

Sowkhya

Magazine™

Mosquitoes!



**Kill It Before It
Kills You!**

Message from the editor

Welcome to the August edition of Sowkhya Magazine™. I hope you are in good health and great spirits.

In this edition, we have spoken only about one of the most menacing insects we are all surrounded by – mosquitoes. These flying little critters are notorious at biting us and annoying us, but their effect on us just does not end there.

Mosquitoes are carriers of a large number of diseases, many of which are prevalent in Bangalore. In our practice, we see many cases of viral fevers, some of which turn out to be dengue fever, a mosquito borne illness. A handful of cases of malaria and chikungunya fever have also walked through our door. While it is not easy to discuss everything there is to know about mosquitoes and the diseases they carry, we thought it appropriate to offer you information regarding what these insects can do to us humans, and what steps one can take to prevent infection.

Measures have been taken over the years to prevent mosquitoes from spreading infection, but we have still got a long way to go. I hope understanding how the mosquitoes operate will give you an idea of how important it is to avoid getting bitten. This edition aims at informing you about mosquito borne illnesses and how they can be managed. I hope, as always, that you find it useful. Until next time.....

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The Mosquito – A Necessary Evil?

The mosquito is one of the oldest living insects on the planet, and forms a part of a large group of insects that have been around for generations. Our attempts at eradicating mosquito borne diseases will likely remain futile for one primary reason – they have been around for 100 million years (maybe more) and have stood the test of time and change in weather. This tiny little insect weighs no more than 2.5 milligram, and has still not yet disappeared from the planet.

There are over 3500 different species of mosquitoes, and only around 200 or so trouble us humans. Interestingly, and unlike the honey bee, eradicating mosquitoes from our planet will possibly have no impact on our ecological system. In fact, it would be beneficial to entire mankind, given the number of diseases that mosquitoes cause. That being said, it may not necessarily be the case with the rest of the ecosystem.

Entomologists have suggested that mosquitoes form an important part of the diet of certain birds. Take migratory birds in the tundra for example. It is suggested that the number of these birds could drop by 50% if mosquitoes are eradicated completely. The larvae of mosquitoes that are present in water form the staple diet of a number of different fish, particularly the 'guppy fish' which have been used as a method to eradicate mosquitoes. *Gambusia affinis*, also called 'mosquitofish' are used in rice fields and swimming pools to eat any mosquito eggs and larvae that lay on the surface of stagnant water. Even frogs and lizards eat mosquitoes, so getting rid of them could take away a good source of food for these animals.

But the benefits do not just end there. Eggs of mosquitoes are responsible for feeding on decaying leaves and certain micro-organisms, helping keep stagnant ponds and other water bodies clean. Male mosquitoes are responsible for pollination for certain flowers and plants, though there are some that argue that this role of theirs is not really significant (like it is in the case of bees).

So what exactly do we do? Do we do our best to get rid of these pests, or do our best to keep them under control? There is no easy answer, but like all living things on the planet, it appears mosquitoes are here for a reason, and not just to feed on us.

Mosquito Borne Diseases

When it comes to disease carrying insects, mosquitoes are in the top three. They transmit viruses and parasites from not just person to person, but even animal to animal and animal to humans. We have all know that mosquitoes transmit malaria and dengue, but that's not all. Let's take a look at what mosquitoes are really capable of transmitting.

1. Malaria – Okay – we mentioned this already. The female anopheles mosquito (*Anopheles stephensi*) transmits *Plasmodium vivax* and *Plasmodium falciparum* – the two malarial parasites. The highest incidence of malaria is in Orissa state, though other parts of India also have a high incidence.

2. Dengue fever – Dengue fever is on the rise in Bangalore and is responsible for a number of patient visits to our clinic these days. It is transmitted by the *Aedes aegypti* mosquito (the mosquito with white bands on its legs). As many as 400 million cases of Dengue were reported across the globe in 2012. Around 50,000 cases were reported in India, though it is likely that this is a gross under-estimation.

3. Filariasis – This is a 'helminthic' infection, meaning it is a disease caused by a small worm. The filariasis worm causes elephantiasis, a condition where the lymphatic tissue swells up causing the affected part of the body to become rather huge. The commonly affected site is the leg.

4. Chikungunya fever – Derived from the word 'Kimakonde' (a Mozambique word) which means 'that which bends up', this condition is characterised by severe joint pains that can last for weeks. It is also transmitted by the *Aedes aegypti* mosquito.

5. Others – Mosquitoes are also responsible for the spread of a number of other viruses -

- Yellow fever
- West Nile Encephalitis
- Japanese Encephalitis
- Eastern Equine and Western Equine Encephalitis
- Epidemic polyarthritits
- LaCrosse Encephalitis
- Dog heartworm (seen in dogs)

As is evident, the mosquito is a deadly, pesky insect that can cause a number of diseases. Taking the right steps to prevent mosquito bites can prevent these illnesses.

Dengue - 'Breakbone Fever' Q & A

We have all heard of dengue fever. Sounds quite scary doesn't it? Well, this article aims to inform you about dengue fever and how it is treated. Let's take a closer look.

What is dengue fever?

Dengue fever is a viral illness that is transmitted by the *Aedes aegypti* mosquito. It is the most common insect borne illness in humans. It affects over millions of people all across the globe every year. The dengue virus is a type of virus called the 'flavivirus'.

How is it transmitted?

Dengue fever is transmitted through mosquito bites. The mosquito bites a human that already has dengue fever and carries the virus within its body. When it bites another human, it transmits the virus to them. The mosquito is called a 'vector'. Dengue is not transmitted from one human to another through contact.

What happens after a mosquito carrying dengue fever bites a human?

After that nasty bite, the dengue virus enters the blood stream. Over a period of 4 to 7 days, the virus grows in number ('replicates') – this stage is called viremia. In the initial stages of viremia, patients may not experience any symptoms. However, after viremia has set in, patients can develop symptoms.

What are the symptoms and signs of dengue fever?

The symptoms that patients with dengue fever experience are similar to any other viral fevers, and include a rise in body temperature to up to 104°F, with associated chills, joint pains and a general feeling of being unwell. 3 days later, patients may notice a skin rash that can affect any part of their body. The rash is not itchy or painful, and usually settles down when the fever subsides. Patients can also experience headaches, weakness and muscle pains. In rare cases, patients may notice bleeding from the gums, nose or skin and this is a complication known as dengue hemorrhagic fever.

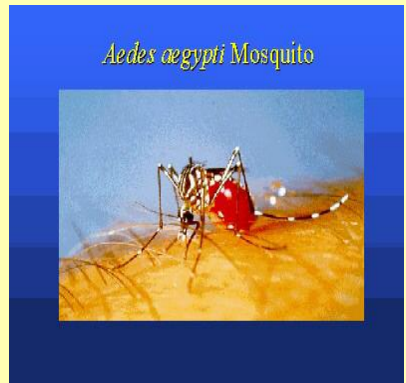
Examination of patients reveals the presence of a fever, joint pains and occasionally a rash. Blood tests are often useful in diagnosing dengue fever and can demonstrate findings such as a low white cell count, low platelet count and an abnormal liver function test. These are rather non-specific for dengue fever and additional tests may need to be conducted to confirm the diagnosis. Once viremia disappears, fever usually subsides, but the rash may persist for a day or two more.

How is dengue diagnosed and treated?

Dengue is confirmed from special blood tests that look for the presence of antibodies (cells that fight the dengue virus) in the blood stream. A dengue NS1 test can detect dengue in the early stages, while immunoglobulin G and M (IgG and IgM) are useful in detecting it later in the illness.

Treatment is primarily supportive and there is no specific treatment. Painkillers and/or paracetamol are useful in controlling pain and keeping the temperature down. Regular blood monitoring may be needed if platelet counts are low. There is no specific diet change that needs to be done. Bed rest is recommended till the fever subsides. Plenty of oral fluids must be taken. It does not take long before patients start to feel better, though some may have joint pains for a few weeks after. Very occasionally, bleeding may be a concern and may warrant blood or platelet transfusion.

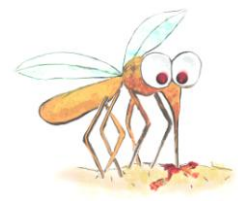
Image courtesy Medscape



Fascinating Trivia about Mosquitoes

We have already established how much we as humans hate mosquitoes. But rather than drown ourselves in our dislike, we thought we would share some rather fascinating facts about mosquitoes. Read on....

1. Mosquitoes are considered the most deadly animals on the planet. Nope – it's not the lion or the King Cobra – it's the mosquito. Why? Because it is the carrier of diseases that can be fatal to humans and even dogs!
2. Mosquitoes fly at a speed of 2 to 3 km per hour. So that's 1 hour from our clinic to Banashankari 2nd stage. Sounds about right in Bangalore traffic, doesn't it?
3. Not all mosquitoes bite humans. Some prefer to bite only birds and other animals. Thank god for that.
4. Mosquitoes beat their wings around 400 to 600 times per second. That explains the annoying buzzing it causes when it flies by your ear – and you slap your face and miss the mosquito.
5. Mosquitoes detect carbon dioxide in the air from over 80 feet away. It is not the blood that draws them close – it's our breathing. Not much we can do about that.
6. Males prefer flowers – Ironically, the female mosquito bites humans, while the males prefer flowers and nectar. Female mosquitoes need blood to produce their eggs.
7. It's not the bite – it's the saliva that makes the skin itch after a bite.
8. Mosquitoes have killed great men and got away with it. Take Alexander the Great for example. Won many battles, but died at the hands of a mosquito (West Nile Encephalitis).



Preventing Mosquito Bites

The best way to avoid getting mosquito borne infections is to adopt suitable preventative measures. Below are some of the steps you can take to keep yourself safe from these menacing insects.



1. Wear a suitable mosquito repellent – If you live in an area that is teeming with mosquitoes and is known to have a high prevalence of mosquito borne diseases, then wear a suitable mosquito repellent. Odomos has been shown in clinical studies to be as effective as DEET. Even products containing lemon eucalyptus may be useful.
2. Wear suitable clothing – Make sure you cover up when you are out. This may work, but seems mosquitoes have now figured out a way to bite us through our clothing!
3. Use mosquito repellent devices – These can keep the mosquitoes out safely and effectively.
4. Use a mosquito net at night – Choose this option if you do not use mosquito repellent devices.
5. Guppy fish – If you have a pond of stagnant water in your garden, make sure you place some guppy fish in them. They eat all the mosquito larvae and prevent your house being infested with a fresh supply of mosquitoes!
6. Deal appropriately with stagnant water and garbage by using insecticide sprays.

Can a Mosquito Spread AIDS?

This is probably a question on your mind - can a mosquito that bites a HIV positive individual spread the virus to another human? The answer is **NO**. The AIDS virus does not survive in the mosquito. This is due to the lack of a particular surface antigen on the cells. Furthermore, the amount of virus ingested is just too small to be significant enough to cause the spread.

Malaria

Ah malaria. We have all heard of this condition, haven't we? It is common in the coastal regions of Karnataka, particularly Mangalore. It is caused by *Plasmodium vivax* and *P. falciparum*, and is spread from person to person through the female anopheles mosquito. Malaria has the potential of being life threatening, so must be treated aggressively.

Signs and symptoms

The clinical signs and symptoms of malaria are fairly typical. Patients present with a fever that has a particular pattern (occurring every 48 to 72 hours) which starts 2 weeks after they have returned from an area that is endemic for malaria. The fever is accompanied with a severe headache, along with chills and rigors when the body is attempting to cool down. Joint and muscle pains are also common.

In some individuals who have suffered from malaria before, recurrence may occur as the organism remains dormant in the body. This is seen with *P. vivax*. Upon examination, there do not appear to be any specific signs, and diagnosis is made through special blood tests.

Complications

If left untreated, malaria can affect the brain and can present as seizures and rarely coma. This is called cerebral malaria that can be fatal. A reduction in the haemoglobin (anemia) due to breakdown of red cells is also seen sometimes. In serious cases, patients can develop problems breathing and may require ventilation. It is because of these complications that malaria should be treated early and aggressively.

Diagnosis

Diagnosis of malaria is made through thick and thin smears of blood taken at the peak of fever. This may not always be possible, but every attempt must be made to do so. Thick smears are better tests than thin smears.

Treatment

The treatment of malaria is through medication. Commonly used drugs include chloroquine, quinine, primaquine, artemether and doxycycline. Agents are given as combination treatments over a period of days. Side effects of drugs must be watched for. Treated early, malaria can be cured and has good long term outcomes.

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