

PREVALENCE OF JAPANESE ENCEPHALITIS IN DHEMAJI DISTRICT OF ASSAM

Mridul Malakar^{*1,2} and Abhishek Mathur³

¹*District Public Health Laboratory, North Lakhimpur Civil Hospital, Saboti, North Lakhimpur, Lakhimpur India-787001*

²*Himalayan University, Arunachal Pradesh, India -791110*

³*Dept. of Research & Development (R&D), Institute of Transgene Life Sciences, Dehradun (U.K), India - 248001*

*For correspondence. (mridulmalakar1@gmail.com)

Abstract: Japanese encephalitis (JE) is the viral disease caused by Japanese encephalitis virus (JEV) transmitted to human by *Culex* mosquitoes. As per WHO, annually 10,000–15,000 people die due to JEV in worldwide. In India, National Vector Borne Disease Control Programme (NVBDCP) is playing an important role for controlling the JEV by surveillance in each Region by Government of India. The present study was carried out to check the positivity rate of JEV among Acute encephalitis syndrome (AES cases) in 2013-2014 at Dhemaji district of Assam and to find out the risk age group and relation of JEV with living behavior. In our study it was found that 74.46% patients reported as AES were below 10 years and out of which 38.09 % patients were JE positive.

Keywords: Japanese Encephalitis Virus, *Culex*, NVBDCP, Dhemaji district

1. Introduction:

Japanese encephalitis is a mosquito-borne disease caused by Japanese encephalitis virus (JEV) [1]. This is the virus from the Flaviviridae family and the virus carrier mosquitoes are mainly *Culex tritaeniorhynchus* and *Culex vishnui*. Domestic pigs and wild birds are the reservoirs of this virus and transmission to humans may cause severe symptoms include Fever, Headache, abnormal behavior (Changing mental status), Seizure, unconsciousness, Neck rigidity, Paralysis etc.[2-10]. As per World Health Organization (WHO) 3 billion persons live in countries where the JE virus is endemic and the annual incidence of the disease is 30,000–50,000 cases [11-13]. Annually 10,000–15,000 people die due to JEV and maximum of them are children in comparison with adults. In 1871, first clinical case of Japanese encephalitis was reported from Japan. In 1927, 1934 and 1935 major outbreak of Japanese encephalitis was recorded in Japan [14]. And in 1938, it was demonstrated that the reservoir hosts of JEV are wading ardeids and pigs. In India the first JEV case was reported in 1952 and in the year 1973 from the Bankura District of West Bengal JEV outbreak was reported [15-17]. Subsequently, the disease spread to other states of the country and caused a series of outbreaks in different parts of the India. In the year 1978, first case of Japanese encephalitis was reported from the Lakhimpur district of Assam. In 1950, first Japanese encephalitis vaccine was introduced to reduce the disease burden. These were inactivated mouse brain-derived vaccine (the Nakayama and/or Beijing-1 strain), made by BIKEN and inactivated vaccine cultivated on primary hamster kidney cells (the Beijing-3 strain). Since 1968 the Beijing-3 strain vaccine was used in the People's Republic of China and which was replaced by them with the live-attenuated SA14-14-2 strain Vaccine. Assam started Children vaccination since 2006 with Sivsagar and Dibrugarh district and in 2007, it includes Golaghat & Jorhat district. Again adult vaccination processed from Sivsagar district in the year 2011 with the vaccine SA14-14-2 strain. After that it includes for Kamrup (M), Golaghat, Jorhat, Dibrugarh, Tinsukia, Dhemaji and Lakhimpur district for adult vaccination. As per the manufacturer the vaccine SA14-14-2 strain having 99 % efficacy among children and Nepal has also successfully carried out the vaccination drive among adults [18].

2. Methodology:

The study included the patients who came with clinical symptoms of AES (Acute Encephalitis Syndrome) to the Dhemaji Civil Hospital and North Lakhimpur Civil Hospital, Assam. The patient's history was asked and next day, the patient's living area was investigated (Field Investigation). After investigation and sample collection, JE IgM Capture ELISA tests were performed. Before starting the test, the reagents were allowed to reach at

room temperature. Further, washing solution, conjugate solution and substrate mixture were prepared. Before adding reagents, plates were washed with washing solution and then 50 µl positive control and 50 µl negative control were added to respective wells of the ELISA plate strip and 500 µl sample diluents were added with 5 µl serum sample in a different tube for each samples for sample dilution and diluted 50 µl serum were added to respective wells of the plate Further it was incubated at 37°C for one hour [19-22]. After completion of the incubation, plate was washed with the help of the ELISA washer. 50 µl Japanese Encephalitis antigens were added and incubated at 37°C for one hour to bind with captured human IgM followed by washing solution. After the completion of washing, 50 µl Anti JE Monoclonal Antibody was added and incubated at 37°C for one hour. The completion of incubation was followed by washing and Avidin-HRP. Lastly chromogenic substrate was added and reaction was stopped by stopping solution. The test result was calculated at 450nm with the help of ELISA reader machine. The positive samples were stored at -20 °C for further study [23, 24].

3. Results:

A, total of 141 (one hundred and forty one) numbers, AES samples were tested by MAC ELISA for Japanese encephalitis. Out of which 52 (fifty two) samples were positive for JE. During the month of July, highest numbers of AES patients were reported at Dhemaji Civil Hospital and North Lakhimpur Civil Hospital. It was observed that the maximum AES patients were below 10 (ten) years, 61 (sixty one) Male and 44(forty four) Female patients were below 10 years, 15 (fifteen) numbers Male and 7(seven) numbers Female's age range were 11-20 Years. Above 21 years minimum numbers patients were reported as AES. During field visit investigation it was found that almost all area in Dhemaji District people are living with domestic pigs. No mosquito nets were found for pigs, No special area/distance area for Pigs (not in all cases) because of which transmission of JEV was easily transmittable by Culex mosquitoes. Again as it is a border district of Assam or neighboring district of Arunachal Pradesh (hilly Area), waters comes from Arunachal Pradesh to Dhemaji district where water logged and helps mosquitoes to breed. Out of 141 (one hundred and forty one) numbers AES patients 26 (twenty six) numbers patients were died due to AES and out of this 26 (twenty six) numbers 18 (eighteen) numbers patients were below 10 Years i.e. the death rate of below 10 Years AES patients is 69.23% and positivity rate is 38.09%. Which indicate how important it is to control in Dhemaji district of Assam. The results are shown in Table 1 and Figures 1-4. The photos showing the life style of people in the district are shown in Images 1-2.

Table 1: Month wise Positivity rate of Dhemaji District.

Months	Cases reported in year 2013	Positive cases reported in year 2013	Cases reported in year 2014	Positive cases reported in year 2014
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	1	0
May	0	0	6	1
June	0	0	3	1
July	9	0	116	48
August	0	0	0	0
September	2	1	0	0
October	2	0	----	----
November	2	1	----	---
December	0	0	---	---

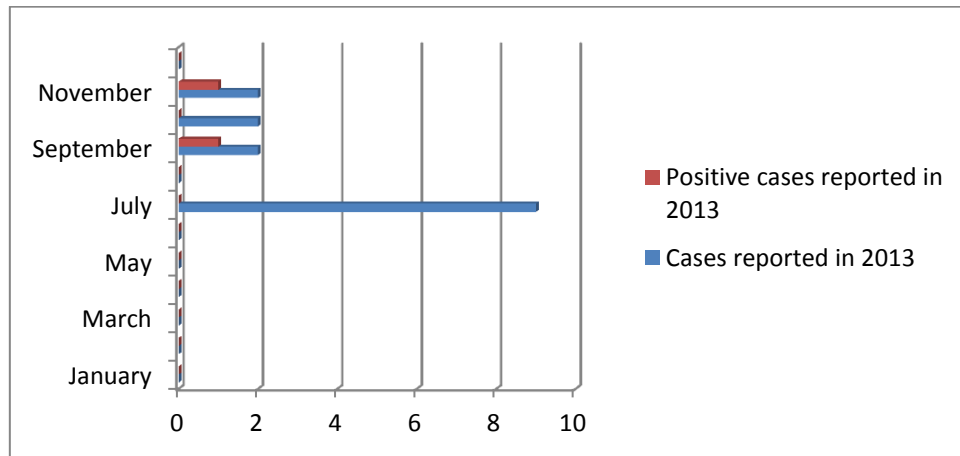


Figure 1: Cases reported of JE in year 2013.

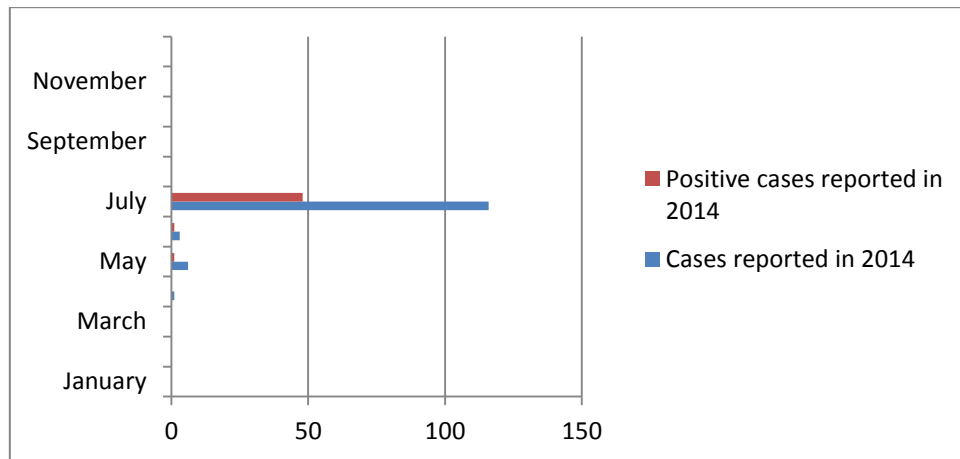


Figure 2: Cases reported of JE in year 2014.

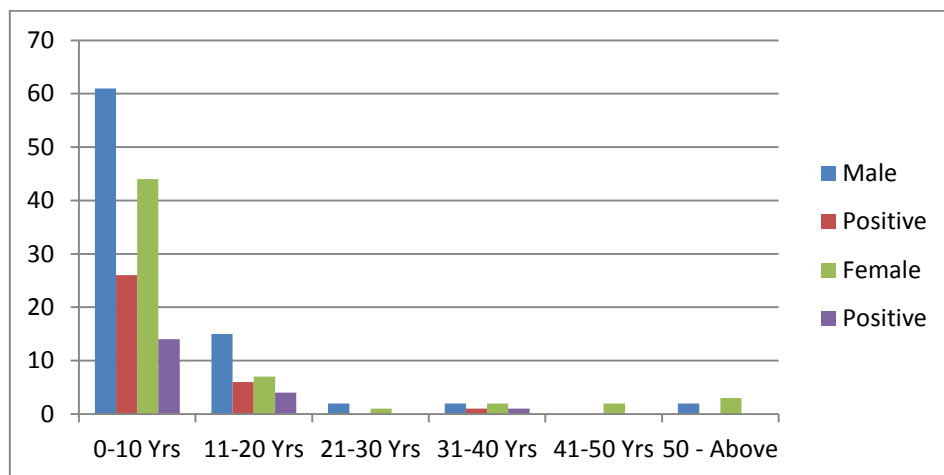


Figure 3: Age and sex wise JE positivity distribution.

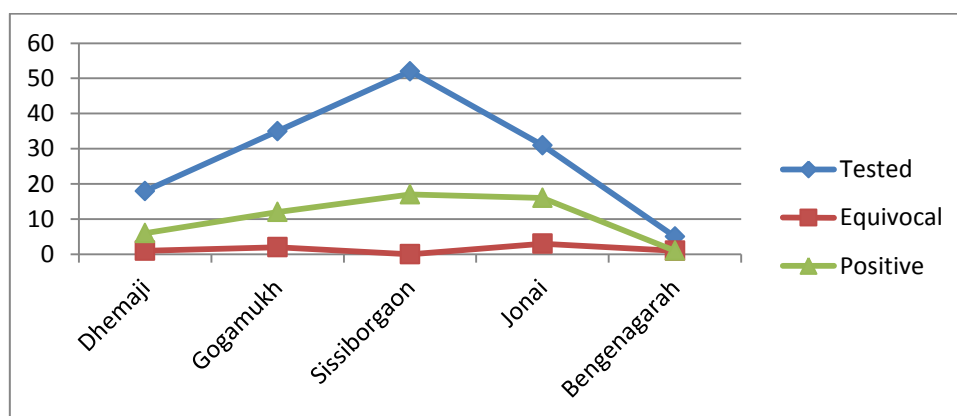


Figure 4: Area wise positivity rate of Dhemaji District



Image 1: People’s living behavior with pigs found during field investigation.



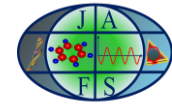
Image 2: An awareness camp organized by author during field visit.

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