fluids if the patients are unable to tolerate oral fluids
- Assessing patient's hemodynamic status by checking their pulse rate, body temperature, blood pressure, capillary refill and urine output, and skin color to ensure the patients are in a stable condition
- Monitoring platelet counts of patients closely
- Performing hemodynamic monitoring test
- Monitoring patients closely, especially during the effervescence
- Avoid administering Aspirin, such as acetylsalicylic acid/ drugs containing Aspirin and non-steroidal anti-inflammatory medications (Aspirin, ibuprofen) due to their anticoagulant properties, which increase the risk of bleeding.
- Blood transfusion to replace the loss of blood and replacement of electrolyte

### **Vaccination of dengue fever**

Dengvaxia® (CYD-TDV) was the first vaccine for dengue created by Sanofi Pasteur, the international pharmaceutical firm in France. It was granted a license in December 2015 and has since received approval from regulatory bodies in 20 nations. The outcomes of additional investigations to determine the serostatus at vaccination time were released only in November 2017, which showed different outcomes for vaccinated and unvaccinated participants. The study has revealed that comparison to unvaccinated participants, the trial participants who inferred a seronegative during the first vaccination were at greater risk for severe dengue fever and were hospitalized. In September 2018, the WHO described in the position paper regarding the Dengvaxia vaccine that the live attenuated vaccine CYD-TDV proved more effective and safer in those with a dengue fever (seropositive) history. Screening for pre-vaccination is a suggested strategy for nations that believe immunization can control dengue fever and consider vaccination programs. In this case, only people/ patients with a history of having dengue fever are eligible to receive vaccinations under this approach method, which is based on running an antibody test to confirm the people/ patients had been infected by dengue fever in their history.

### **Prevention and control:**

Prevention is better than cure. Improving outbreak detection and prediction is necessary to reduce dengue morbidity. This can be done by coordinating epidemiological and entomological surveillance, promoting the principles of integrated vector management, implementing locally tailored vector control measures, such as efficient management of household and urban water

supplies, and communicating with the public to encourage behavioral changes in prevention programs. Examples:

- i) Prevent mosquito breeding: Domestic refuse should be disposed of in a proper way. For instance, the garbage bags should be packed and tied tightly and should be thrown only in a galvanic steel dustbin with a fitted cover.
- ii) Tyres dumped in public rubbish sites, sewers, and other locations with stagnant water should be treated with pesticides or sprayed with insect repellent to prevent mosquito breeding. In this situation, environmental sanitation and hygiene need to be improved.
- iii) Self-protection: Individuals who travel or reside in locations where dengue fever is a serious threat should take precautions by completely covering their bodies (wearing long-sleeved clothes and covered shoes).
- iv) Educate the community: It is important to educate primary and high students about the seriousness of dengue fever. For instance, the teachers should educate their students on Aedes mosquitoes' development and breeding methods, how it is being transmitted from one to another, the risk factors, and control and prevention methods. On the other hand, medical professionals should carry out campaigns in colleges, universities, schools, and other locations with a high risk of dengue fever. This practice benefits the community from having better information and a greater understanding of the severity of dengue fever. Educating the public and raising awareness keeps the transmission of dengue fever in control and control and decreases the mortality rate.

### **Conclusion**

Negligence of Asians has brought a wide-ranging influence on the development of dengue illness. As mentioned earlier, the dengue virus spread rapidly among the population. Despite several preventive measures, dengue fever cases continue to rise; the government and the public should strengthen surveillance for dengue cases and mosquito vectors to limit dengue outbreaks. The populations must understand the dangers of the dengue virus and how it can have serious negative effects on both the individual and the wider world. By understanding the dengue virus's effects on the nation and how to prevent its spread, it is important as a person to prevent the virus's spread, not just expecting the health sector and the government. The government should enforce a law and severely penalize anyone who contributes to breeding Aedes mosquitoes. For instance, people who discard wastes in public areas, dispose of wastes and unwanted materials in untied garbage bags near housing areas, and keep stagnant water in tanks, tins, or Tyres at home are to be fined so that they will not be neglected and will consider the seriousness of dengue illness. Enforcement of such laws by the government will improve public health by preventing them from getting infected by dengue illness and its severity.



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