



Town and city councils are always on front foot against mosquitoes, spraying breeding grounds with environmentally friendly products to control mosquitoes populations.

Picture: LUKE RAWALAI

Dengue fever alert

What you need to know to protect yourselves

THE global incidence of dengue has increased dramatically in the past several decades, with an estimated 40 per cent to 50 per cent of the world's population in 128 countries at risk. Severe dengue largely affects Asian and Latin American countries, where it is a leading cause of hospitalisation and death. The World Health Organization (WHO) ranked dengue as one of the top ten threats to global health in 2019.

The first record of probable dengue dates far back to the Jin Dynasty (265-420 AD) where in the Chinese Medical encyclopedia it is described as a "water poison associated with flying insects".

The first recognised Dengue epidemics occurred almost simultaneously in Asia, Africa, and North America in the 1780s, shortly after the identification and naming of the disease in 1779. The first confirmed case report dates from 1789 and is by Benjamin Rush, who coined the term "breakbone fever" because of the symptoms of myalgia and arthralgia.

In Fiji, there have been epidemics of dengue fever noted as early as 1885. A notable point is that these epidemics are becoming fairly frequent from the 1970s and are associated with significant mortality. Over the various outbreaks, all 4 different serotypes of the virus have been identified circulating in the population in Fiji.

The Dengue virus

Dengue fever is caused by an infection with 1 of the 4 serotypes of the dengue virus, which is a Flavivirus (a genus of single-stranded non-segmented RNA viruses). Infection with one dengue serotype confers lifelong immunity to that serotype and a brief period (two years) of partial immunity to other serotypes. Several serotypes can be in circulation during an epidemic, as is seen mainly in the Latin Americas and Central-Eastern Asian countries.

In the Pacific Island Countries, there is usually one predominant serotype in circulation during any particular outbreak.

The aedes mosquito

The virus is transmitted by mosquitoes of the genus *Aedes*, which are widely distributed in subtropical and tropical areas of the world. In Fiji, there are 26 known species of mosquitoes, of which 6 species are known to transmit the virus. *Aedes aegypti* is the primary vector, found breeding mainly in artificial or man-made containers, used tires, flower pots and vases, water storage containers, tins, and gutters.

Recognising Dengue

Initial dengue infection can be asymptomatic in up to 50 per cent of individuals, may present only as a non-specific febrile illness, or with classical signs and symptoms. Classical dengue fever is marked by rapid onset of high fever, headache, retro-orbital pain, diffuse body pain (both muscle and bone), weakness, vomiting, sore throat, altered taste sensation, and a centrifugal maculopapular rash (one which is fairly difficult to appreciate in our melanin rich population).

An individual with dengue is capable of transmitting the virus for four to five days (maximum, 12 days) to a capable vector. After an incubation period of 5-10 days, the infected mosquito can transmit the virus for the rest of its life span (2 weeks to 1 month).

Severe Dengue

A few individuals who have previously been infected by one dengue serotype can develop bleeding and endothelial leakage when infected with another dengue serotype. This syndrome is termed severe dengue and can at times be fatal if not identified early and managed appropriately (reclassified in 2009 by the WHO, previously referred to as dengue hemorrhagic fever and dengue shock syndrome).

The critical phase is usually within three to seven days after the initial onset of symptoms, and during this time the fever usually begins to settle and a common assumption is that the individual is getting better. Warning signs of severe dengue which one should be on the lookout for include abdominal pain or tenderness, persistent vomiting, mucosal bleeding (nasal bleeding, gum bleeding, black tarry

stools, vaginal bleeds, bruising easily), lethargy or restlessness, clinical fluid accumulation (pleural, pericardial and peritoneal effusions presenting as shortness of breath, chest tightness, chest pain, abdominal distension and discomfort), liver enlargement as assessed by your doctor, and an increase in hematocrit with concurrent rapid decrease in platelet count as noted on the full blood count.

If anyone with presumptive dengue fever or serologically diagnosed dengue fever is managed on an outpatient basis by their doctor (more than 90 per cent do not need hospitalisation), and develops any of the above mentioned danger signs, they should present immediately to their doctor or nearest health facility for another proper reassessment.

Dengue in pregnancy

Pregnant woman infected with dengue can pass the virus to the fetus during pregnancy or around the time of birth. Dengue can have harmful effects, including death of the fetus, low birth weight, and premature birth. Pregnant women with dengue fever respond well to the usual therapy of fluids, rest, and antipyretics. If the mother acquires infection in the peripartum period, newborns should be evaluated for dengue with serial platelet counts and serological studies.

Diagnosing Dengue fever

Many times the diagnosis is made clinically given the signs and symptoms a patient presents with, however confirmatory diagnosis of dengue fever requires a blood test. The sample is then sent to the lab where a rapid test kit, ELISA or RT-PCR test can be used to identify the presence of antibodies, viral antigens, or viral genomic sequences to confirm a serological diagnosis.

Other blood tests done in conjunction include full blood count (looking mainly at decreasing white cell and platelet counts), renal function tests, and liver function tests.

Treatment of Dengue Fever

Dengue fever is usually a self-limiting illness and there is no specific treatment available. Treatment is mainly supportive

with analgesics/antipyretics for pain and fever relief, adequate hydration and bed rest. Acetaminophen (Panadol) is the only recommended drug of choice; NSAIDs, Aspirin, and corticosteroids should be avoided as they all increase the risk of bleeding.

Patients with severe dengue require hospitalisation and inpatient treatment.

Protection from Dengue Fever

The only way to truly prevent dengue virus acquisition is to avoid being bitten by a virus infected vector mosquito in the first place. As ideal as that may sound, it is truly unrealistic in a country such as Fiji. The mainstay of protection from dengue therefore should be aimed at reducing the vector population, and it is essential that every individual takes responsibility in doing so. We should all aim to keep our environment and surroundings clean and free from vector breeding sites; remove all water collecting waste containers, tires, keep gutters and drains clean so they don't stagnate water, ensure pot plant bases and flower vases are drained regularly and so forth. This should be paramount given that we already have close to 800 confirmed Dengue cases at the end of May this year.

Other protective measures include using DEET containing mosquito repellants, wearing protective clothing preferably impregnated with permethrin, wearing neutral colored clothing preferably covering the wrists and ankles, and using mosquito repellants such as sprays and vape-mats.

The World Mosquito Program and Wolbachia

The World Mosquito Program in Fiji is part of a global, non-profit program that is working to protect communities from mosquito-borne diseases. It has partnered with the MoHMS since August 2017. As at the end of 2019, they have three project sites (Nadi, Lautoka, and Suva), have reached a total population of 272,916 individuals and covered an area of 116.4 square kilometers.

Wolbachia is a naturally occurring gram-negative bacterium found in many arthropods, and

does not pose any threat to humans. In the *Aedes* species, this competes with the Dengue virus and prevents it from replicating thus reducing its numbers effectively.

The bacteria are passed on in the eggs of the mosquito to the next generation. The aim is to have a population of *Aedes* mosquitoes infected with the Wolbachia bacteria so that effectively it diminishes the ability of the dengue virus to replicate within the mosquito and hence decreasing its numbers and its ability to be transmitted in the population.

Unlike most other techniques that aim to prevent mosquito-borne diseases, the Wolbachia method is natural and self-sustaining.

It does not suppress mosquito populations or in any way alter the genetic material of the mosquito. Long-term monitoring has also revealed that the Wolbachia method is self-sustaining in almost all international project sites, with the first mosquitoes released in 2011. Follow-up has shown reduced incidence of dengue cases and also reduced outbreaks; hopefully something we shall be able to appreciate in a few years down the line in Fiji.

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