International Journal of Pharmaceutical Research and Applications
Volume 5, Issue 2, pp: 713-717 www.ijprajournal.com ISSN: 2249-7781

Incidence of Japanese Encephalitis amongst Acute Encephalitis Syndrome Cases in a Tertiary Care Hospital of Western Odisha.

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Date of Submission: 20-11-2020 Date of Acceptance: 10-12-2020

ABSTRACT: Japanese encephalitis (JE) is a major public health problem in India because of high mortality rate and residual neuropsychiatric damage in the survivors.The present study was undertaken to investigate JE positivity amongst patients admitted with acute encephalitis syndrome (AES) in a tertiary care of western Odisha.It was a hospital-based cross-sectional study conducted from September 2018 to August 2019. A total of 210 consecutive non-repetitive hospitalized patients, satisfying the clinical case definition of AES as per the WHO guidelines, were included in the study. Serum samples were tested for Japanese encephalitis virus specific IgM antibodies by MAC ELISA method. Of the 210 patients admitted, 43 (21 %) were diagnosed as JE with male-to-female ratio1.6:1. Fever (100%), seizure (52.80%) and change in mental status (46.50%), were the major clinical findings. The majority of cases (79%) were from rural areas.A higher occurrence of JE was observed in below 15 year age group.

KEYWORDS- Japanese encephalitis, Acute encephalitis syndrome,IgM, ELISA

I. INTRODUCTION

A case of Acute encephalitis syndrome (AES) was defined as "acute onset of fever, change in mental status (such as confusion, disorientation, delirium or coma) and/or new onset of seizures(excluding simple febrile seizures) in a person of any age presenting at any time of the year."[1,2]Japanese Encephalitis(JE) is a leading viral cause of acute encephalitis syndrome (AES) with high mortality rate.[2]It is an important public health problem in South East Asian region and India as most of the outbreaks and sporadic encephalitis cases have been attributed to it.[3]It is an emerging mosquito-borne zoonotic disease caused by Japanese encephalitis virus (JEV) listed under Flaviviridaefamily.[2]Epidemiological data suggest that the disease primarily affects children under theage of 15[2]. Around 30,000–50,000 cases of JE and upto 15,000 deaths are reported annually across Asia.These statistics may not be representative of the actualburden of disease because of poor surveillance andreporting.[4]About 1% of human Japanese Encephalitis Virus (JEV) infections result in JE, but 20-30% of these cases are fatal and 30-50% of survivors have significant neurologic or psychiatric squeale.[5]Further threats to humanity are there because the JE virus has shown a tendency to extend to other geographic areas. The combined effects of climate change, altered bird migratory patterns, increasing movement of humans, animals, and goods, increasing deforestation, and development of irrigation projects willalso help this geographic dispersal of the virus, producing an enhanced threat to humanity.

The present study was undertaken to investigate the JE positivity amongst AES cases in during September 2018 to August 2019. Different parameters with their changing trend related to JE in terms of age,sex, geographical location, clinical presentation and seasonal variation were also studied.

II. MATERIAL AND METHODS

This hospital-based prospective cross-sectional study was conducted in the department of Microbiology,VIMSAR, Sambalpur, Odisha,India, for a period ofSeptember 2018 to August 2019.The study included a total of 210 consecutive non-repetitive Acute Encephalitis Syndrome(AES) patients of different age groups and both sexes admitted to the Medicine and Pediatrics departments of VIMSAR. The inclusion criteriawere the cases with clinical case definition of AES as per the WHO guidelines.[1,2]Cases were reported using standard Case Investigation Form for documentation of clinical and demographic characteristics and Laboratory request form as per guidelines set by National Vector Borne Disease Control Programme (NVBDCP), Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India.[6]Serum

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samples (2 ml) were collected under strict aseptic conditions. Blood samples were left at room temperature for 30 min for clot formation then serum was separated by centrifugation. Samples were kept at 4-8°C if testing is done within 48 h, for short- and long-term storage kept in a deep freezer at −20° and at −80°C, respectively. MAC ELISA technique was used for the detectionof JE virus-specific IgM antibodies using kits acquiredfrom ICMR-National Institute of Virology, Pune,India. Samples were reported as positive or negativeor equivocal.

III. RESULT

A total of 210 clinically suspected AES cases were included in the study. Out of which, 43(21 %) cases were diagnosed as JE positive shown in **Figure 1** .**Figure2** shows that 63% and 37% of the JE positive cases were males and females, respectively. Clinically, the JE cases were presented as viral encephalitis. **Figure 3**shows thatfever was the most common presentation found in all cases, followedby seizure (52.80%) and altered mental status (46.50%).**Figure 4** shows the higher JE positivity from rural (79%) areas as compared to urban areas. **Figure 5** shows maximum percentage of positive cases fall under 15yrs of age group i.e 98%.**Figure 6** shows the seasonal trend of positive cases with a spike during May –July.

Fig 1: IgM Ab of JE virus by Mac-ELISA (N=210)

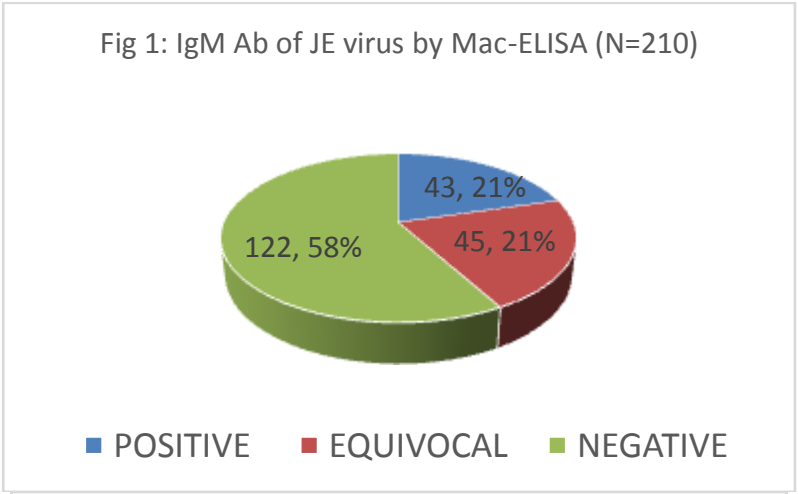
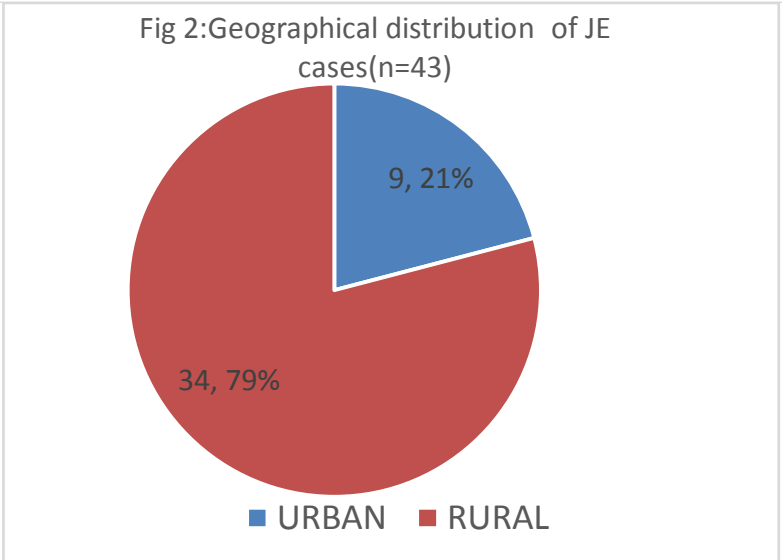


Fig 2:Geographical distribution of JE cases(n=43)



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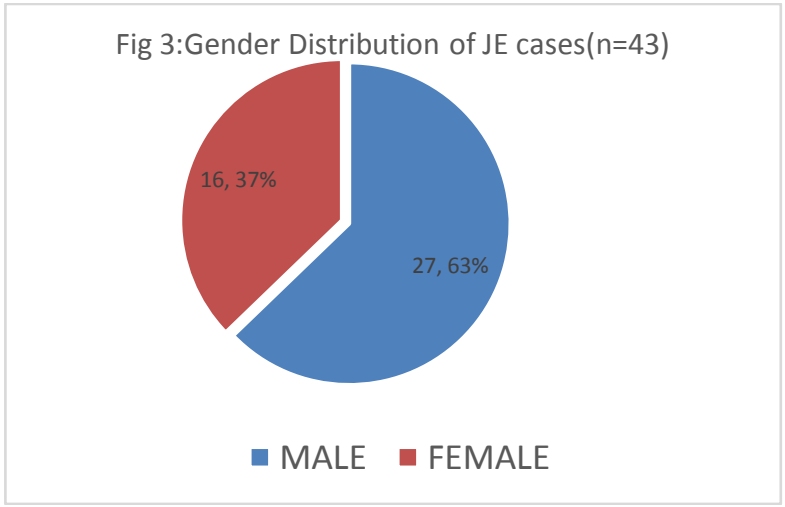

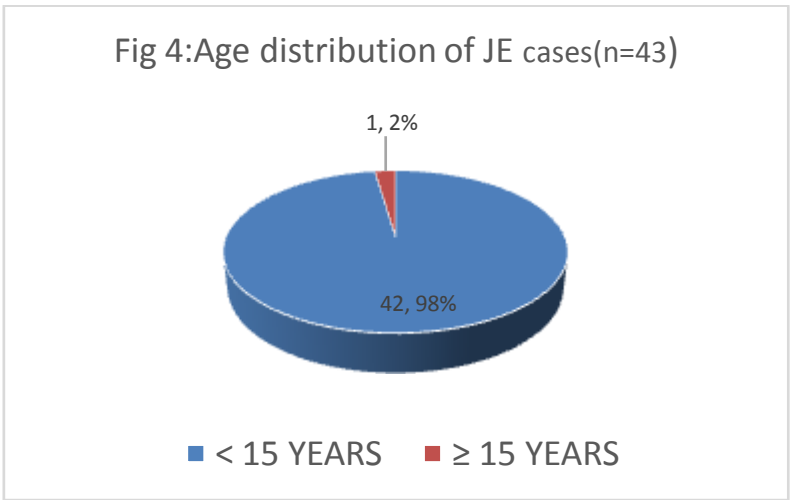

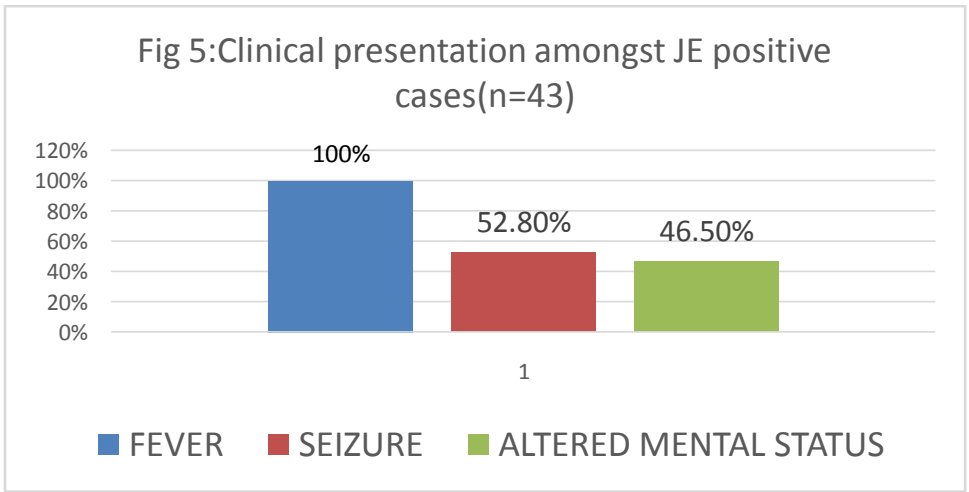

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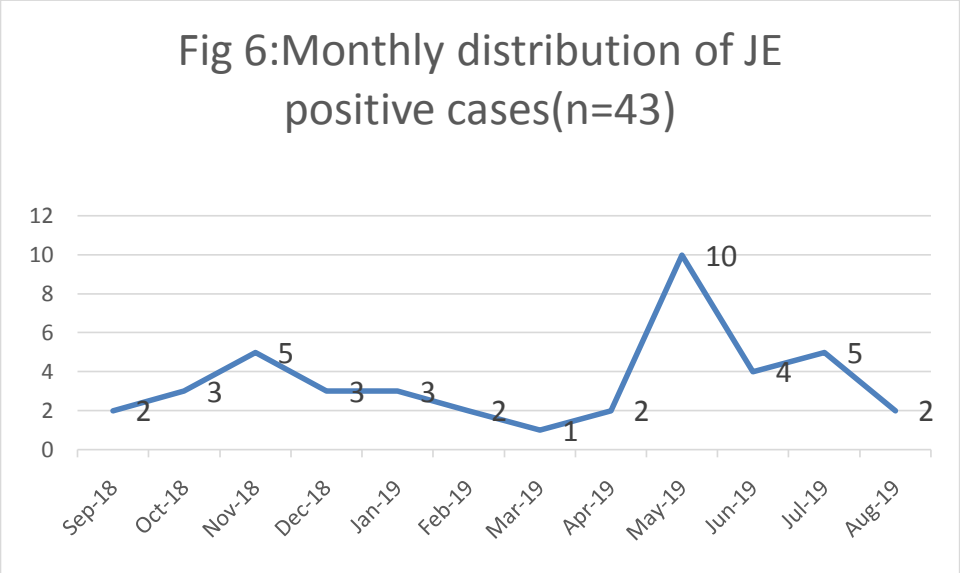

IV. DISCUSSION

Out of 210 clinically diagnosed AES cases, 21% were diagnosed as JE which is having almost similar incidence of 22.7% in the study done by Tiwari JK et al. but slightly higher than the study done by Dwiwedi b et al(13%).

Similar to other studies, we also observed rural predilection of JE cases.[10,11,12] The JE virus is particularly common in rural areas where irrigated rice fields attractthe natural avian hosts and provide abundant breeding site for the vector. In urban settings, the potential for an outbreak of JE is low although transmission can occur.

The majority of the studies focusing on the gender prevalence revealed the presence of a skew towards greater rates of infection among the males. In our study, among the cases with recent JE infections (IgM positive), 63% were males. This compares favorably with Rayamajhi[9], who, in his study found a positive fraction of 69% among the males and 31%among the females,(19) which is about similar as in our study.

Majority of cases (98%) were under fifteen years age group which is almost similar to many studies.[3,7,8]

Fever was present in all cases(100%) which is similar with study done by Medhi M et al where as change in mental status and seizure were present in 46.% and 52.8% of cases respectively was different from other studies.[3,7,8]

There was increase in number of cases during the month of May, june and July but in another study clustering of cases were mainly found during the month of june, july and august.[3,7,8]

V. CONCLUSION

Japanese Encephalitis is a serious public health problem with significant morbidity and mortality. JE is a predominant infection among children.So immunization of less than 15year child with Japanese Encephalitis vaccine and other preventive public health measures should be taken to reduce the incidence of Japanese encephalitis in western Odisha. The study showed a high JE positivityamongst AES cases. It also highlighted on the association of JE withdifferent parameters such as age, season and geographicallocation (rural/urban). The JEsurveillance system and the vaccination program needto be strengthened in the state. The case managementand referral system should be improved to avoid anycomplication and mortality.

ACKNOWLEDGEMENT

The authors express their deep gratitude to the Professor and HOD department of microbiology of the institute for providing laboratory facilities and healthy working atmosphere during the study period. The authors are also thankful to the technical staff of the institute for providing necessary helping hand during the endeavour.

International Journal of Pharmaceutical Research and Applications
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