

# **SERO- EPIDEMIOLOGY OF JAPANESE ENCEPHALITIS IN NEPAL**

A

Dissertation

Presented to the Central Department of Microbiology  
Tribhuvan University

In Partial Fulfillment of the Requirements for the Award of the Degree of  
Master of Science in Medical Microbiology

by

**Shyam Prakash Dumre**

Department of Microbiology  
Tribhuvan University  
Kirtipur, Kathmandu, Nepal

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## RECOMMENDATION

This is to certify that **Mr. Shyam Prakash Dumre** has completed this dissertation work entitled “*Sero-epidemiology of Japanese encephalitis (JE) in Nepal*” as a partial fulfillment of M. Sc. degree in Medical Microbiology under our supervision. To our knowledge this work has not been submitted for any other degree.



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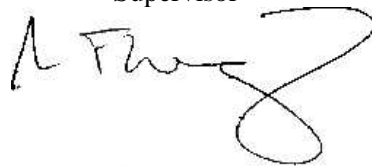
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**Shyam Prakash Dumre**

## ABSTRACT

Japanese encephalitis (JE) is one of the major public health problems in Nepal because of its increasing disease morbidity and mortality. In 2005, a total of 2952 cases of acute encephalitic syndrome (AES) were reported with a peak (76.4%) during 31-38 epidemiological weeks in the range of 92 to 498 cases per week. Among 58 AES cases reporting districts, the highest no. were reported from Kailali (435, 14.7 %) followed by Dang, Bardiya, Kathmandu, Banke, Kachanpur, Kapilvastu, Nawalparasi and Sunsari. These 8 districts reported more than 50 % cases. The highest no. of AES cases (839, 28.4 %) were recorded from MWDR.

Only 2239 specimens (serum/CSF) could be collected and tested by MAC ELISA technique, of which 723 (32.3%) were found positive for anti-JEV IgM. Also, 235 clinically defined AES cases showed anti-JEV IgM in the range of 20 to <40 units which may be doubtful/equivocal.

Among positive cases, 420 (58.1 % of total JE positives) were male and 303 (41.9 %) were female. The ratio of JE cases in male to female was observed as 1.4:1. The majority positive cases (58.9 %) were from the age group below 15 years than from above 15 years. Age group 5-15 years showed both the highest no. of positive cases (41.2 %) and sero-positivity (36 %).

JE cases started increasing from May and reached a peak during September (436, 60.3 %) and dropped then after. Sero-positivity rate was also highest in the month of September (42.1 %).

Among 41 districts, the highest no. of positive cases were detected in Bardiya (15.4 %) followed by Kailali (14.7 %), Banke (13.3 %) and Dang (12.3 %). These 4 districts accounted for 55.7 % of the total positives. The highest no. of positive cases (314, 43.4 %) were detected from MWDR followed by FWDR (130, 18 %). Geographically, terai

region (20 districts) reported 75.6 % (2232) of total AES cases and 85.1 % (615) of total JE positives.

In 2005, 322 deaths due to AES were recorded with the CFR and CI of 10.9 % and 12.9 per 10<sup>5</sup> population respectively. Among positive cases, 43 died and CFR of 5.9 % and CI (3.2/10<sup>5</sup>) were reported. The highest CFR (8.9 %) and CI (5.1) for JE positive cases were found in the age groups above 15 years and 5-15 years respectively. CI was highest in Bardiya (65.1) district followed by Kailali (63.5), Dang (60.1), Banke (51.6) and Kanchanpur (35.7). CFR was highest in WDR (15.2 %) followed by FWDR (14.5 %) and CI was highest in FWDR (39.1) followed by MWDR (31.5). The actual JE burden can be estimated by strengthening and expanding the diagnostic facilities in the country. Continuation of active surveillance, vector control measures and expanded programme of immunization (EPI) in JE endemic areas should be strongly emphasized to reduce the endemicity of disease.



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## LIST OF ABBREVIATIONS

ABC	Avidin biotin system
ACRIA	Antibody capture radioimmunoassay
ADCC	Antibody dependent cellular cytotoxicity
AES	Acute encephalitis syndrome
AFP	Acute flaccid paralysis
Cx.	<i>Culex</i>
AFRIMS	Armed Force Research Institute of Medical Sciences
BPKIHS	B. P. Koirala Institute of Health Sciences
C	Capsid protein
CDC	Centre for Disease Control and Prevention
CDM/TU	Central Department of Microbiology/ Tribhuwan university
CDR	Central Development Region
CF	Complement fixation
CFR	Case fatality rate
CI	Case incidence
CMI	Cell mediated immunity
CNS	Central nervous system
CSF	Cerebrospinal fluid
DNA	Deoxyribonucleic acid
DoHS	Department of Health Services
E	Envelope protein
EDCD	Epidemiology and Disease Control Division
EDR	Eastern Development Region
EEG	Electro encephalogram
ELISA	Enzyme Linked Immunosorbent Assay
FWDR	Far-western Development Region
HI	Haemagglutination inhibition
hMDF	Human macrophage derived factor

HMIS	Health Management Information System
IFA	Indirect fluorescent antibody
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IPD	Immunization preventable diseases
JE	Japanese encephalitis
JEV	Japanese encephalitis virus
KA	Kala azar
MAC-ELISA	IgM antibody capture ELISA
MoHP	Ministry of Health and Population
MVE	Murray valley encephalitis
MWDR	Mid-western Development Region
NC	Negative Control
NPHL	National Public Health Laboratory
NS	Non-structural protein
O/N	Overnight
PCR	Polymerase Chain Reaction
PHK	Primary Hamster Kidney
PrM	Pre-membrane protein
PRNT	Plaque reduction neutralization test
QNS	Quantity not sufficient
RNA	Ribonucleic acid
RT-PCR	Reverse transcriptase polymerase chain reaction
SEA	South East Asia
SLE	St. Louis encephalitis
SMO	Surveillance medical officer
US	United States
UTR	Untranslated region
WDR	Western Development Region
WPC	Weak Positive Control

WHO

World Health Organization

WNV

West Nile virus

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