

Epidemiological Unit Ministry of Health and Mass Media 231, De Saram Place, Colombo 10 Tel: (011) 2695112, 4740490 Fax: (011) 2696583 e-mail: epidunit@sltnet.lk Last update May 2025

Japanese Encephalitis Fact Sheet

Causative agent

Japanese encephalitis (JE) is an infection of the Central Nervous System (CNS) caused by a virus (Flavivirus) transmitted to the man by a mosquito. Japanese Encephalitic Virus (JEV) is the main cause of viral encephalitis in many countries of Asia, with an estimated 100,000 clinical cases every year. This virus primarily affects animals, and humans are infected incidentally.

Transmission

Twenty-four countries in the WHO South-East Asia and Western Pacific Regions have JEV transmission risk, which includes more than 3 billion people. Humans become infected when they are bitten by mosquitoes infected with the JE virus. Culicine mosquito species such as Culex tritaeniorhyncus, Cx. gelidus, Cx.vishnui, Cx. pseudovishnui and Cx fuscocephala are the prominent vectors. These mosquito species prefer to feed outdoors primarily on vertebrate animals other than humans. The JE natural cycle is maintained in these mosquitoes, vertebrate animals and wading birds such as herons, egrets, etc. However, when the conditions are favourable, humans are subject to mosquito bites and are infected incidentally.

These mosquito vectors generally breed in groundwater habitats, particularly in paddy fields, irrigation canals, ground pools and shallow ditches. Mosquito breeding increases during rainy seasons. When the vectors are abundant, the absolute number of infected mosquitoes is high and man–vector contact is adequate, humans are at risk of being infected. Infected mosquito density rises when amplifying hosts, such as pigs, are available in peri-domestic areas. Human behaviours such as outdoor roaming in bare bodies also increase the risk. In the wet zone of the country, coir production as a cottage industry has also facilitated the spread of the disease due to increased mosquito breeding.

Not all individuals bitten by infected mosquitoes develop the disease (encephalitis). However, all infected humans develop anti-JE antibodies. According to estimates, the ratio of manifested disease to inapparent disease is in the range of 1:20 to 1:1000.

1

Clinical Manifestation

Symptomatic JE is rare, and the majority of cases occur in children below 15 years of age. The course of the disease is conveniently divided into three stages, namely:

- 1. Prodromal
- 2. Acute encephalitic
- 3. Late

\

Prodromal stage: This stage starts before the involvement of the CNS. The onset of the disease is acute and heralded by fever and often with rigours. Severe frontal or generalised headache, nausea and vomiting are common. This period is variable as short as 24 hours to as long as 14 days.

Acute encephalitic: This stage is characterised by altered sensorium, convulsions, stiff neck, muscular rigidity, mask-like face, abnormal movement, dehydration and weight loss. Altered sensorium includes symptoms such as clouding of consciousness, excitement and confusion. Continuous fever, nuchal rigidity, focal CNS signs, convulsions and altered sensorium are predominant. In many cases, the conditions may be worsened by coma.

Late stage: This stage is marked by recovery or persistence of signs of CNS. Increased deep tendon reflexes, thick and slow speech, aphasia and paresis are other signs and symptoms which may be present. Convalescence is usually slow.

Laboratory criteria for diagnosis of JE :

Presumptive diagnosis of JE is made based on a fold or greater rise in JE virus-specific IgG antibodies in paired sera (acute and convalescent), ELISA, haemagglutination Inhibition test, and Virus Neutralisation test in a patient with no history suggestive of either vaccination against or cross reactions to other flaviviruses. Otherwise, it is done by demonstrating JE virus-specific IgM antibodies in a single blood sample in the late acute phase or early convalescence. Confirmatory diagnosis of JE is made by demonstrating JE virus-specific IgM antibody in the CSF by IgM capture ELISA or the JE virus, antigen or genome in brain, spinal cord by immunochemistry, immunofluorescence or Polymerase Chain Reactions (PCR).

2

Clinical management of JE:

There is no specific treatment for JE, but supportive and symptomatic management is crucial.

Consequences of contracting JE:

Despite the fact that only a small proportion of the large number of JE virus-infected individuals develop overt manifestations of encephalitis, the case fatality ratio is around 30%. Nearly 50000 to 100000 patients die annually in the world due to JE. Those who survive, 20–30% suffer permanent cognitive, behavioural or neurological sequelae such as seizures, hearing or vision loss, speech, language, memory, and communication problems or weakness of the limbs. Permanent neurologic, cognitive and behavioural sequelae occur in 30–50% of those with encephalitis. The most commonly observed sequelae in patients are mental impairment, severe emotional instability, personality changes, and paralysis. Cognitive function is impaired by the disease, resulting in poor intellectual capacity.

Preventive and control measures:

Isolation of patients and disinfection of secretions of patients are not required as JE is not transmissible from person to person.

Vector control: This may be useful as a short-term measure in high-risk areas that are relatively small and where there is clear seasonality. Transmission can be minimized with vector control measures timed to coincide with the rise in vectors. Larviciding is impractical due to widespread breeding. Adulticiding by space spraying /fogging/ULV is carried out around peridomestic areas (vegetations and piggeries) to achieve maximum knock down, particularly in outbreak situations and to ensure residual insecticide activity.

As a long- term measure, vector control measures are used to sustain low vector densities. Among these measures, the most reasonable ones are:

- 1. Water management that entails periodic drying in paddy fields.
- 2. Selection of paddy plants with minimum water requirements
- 3. Promotion of larvivorous fish in streams, canals and paddy fields
- 4. Environmental manipulations such as drainage, filling and weeding.

However, it is essential to bear in mind that vector control cannot be expected to achieve a significant impact on overall disease burden as a single strategy.

Health Education and communication for behavioural change:

There should be simple information for the general public on how to avoid exposure to mosquito bites and means and ways to encourage and motivate communities to engage in vector control activities

Control of amplifying hosts:

Despite the suggestion as a control measure, segregation of pigs is practically impossible. Although pigs are immunized, they are slaughtered at 6-8 months, and as a result, maternal antibodies may interfere with the immune response. Even if pig control is made 100% effective, the existence of the virus among wading birds will ensure the circulation of the JE virus in the enzootic cycle, making humans vulnerable to the infection.

Immunization against JE:

Immunization against JE is the most cost-effective strategy to control and prevent JE. Immunization against JE was initiated in Sri Lanka in 1989 following the outbreak in the North Central Province on a phase basis. Over the years, the incidence of JE was reduced dramatically. However, as it reappeared in endemic areas where immunization was not carried out, gradually the programme was expanded to these potentially vulnerable areas and currently, since 2011, the programme is covering the entire country.