

General Science & Ability

Assignment

Write down the definitions, causing agents, symptoms, treatments and prevention of the following diseases:

- (i) Dengue
- (ii) Malaria
- (iii) Typhoid

1- Dengue Fever (Break bone fever)

(a) Definition

According to WHO

"Dengue (break-bone fever) is a viral infection that spreads from mosquitoes to people."

It is more common in tropical and subtropical climates. Dengue fever is a painful, debilitating mosquito-borne disease. c.

(b) Causing Agent of Dengue

Dengue is caused by a viral infection caused by dengue virus.

Dengue is transmitted by several species of mosquito within the genus "Aedes," particularly *A. aegypti*. The virus has 5 different types; infection with one type usually gives lifelong immunity to that type, but short-term immunity to others. Subsequent infection with a different type increases the risk of severe complications.

(c) Symptoms

Symptoms, usually begins 4 - 6 days after infection and last up to 10 days, may include:

- (i) Sudden, high fever (40°C / 104°F)
- (ii) Severe headaches
- (iii) Pain behind the eyes
- (iv) Severe muscles and joint pains
- (v) Fatigue
- (vi) Nausea
- (vii) Vomiting

(viii) Swollen glands

(ix) Skin rash, which appears two to five days after the onset of fever. Mild bleeding (such as nose and gums bleeding)

Individuals who are infected for the 2nd time are at greater risk of severe dengue.

Symptoms of severe dengue often come after the fever has gone away. Symptoms of severe dengue are:

- (i) Severe abdominal pain
- (ii) Persistent vomiting
- (iii) Rapid breathing
- (iv) Bleeding gums and nose
- (v) Fatigue
- (vi) Restlessness
- (vii) Blood in vomit or stool
- (viii) Being very thirsty
- (ix) Pale and cold skin
- (x) Feeling weak

(d) Diagnostic and Treatment for Dengue

There is no specific medicine to treat dengue. The focus is on treating the pain symptoms.

(i) Acetaminophen (paracetamol) is often used to control pain. Non-steroidal anti-inflammatory drugs like ibuprofen and aspirin should be avoided as they could worsen the bleeding.

(ii) There is a vaccine called Dengvaxia for people who have had dengue at least once and live in places where the disease is common.

(iii) Taking rest, drinking plenty of fluids & see your doctor. Get yourself to the hospital immediately, if you feel worse in the 24 hours after the fever goes down.

(e) Prevention:

The mosquitoes that spread dengue are active during the day. Lowering the risk of getting dengue by protecting yourself from mosquito bites by using

- (i) Stay away from heavily populated areas, if possible.
- (ii) Clothes that cover as much of your body as possible.
- (iii) Use mosquito repellents, even indoors. Coils and vaporizers should be used.
- (iv) When indoors, use air conditioning, if possible.
- (v) Make sure that windows and door screens are secure and free of holes. If sleeping areas are not secured or air conditioned, use mosquito nets.

2- Malaria

(a) Definition / Introduction

According to WHO

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of mosquitoes. It is mostly found in tropical countries.

Malaria is world's largest parasitic disease, killing more people than any other communicable disease except Tuberculosis.

Each year 300-500 million people contract malaria and about 3 million die, most of which are children under 5 years old.

(b) Causative Agent of Malaria

The causative agent of Malaria was discovered in 1880 by Charles Alphonse Louis Laveran. The disease is caused by infection with the intracellular protozoan parasites of the genus "plasmodium" that are transmitted by female "Anopheles" mosquitoes. 4 species of "plasmodium" infect humans: *P. falciparum*, *P. vivax*, *P. ovale* and *P. malariae*.

P. falciparum and *P. vivax* pose the greatest threat. *P. falciparum* is the deadliest parasite accounting for majority of infections and being the most lethal. and most prevalent on the African countries. *P. vivax* is dominant malaria parasite in most

countries outside of Sub-Saharan Africa.

Malaria is caused by a parasite and does not spread from person to person.

(c) Symptoms of Malaria

The early symptoms of malaria are intense fever, occurring in 24-72 hour intervals accompanied by nausea, headache, chills and muscular pain. Other symptoms are fatigue, vomiting and in severe cases, it can cause Jaundice (yellowing of eyes and skin), impaired consciousness, difficulty breathing, dark or bloody urine, abnormal bleeding, seizures, multiple convulsions, coma or death. A variety of symptoms including liver failure, Renal disease failure and cerebral diseases are associated with untreated "*P. falciparum*".

(d) Treatment

Malaria is a serious infection and is treated with antimalarial medications

Doctors will choose one or more based on:

The type of malaria, whether a malarial parasite is resistant to a medicine, the weight or age of the person infected with malaria and whether the person is pregnant etc.

Recommended treatments for malaria is the intravenous use of antimalarial drugs.

Normally, Quinine is used to treat malaria but for severe malaria, artesunate is superior to quinine for both children & adult.

Artemisinin-based combination therapy medicines like artemether-lumefantrine are usually the most effective medicines.

Chloroquine is recommended for treatment of infection with the "P. vivax" parasite only in places where it's still sensitive to this medicine. Primaquine should be added to the main treatment and to prevent relapses of infection with "P. vivax" and "P. ovale" parasites.

Treatment of severe malaria involves supportive measures that are best done in a critical care unit. This includes the management of high fevers and seizures that may result from it. It also includes monitoring for poor breathing effort, low blood sugar, and low blood potassium.

(e) Preventive measures.

Malaria can be prevented by avoiding mosquito bites by using mosquito nets while sleeping in places where malaria is present, using mosquito repellents after dusk, using coils and vaporizers, wearing protective clothes and using window screens. Malaria can also be prevented by taking medicines with the consult of doctors such as chemoprophylaxis before travelling to areas where malaria is common.

^{Vector}
Vital control is also an important component of malaria control. The 2 core interventions are insecticide-

treated nets (ITNs) and indoor residual spraying (IRS).

Since October 2021, WHO recommends broad use of the RTS,S/AS01 malaria vaccine among children living in the regions of moderate to high "P. falciparum" malaria transmission. This vaccine has shown reduction in malaria and deadly severe malaria, among young children.

Preventive Chemotherapies can also be used to prevent malarial infections and their consequences.

3. Typhoid (Enteric Fever)

(a) Introduction and causative agent

According to WHO.

Typhoid fever is a life-threatening infection caused by the bacterium "Salmonella Typhi". It is usually spread through contaminated food or water. Once "Salmonella Typhi" is ingested, it multiply and spread into

the bloodstream

(b) Causing agent

It is caused by a bacterium called "Salmonella Typhi". The organism is a Gram-negative short bacillus, rod shaped and is motile due to its ^{Peritrichous} flagella.

This bacteria grows best at 37° - human body temperature. This bacteria is from the family: Enterobacteriaceae.

It transmits due to close contact with carrier or patient, use of contaminated water and food, through faecal-oral route and also because of flies & cockroaches. S. Typhi lives only in humans.

Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract.

(c) Symptoms

The symptoms of ~~the~~ Typhoid include prolonged high fever, fatigue, headache, nausea, abdominal pain and constipation or diarrhoea. Some patients

may have rash. Severe cases may lead to serious complications or even death.

Typhoid fever can be confirmed through blood testing.

(d) Treatment

Typhoid fever can be treated with antibiotics. Antimicrobial resistance is common with likelihood of more complicated and expensive treatment options. Even when symptoms go away, people may still carry typhoid bacteria, meaning they can spread it to others so, it is important for people being treated to take prescribed antibiotics for as long as the doctor has prescribed. Typhoid conjugate vaccines as a single dose can inject in children from 6 months of age in in adults up to 45 or 65 years.

(e) Prevention

The preventive measures that can prevent from being infected by typhoid

fever are:

Access to safe water and adequate sanitation, hygiene among food handlers and typhoid vaccination are effective in preventing typhoid fever. Other than this ensure that the food you eat is properly cooked and hot when served.

Also, avoid raw milk and products made from raw milk, use only pasteurized or boiled milk. Additionally, wash hands properly with soap, in particular after contact with pets or farm animals and after having been to the toilet. More importantly,

wash fruits and vegetables if they are eaten raw. If possible, peel off fruits and vegetables. Use boil water and if it is not possible, disinfect it with a reliable, slow-release disinfectant agent.

Typhoid fever vaccination should be offered if you are travelling to high risk areas to prevent yourself from disease.