



RESEARCH ARTICLE

ZOOLOGY

**OUTBREAK OF JAPANESE ENCEPHALITIS IN SANGLI DISTRICT, INDIA.**

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**ABSTRACT**

A survey study of Japanese Encephalitis was conducted in Sangli district during the years 1997 to 2004. Five cases of JE were reported during the year 1997 and one case in year 2002. Various control measures such as spraying, fogging, biological control, piggary control and sanitization etc controlled the disease of the region. No incidence of Japanese Encephalitis was noticed after the year 2002. Details of outbreak of Encephalitis and its control measures were discussed in this paper.



## KEY WORDS

Japanese Encephalitis, Sangli district,

## INTRODUCTION

Sangli district is situated in western Maharashtra, 395 km away from Mumbai. The area of the district is 8577 sqkm divided into 9 talukas and population is 2581835 (2001sensus). In this district, natural environment includes annual rain fall that varies from 500 to 900 mm and temperature that varies from 14<sup>0c</sup> to 38<sup>0c</sup> and relative humidity that varies from 40 to 70. The man made environment includes 120320 hectare-irrigated area and major and minor 60 irrigation projects and unprotected water reservoirs that favor the vector breeding.

The disease causes acute inflammatory of short duration involving parts of brain, spinal cord and meninges. It affects central nervous system and can cause severe complications. The fatality rate of this disease was high, particularly between 20 to 40%; children too suffer from the highest attack rates because of the lack of cumulative immunity due to natural infection. The incubation period in the man varies from 5 to 15 days. The average period between the onset and death is about 9 days.

Indian strain of Japanese encephalitis virus (JEV) is GP78, which is phylogenetically closer to the Chinese SA14 isolate. JE is a zoonotic disease and generally maintained in natural cycle involving mosquitoes as vectors and ardeid birds as reservoirs. Pigs act as amplifier host i.e. reservoirs, they do not manifest the disease; they develop very high titers of virus in circulating blood and infect mosquitoes. Man is "dead end" host because of transient and low levels of viraemia. After 5 to 15 days virus invades the central nervous system and causes the disease.

JE virus has been isolated from 10 species of the genus *Culex*, 2 species of *Anopheles* and 3 species of *Mansonia* in India (Gajanana and Reuben, 1997). Majority of isolates are from *Culex vishnui* group

comprising of *Cx. tritaeniorhynchus*, *Cx. vishnui* and *Cx. pseudovishnui*. Most of the JE virus isolations have come from *Cx. tritaeniorhynchus*. The vector mosquitoes are mainly outdoor resters and the density of mosquito shows a rising trend from August to reaching the peak during September.

## MATERIALS AND METHODS

**Study area:** The Sangli district contributes the Valley of river Krishna and its tributaries are one of the greenest and irrigated area and other hand Jath. Atpadi and Kavathe Mahankal talukas were the drought prone area. Four patients admitted in Civil Hospital, Sangli showed the symptoms of JE. The fever mass surveillance was carried out in 53 wards of Municipal Corporation and 16 villages from rural area. The serum sample of these suspected cases were collected and examined for JE. 7 to 10 ml blood was collected and serum was separated and tested to Mac Elisa IgM, IgG for antibodies reaction. Those who were suspected and found positives of JE shifted to isolation ward in Civil Hospital. The survey of private hospitals for tress out the suspected JE patients was carried out. To detect the early warning signals for an outbreak and effective control measures epidemiological, entomological, laboratory and veterinary-based surveillance was monitored.

## RESULTS AND DISCUSSION

During the survey studies (1997 to 2004) 49 suspected cases were reported, out of which 43 were in 1997 and 6 in 2002. Positive cases for JE reported were 5 and 1 in the years 1997 and 2002 respectively. The patients of age group 5-14 were more susceptible for JE and 1-4 was less susceptible. There was no death observed in the outbreak. The following



control measures for JE were suggested for appropriate control of JE.

1. District Level review committee was established to handle the situation.
2. The control room was established in District Malaria Office, Sangli and one isolation ward was reserved for management of JE patients.
3. Action plan was prepared and responsibilities were handed over to regional officers and staff for surveillance. Rapid fever mass survey was carried out to detect the JE patients, simultaneously the blood smear for malaria detection were collected, total 762 blood smears were collected and examined for malaria all of them were found to be negative.
4. **Vector control** - Because of the exophilic nature of the vector, residual spraying of insecticides and fogging operation had only the limited role in JE. The Culex density per man in the affected area was as follows: Culex density 15.4, Gaonbhag 8.4, Khanbhag 4.00, Indiranagar 7.2, Kundal 5.6, Erandoli 6.0 and Budhgaon 8.4.
- A) **Fogging**: Malathion was used for fogging to cover 63619 populations. Three rounds twice in a week was carried out to control the mosquitoes.
- B) **Spraying** : The spraying of D.D.T.50% was carried out in 10144 houses with coverage 74.5%.
- C) **Impregnation of Bed Nets** – Total 558 Bed nets were impregnated in synthetic pyrethroid flow.
- D) **Larval control** – Total 293 breeding sites were enumerated and introduced the guppy fishes, larvicidal activity and engineering methods.
5. **Cleanliness Drainage & Gutters**: Special drive was carried out to clean the gutters and drainage. The garbage collection campaign was carried out in the city during this period total 718 Metric tones garbage was collected & destroyed.
6. **Control of Pigs** - In the district there was no centralized pig rearing, the pigs were scattered, Municipal Corporation detected the 12000-pig density, but only 684 Pigs

were collected & transferred to Chandoli Forest by Corporation.

7. **Mass Approach** - The District Administration, General Hospital & Municipal Corporation's wide Publicity were given about the sign & symptoms to prevent J.E. through the Press Conference, Pamphlets & Handbills. Preventive measures for J.E were adopted in 2002.

In Walwan village 30 blood smears were collected and examined for malaria, all of them were found negative. 6 serum samples were collected and tested for MAC Eliza. Two round of fogging of King fog was carried out and in 18 breeding places the guppy fish were introduced.

The capacity of vector to transmit the disease results from the interaction between the environment, both natural, man made and genetically determined characteristics. Irrigation system led to a vast increase of malaria and arboviral vectors and enhanced disease transmission. Breakdown of social order made an impact on disease itself with increased vector breeding through disruption of agriculture and water management. This belt is associated with unusual monsoon rains and other socio-economic factors, changing the scenario at regular interval. In endemic areas, sporadic cases may occur throughout the year due to congenial climatic conditions throughout the year.

The spraying mosquito habitats with insecticide is time consuming and expensive. It is difficult to cover all mosquito habitats, and causes environmental pollution. Mosquitoes bite at dusk before people are in bed. So there is no use of bed nets. Pig controls including segregating, slaughtering, or vaccinating pigs are economically not feasible and difficult also. Other animals, like birds, may also act, as amplifying hosts even if pigs are eliminated JE will not disappear. So above solutions are not the best solutions to eliminate the JE. Human vaccination is the only effective long-term control measure against JE. JE vaccines are currently available in 2 categories: inactivated vaccines and Live, attenuated vaccine. Live attenuated vaccine has simpler schedule,



better safety profile, longer duration of action and cheaper price.

In India, a Killed JE vaccine is produced at the Central Research Institute, Kasuli from the brain of suckling mice. Two doses of 1 ml (0.5 ml each) should be administered subcutaneously at an interval 7-14 days. A booster dose of 1 ml can be given after four weeks or one year in order to develop full protection. In India, due to the limited production the cost of vaccine is high.

In India instead of spending the colossal amount on JE vaccines the same amount can be spent on environmental sanitization and drainage system which will give the better results and will be helpful to eradicate Polio, Malaria, Gastroenteritis, typhoid, filariasis, dengue etc. However, many countries are making good progress towards control of JE by immunization.

Measures to control mosquitoes, pig reservoirs, environmental sanitization, use of mosquito nets and vaccination of the

susceptible population will go a long way in prevention of JE. Control of JE requires coordinated efforts of Panchayat Raj, Municipal administration and Urban development for environmental sanitation; Agricultural department for convincing the farmers to follow the alternate wet and dry methods of irrigation system; Medical and health department for prevention of the disease and care of the patients; Information department and mass media like news paper, TV channels for health education. Unless every individual feels his/her responsibility to keep the environment clean and takes personal care, it cannot be eradicated.

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