



Original Research Article

Serological study of Japanese encephalitis virus (JEV) among acute encephalitis syndrome cases at Chandrapur, Maharashtra

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ABSTRACT

Japanese encephalitis Virus (JEV) a flaviviridae family member (genus Flavivirus) is the main cause of meta-zoonotic viral encephalitis in many Asian countries. The disease was primarily reported in 1952 from Nagpur territory of Maharashtra recording nearly 16 deaths of an unknown viral encephalitis which was later awarded to be JEV; just nearer to Chandrapur reporting the present catastrophes.

Hence we have undertaken present study to make a countable move not only towards the diagnosis of the diseases but also to restrict its future spread in Indian continent. Which will also aid medical practitioners to combat with this metazoonotic disorder.

Amongst total suspected population nearly these 20 males and 22 females were positive. Considering monthly distribution most number of suspected cases were seen in the month of July. Most number of JEV affected population was seen more in the age group of 1 to 5 years of children and with advancement of the age reduction in the number of seropositive cases were observed. Human blood or CSF to be the reservoir Source from which isolation of opportunistic infections could be made possible. Also important role played by vaccinations could also be cross checked in JE epidemic areas. Hence role of JE Vaccine in routine vaccination programme in JEV epidemic areas could also be proved to be beneficial.

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1. Introduction

Japanese encephalitis Virus (JEV) a flaviviridae family member (genus Flavivirus) is the main cause of meta-zoonotic viral encephalitis in many Asian countries.^{1,2}

The disease was primarily reported in 1952 from Nagpur territory of Maharashtra recording nearly 16 deaths of a unknown viral encephalitis which was later awarded to be JEV; just nearer to Chandrapur reporting the present catastrophes.³

It is endemic with recurrent dispersal in parts of China, Russia and South-East Asia.⁴ There are informed 30,000 to 50, 000 clinical cases of JEV per annum, with an probable mortality extending from 10,000 to 15,000 deaths each year.⁵

It is more common in rural areas like Chandrapur district and nearby geographical dwellings where regular rice cultivation is taking place which endorses natural cultivation of causative vectors for JE. Three mosquitoes have been convicted for transmission of JEV cycles, the most important one is *Culex* followed by *Anopheles* and *Mansoni*.⁶

But the natural reservoir for the JE virus is known to be the Pigs which act as an amplifier of the virus and Humans are supposed to be the 'dead end' hosts of the disease. In some developed peculiarly, Asian countries use of the JE vaccine has affectedly declined cases of the disease found in children. Though, JE is still seen in adults, particularly the elderly.⁷

There is no treatment for JEV. Vector-control measures are not operationally realistic, are overpriced and of restricted significance. It causes substantial sickness with mortality in about one-third patients and similar number of

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recovered experience disability.⁸

Hence we have undertaken present study to make a countable move not only towards the diagnosis of the diseases but also to restrict its future spread in Indian continent. Which will also aid medical practitioners to combat with this metazoanotic disorder.

2. Materials and Methods

The present retrospective study was carried out in the dept. of Microbiology, Govt. Medical College, Chandrapur (MH). All serum samples of clinically suspected JE patients received from GMC and Hospital Chandrapur and from periphery of Chandrapur district were considered for the present study.

Demographic details like age, gender, address, and patient's details like date of admission, clinical history, signs, symptoms, collection of sample were noted.

Received samples were processed for IgG and IgM anti JEV antibody by JEV IgG-IgM capture ELISA (Mac ELISA), and required kits and test results were provided by National Institute of Pune (MH). The test was run and analysed as per guidelines given by World Health organisation.^{9,10}

The ELISA machine used was mindray micro plate reader model: MR-96A by Shenzhen Mindray bio-medical electronics, Shenzhen, China. Test results were read as per provided literature and the data obtained was utilised for knowing sero-prevalence of JEV in Chandrapur district.

3. Results

A sum 149 samples from suspected JEV patients were processed in Microbiology laboratory. Out of all these tested samples 42 were found to be positive and 43 were equivocal for JEV on ELISA as depicted in Table 1. Considering the total population under study 92 were males and 57 were females. Amongst these 20 males and 22 females were positive. Considering monthly distribution most number of suspected cases were seen in the month of July and were amounting to 107 cases.

With the present scenario Prevalence of JEV amongst the population of Chandrapur district could be calculated as:

Prevalence of JEV = total number of positive cases ÷ sample size under observation × 100.

Hence prevalence of JEV for a period of 12 months (that is period prevalence) is 28.18%.

Considering male population prevalence was 21.73% and in female population it was observed to be 38.59%

As depicted in Table 2 most number of JEV affected population was seen more in the age group of 1 to 5 years of children and with advancement of the age reduction in the number of seropositive cases were observed.

4. Discussion

A vector born deadly disease JEV is mainly found to be spread mainly because of Culex mosquitos which was confirmed by taking history of the admitted patients or their parents; this effect could be attributed to the open sewage systems of Chandrapur city and surroundings of paddy fields which promotes growth of the mosquitos. The solutions to the problem could be found by doing smogging, maintaining and strong pest control in the epidemic areas.²

As seen in present study eruption of JEV was first recognized in Nagpur city claiming more than a dozen of Death sand later a catastrophe in serological survey in the 1950s.^{11,12}

The next JEV outburst was informed in West Bengal in 1973, trailed by several states in the country.^{13–16}

After 1978 North India incidence, a severe outbreak of JE occurred with 5,700 cases and 1,315 deaths in Uttar Pradesh again in 2005.^{17,18}

Even though viruses being the most important pathogens which cause infectious frequencies reported higher in children of age group 1 to 3 years, which are supposed to be easy prey of mosquitos Similar results were observed by Phukan AC, Sarkar A and Bandopadhyay B.^{2,19,20}

Hospital-based acute encephalitis syndrome (AES) surveillance in north and northeast India showed that ~25% of cases were positive for JE, which were prevalent mainly in children. The estimated JE incidence rate was 15 per 100,000 in 5–9-year-olds in Tamil Nadu, a state in southern India. The JEV infection rate reached as high as 70.7% of the cases. Similar results were observed in present study.

Prevalence of JEV was found to be 28.18% in the present study which could be a positive risk factor for 'summer abortion', which could be due to bore wells as a water cradle', 'reported presence of mosquitoes' and 'lower elevation' as found by Thakur KK. Further they have added that JEV is likely circulating in the mountain districts of Nepal, and to be considered risk for citizens of the country and travelers.²¹

Human blood or CSF to be the reservoir source from which isolated appropriate management of opportunistic infections is as important as most of the infections in our study were observed in patients who were not given vaccinations.²² Hence it is strongly recommended to include JE Vaccine in routine vaccination programme in JEV epidemic areas so as to reduce the mortality related to the disease.

5. Source(s) of Support

Nil

6. Conflicting Interest

None.

Table 1: Distribution of JEV reports amongst males and females in the year 2018-19 at tertiary care centre, Chandrapur

Month	No. of Sample Tested				Male				Female			
	Tot	+ve	-ve	Equivocal	Tot	+ve	-ve	Equivocal	Tot	+ve	-ve	Equivocal
Oct 2018-	00	00	00	00	00	00	00	00	00	00	00	00
Dec 2018												
Jan	00	00	00	00	00	00	00	00	00	00	00	00
Feb	00	00	00	00	00	00	00	00	00	00	00	00
Mar	00	00	00	00	00	00	00	00	00	00	00	00
Apr	00	00	00	00	00	00	00	00	00	00	00	00
May	00	00	00	00	00	00	00	00	00	00	00	00
Jun	7	3	3	1	5	3	1	1	2	0	2	0
Jul	107	28	48	31	68	14	32	22	39	14	19	6
Aug	9	3	2	4	5	1	1	3	4	2	1	1
Sept	21	8	11	7	14	2	8	4	15	6	3	3
Tot	149	42	64	43	92	20	42	30	57	22	22	13

Table 2: Age wise distribution of JEV affected population in tertiary care centre at Chandrapur

Age group	No. of Patients	JEV Positive cases	JEV Negative cases
1 to 5 years	78	24	54
6 to 10 years	49	10	39
11 to 15 years	8	5	3
16 to 25 years	7	3	4
26 to 50 years	6	0	6
>50 years	1	0	1

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