Fact Sheet on Yellow Fever

Summary

- Yellow fever is a serious disease that may affect children and adults and can be fatal;
- Yellow fever is transmitted by the bite of the *Aedes aegypti* mosquito, which has become infected with the virus while feeding on the blood of an infected person. *Aedes aegypti* mosquitoes bite during the day;
- Persons suspected of having yellow fever should see a doctor immediately;
- Vaccination is the main measure for preventing yellow fever. The only treatment to decrease dehydration and fever, the principal symptoms of the disease, are Oral Rehydration Salts and paracetamol. Patients with a bacterial infection should be treated with antibiotics. Intensive care may improve the condition of seriously ill patients;
- There is no direct person-to-person transmission of yellow fever. To prevent *Aedes aegypti* mosquitoes to bite an infected person and to further transmit the disease, yellow fever patients should be protected by a mosquito net during the period of illness;
- People who suspect they may have yellow fever and people who have contracted the disease are advised not to take aspirin or ibuprofen.

General

Yellow fever is a mosquito-borne viral infection that has caused large epidemics in Africa and the Americas, as far as known, over the past 400 years. Infection causes a wide spectrum of symptoms, from very mild to severe illness, and death. Yellow fever owns its name to the yellow colour of the skin and especially the eyes that some of the infected patients acquire, called jaundice. Although an effective vaccine has been available for 60 years, the number of people infected over the past two decades has increased, making yellow fever a serious public health threat. Yellow fever is found in tropical and sub-tropical climates around the world, predominantly in urban and semi-urban areas.
Recognition of Yellow Fever

- Yellow fever is difficult to recognize, especially during the early stages and can be confused with malaria, typhoid and other haemorrhagic fevers such as dengue.
- A laboratory analysis is required to confirm a suspect case.
- The yellow fever virus has an incubation period of three to six days before manifesting itself.
- There are two phases:
  1. While some infections remain without any symptoms at all, the majority of yellow fever patients develop high fever, muscle pain (with severe backache), headache, shivers, loss of appetite, nausea and/or vomiting during the first “acute” phase. Often high fever is associated with a slow pulse. After three to four days most patients improve and their symptoms disappear;
  2. Fifteen percent of all patients enter the “toxic” phase within 24 hours, after experiencing a temporary improvement subsequent to the “acute” phase. Fever reappears and several body systems, such as the renal system, the liver and the cerebral function can be affected. The patient rapidly develops jaundice, and complaints about abdominal pain combined with vomiting are frequent. Bleeding can occur from mouth, nose, eyes and/or stomach. Once this happens, blood appears in the vomit and faeces. Kidney function deteriorates (this can range from abnormal protein levels in the urine (albuminuria), to complete kidney failure with no urine production (anuria). Half of the patients in the “toxic” phase die within 10 to 14 days. The other 50% recovers without significant organ damage.

Characteristics

There are three types of transmission cycles for yellow fever: sylvatic, intermediate and urban. All three cycles exist in Africa, while in South America only sylvatic and urban yellow fever occur.

- **Sylvatic (or jungle) yellow fever:** Monkeys living in tropical rainforests can be the bearer of the yellow fever virus and when bitten by the *Aedes* mosquito, the mosquito can transmit the disease to humans. This type of yellow fever only sporadically occurs.

- **Intermediate yellow fever:** In rural areas of humid or semi-humid savannahs in Africa, due to increased contact between man and infected mosquito, small-scale epidemics of yellow fever may occur. Neighbouring villages can suffer simultaneously from yellow fever cases, fortunately very few people die from the disease. This is the most common type of outbreak seen in recent decades in Africa. It can shift to an urban-type epidemic if the conditions are suitable, e.g. where the *Aedes* mosquito is present and where people are not vaccinated.

- **Urban yellow fever:** Large epidemics can occur when migrants introduce the virus into areas with high population density. The *Aedes aegypti* mosquito carries the virus from person to person. These outbreaks tend to spread to a large geographical area.
Prevalence

The virus is constantly present with low levels of infections (i.e. endemic) in some tropical areas of Africa and the Americas. Thirty-three countries located between 15° N to 10° S of the equator, and with an estimated total population of more than 508 million, are at risk.

In the Americas, yellow fever is endemic in nine South American countries and in several Caribbean islands. Due to underreporting, only a small percentage of these cases are identified. Small numbers of imported cases also occur in countries free of yellow fever. Although yellow fever has never been reported from Asia, this region is at risk because the appropriate primates and mosquitoes are present.

Transmission

The yellow fever virus is transmitted to humans through the bite of several different species of the *Aedes* and *Haemogogus* (South America only) mosquitoes. These mosquitoes are either domestic (i.e. breed around houses), wild (they breed in the jungle) or semi-domestic types (they display a mixture of habits). The mosquito can also pass the virus via infected eggs to its offspring. Any region populated with these mosquitoes can potentially harbour the disease. Control programmes successfully eradicated mosquito habitats in the past, especially in South America. However, these programmes have lapsed over the last 30 years and mosquito populations have increased, creating favourable conditions for epidemics of yellow fever.

Prevention and control

Vaccination

Vaccination is the most important measure for preventing yellow fever. In populations where vaccination coverage is low, surveillance is critical for prompt recognition and rapid control of outbreaks.

Yellow fever vaccine is safe and highly effective. The protective effect (immunity) occurs within one week in 95% of people vaccinated. A single dose of vaccine provides protection for ten years and probably life. More than 300 million people have been vaccinated up to date and serious side effects are extremely rare. A few serious adverse outcomes, including death, have been reported from Brazil, Australia and the United States. Scientists are still investigating these cases.

Vector control

Mosquito control measures should be used to prevent virus transmission until vaccination has taken effect.

1) Preventing mosquito bites:

Yellow fever mosquitoes bite during the daytime. Therefore, the protection against mosquito bites is crucial:

- Wear long sleeves and long trousers to cover the limbs;
- Use insect repellent: Care should be taken in using repellents on small children and the elderly;
- **Use mosquito coils** during the daytime.
- **Use mosquito nets** to protect yellow fever patients, babies, elderly people and others, who may rest during the day. The effectiveness of such nets can be improved by impregnating them with permethrin (pyrethroid insecticide). Curtains for windows or doorways (cloth or bamboo) can also be treated with insecticide, to repel or kill mosquitoes.

2) **Preventing multiplication of mosquitoes:**

*Aedes aegypti* mosquitoes live and breed in and around houses in shallow water, either dirty or clean. Stagnant water should be avoided at all times:

- **Drain water** from tanks, barrels, drums and buckets, tree holes, etc.;
- Remove all objects, e.g. plant saucers, etc. that has water collected in them around the living environment. Avoid at all times all objects that can retain stagnant water;
- Remove water from refrigerator drip pans every other day;
- Cover all stored water containers at all the times;
- Discard solid waste;

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