

---

## PUBLIC HEALTH RESEARCH

---

### Perception of Prevention of Japanese Encephalitis with Emphasis on Its Vaccination Programme: A Community Based Study in a Slum of Kolkata

*Dasgupta Aparajita, Dey Atanu, Paul Bobby, Bandyopadhyay Lina and Garg Shobhit*

*Department of Preventive & Social Medicine, All India Institute of Hygiene and Public Health, Kolkata, West Bengal, India.*

*\*For reprint and all correspondence: Dr Atanu Dey, Sreeniketan Apartment; Flat no – S4; 81/5A, Raja S.C.Mullick Road; Kolkata; West Bengal. PIN 700047.*

*Email : dratanudey@gmail.com*

#### ABSTRACT

---

<b>Received</b>	27 March 2017
<b>Accepted</b>	18 August 2017

**Introduction** Japanese Encephalitis (JE) is a mosquito borne disease with epidemic potential. There is no specific treatment available till date and apart from vector control, vaccination of individuals is considered as a safe and effective measure for prevention. Vaccination campaign among 1-15 years is being carried out with full vigour from 2015 onwards in West Bengal.

**Objectives** This study was conducted to assess the knowledge of the care givers of 1-15 years old children about JE and its prevention and to find out the factors associated with vaccination status of the children.

**Methods** A cross sectional, community based study was conducted from May-June 2016 in a slum of Chetla, Kolkata, which is within the service area of Urban Health Unit and Training Centre (UHU&TC), Chetla of All India Institute of Hygiene and Public Health, Kolkata, where the campaign prior to the study was completed in March 2016. Care givers of 90 children of aged 1-15 years were interviewed with a pre-designed, pre-tested, structured schedule.

**Results** Mean age of the surveyed children was 6.34 years (SD 3.76) and 88% of them were vaccinated during the campaign. 56.7% of the caregivers had poor knowledge about JE and 84.95% were sensitized about the campaign by relatives/friends followed by health workers (33.7%). Low socio-economic status and good knowledge of JE had significant association with vaccination of the child after adjusting with other factors (age and sex of the child, education and occupation of parents, type of family).

**Conclusions** Enhancement of knowledge and awareness about JE with appropriate health education programmes and special emphasis on sensitization campaigns for JE vaccination at both mass and individual level would prevent emergence of JE epidemics in future.

**Keywords** Japanese encephalitis - Vaccination - Health Education.

### INTRODUCTION

Japanese Encephalitis (JE) is a zoonotic disease caused by Japanese Encephalitis Virus (JEV). JEV exists in a transmission cycle between mosquitoes, pigs and/or water birds and is transmitted to humans through bites from infected mosquitoes of the *Culex* species (mainly *Culex tritaeniorhynchus*).<sup>1</sup>

In most temperate areas of Asia, JEV is transmitted mainly during the warm season where as in the tropics and subtropics, transmission often intensifies during the rainy season. In rice-cultivating regions transmission also increases in pre-harvest period.<sup>1</sup>

More than 3 billion people are at risk of JEV transmission in 24 countries in the WHO South-East Asia and Western Pacific regions.<sup>1</sup> Majority of cases occur among children less than 15 years of age.<sup>2</sup>

Most JEV infections are mild (fever and headache) but severe disease may occur (1:250) which causes high fever, headache, neck stiffness, disorientation, coma, seizures, spastic paralysis and ultimately death. The case-fatality rate can be as high as 30% among those symptomatic patients and 20%–30% of the survivors suffer from permanent intellectual, behavioural or neurological problems.<sup>1</sup>

There is no specific antiviral treatment available for JE till date and apart from protection from mosquito bite and mosquito control, safe and effective JE vaccine is considered as the best method to prevent the disease.<sup>1</sup>

As per recent estimate nearly 68000 clinical cases of JE occurs globally each year, with approximately 13600 to 20400 deaths.<sup>1</sup>

In India, first case of JE was reported in 1955 from Tamilnadu and first outbreak of JE was reported in Burdwan district of West Bengal in 1973.<sup>3</sup> A major outbreak of Japanese Encephalitis was reported from eastern UP during 2005 resulting in recording of more than 6000 cases and 1500 deaths.<sup>3</sup> Following this, JE vaccination program started in 2006 in JE endemic areas with strategy to cover all children of 1-15 years of age in mass vaccination drive (campaign mode) and subsequent integration into routine immunization (two dose along with measles).<sup>4</sup> Single dose live attenuated JE vaccine (SA14-14-2) was used for immunization against JE in campaign mode.<sup>1</sup>

In West Bengal, JE vaccination campaign among age group 1-15 yrs was carried out in Coochbehar, Murshidabad, Nadia, Purulia and Bankura district within 1st June 2015 to 20th June 2015 following an outbreak of the disease in the state.<sup>5</sup> Subsequently this programme was carried out to other parts of the state.

In the service area of UHUTC, Chetla, Kolkata, this programme was carried out from 21st December 2015 to 18th March 2016. Apart from the health workers of the UHUTC, Kolkata

Municipal Corporation carried out the campaign for the programme. UHUTC, Chetla served as one of the vaccination sites for this programme.

JE is a disease of public health importance as billions of people are at risk of getting infected by JEV. It has high case fatality rate, leads to poor sequelae and there is no specific treatment till date. Children below 15 yrs are more susceptible and also it has an epidemic potential. This disease can be easily prevented by a safe and effective vaccine.

This study was carried out to assess the knowledge of the care givers of 1-15 years children about JE disease and its prevention and to find out vaccination status and its predictors of those children. This may predict the vulnerability of the beneficiaries to JE and may help to draw future plan to protect the community from the disease.

### MATERIALS AND METHODS

A cross sectional, observational community based study was carried out from 1<sup>st</sup> May 2016 to 30th June 2016 in a slum of Kolkata municipality (KMC) area in West Bengal, which is service area of UHUTC, Chetla and urban field practice area of All India Institute of Hygiene and Public Health, Kolkata. Care givers of children of aged 1-15 years residing in this area were interviewed with a pre-designed, pre-tested, structured schedule provided they have given informed consent to participate in this study. This schedule was prepared with the help of the experts of department of P.S.M., AIHH and PH, Kolkata and was pretested in a different setting.

#### *Sampling*

During pretesting with the schedule it was found that 12 to 15 minutes were spent with every subject to complete the interview. Three wards of KMC (ward no 74,81,82) are served by the UHUTC, Chetla. One ward (ward no. 82) was selected through simple random sampling for conducting the study. Door to door interview was carried out after taking informed consent of the respondent. If more than one child of 1-15yrs were present in a household, any one child was taken in account by simple random sampling.<sup>6</sup> In the study period total 12 working days were available and in every working day 3 to 3.5 hours were spent in the field to collect data. In this manner total 90 study subjects were interviewed in the speculated time.

#### *Study variables*

##### **Independent variables**

Socio-demographic: Age of the child, sex of the child, education and occupation of parents, type of family, socio-economic status.

Knowledge of JE: Care giver's knowledge about JE disease and its prevention.

Outcome variable : Vaccination status of the child.

*Data analysis*

Statistical analysis was done by using statistical package of social science SPSS version 16. Data was analysed using appropriate statistical methods and represented by tables, graphs, diagrams etc. and appropriate statistical significant tests with univariate and multivariable regression was applied accordingly.

To assess the knowledge of JE among care givers score of one was given to every correct response except in two questions regarding mode of transmission and methods of prevention where weightage was given to two certain responses.

*Ethical issues*

Permission was taken from O.C. UHUTC, Chetla to conduct the study.

Informed consent was taken from the study subjects before conducting the interview.

**RESULTS & ANALYSIS**

Table 1 shows characteristics of the children surveyed in the study. 45.6% of the children was in the age group of 1-5 years. Mean age of the children was 6.34 (SD 3.76) with median age of 6 and 54.4% of them was male. One child (2.6%) was illiterate. This male child is deaf and dumb and was deprived of any education.

**Table 1** Distribution of children according to age, sex and education (N=90)

Characteristics		Frequency	Percentage	Mean ( $\pm$ SD)* Median (IQR)#
Age (in yrs)	1-- 5	41	45.6	*6.34 (3.76)
	6-- 10	34	37.7	# 6.0
	11-- 15	15	16.7	
Sex	Male	49	54.4	
	Female	41	45.6	
Education of child aged $\geq$ 7 yrs. (n = 39)	Illiterate	1	2.6	# 4(2—6)
	Up to primary	24	61.5	
	Above primary	14	35.9	

49 (54.4%) of the child belongs to nuclear family. 53 (58.8%) of the families belong to SES class IV category i.e. lower middle class category as per B G Prasad scale 2016. Mean PCI was Rs.1749.50 (SD 784.80) and range was Rs. 667-5333. Most of the parents (39[43.3%] fathers and

38[42.2%] mothers) had primary education i.e. they had passed class V but not class VIII. 44(48.9%) father were unskilled labour where as 87(96.7%) mothers were home maker. Socio-demographic characteristics of care givers are described in table 2.

**Table 2** Socio-demographic characteristics of surveyed children (1-15yrs) [N=90]

	Characteristics	Frequency	Percentage
Type of family	Nuclear	49	54.4
	Joint	41	45.6
Education of father	Illiterate	5	5.6
	Primary	39	43.3
	Middle	19	21.1
	Secondary	18	20.0
	H.S. & above	9	10.0
Education of mother	Illiterate	7	7.8
	Below primary	12	13.3
	Primary	38	42.2
	Middle	16	17.8
	Secondary	15	16.7
Occupation of father	H.S. & above	2	2.2
	Unemployed	1	1.1
	Unskilled labour*	44	48.9
	Semi skilled labour**	8	8.9
	Skilled labour***	15	16.7
	Business	7	7.8
	Teacher	1	1.1
	Service	14	15.6

## Japanese Encephalitis Vaccination Programme

Occupation of mother	Home maker	87	96.7
	Maid servant	3	3.3
Social class	Class II (Rs. 3047– 6093)	5	5.6
B.G.Prasad scale (Feb'16)	Class III (Rs. 1828– 3046)	26	28.9
	Class IV (Rs. 914– 1827)	53	58.8
	Class V ( $\leq$ Rs. 913)	6	6.7
Per capita income in family (Rs)	Minimum=667	Mean= 1749.5	
	Maximum =5333	SD =784.8 Median = 1600	

\*Unskilled = Labour, Security guard, Hawker, Fruit vendor, Shop worker

\*\*Semiskilled = Motor mechanic, Garage worker, Led worker

\*\*\*Skilled = Driver, Auto driver

To assess the knowledge of the care givers about JE, scoring was done to the corresponding questions. All of the care givers were mother of the child and maximum attained score was 11 with

minimum score of 0. Median knowledge score was 3. Considering this as cut off value, 56.7% of mothers were having poor knowledge about JE (Table 3 and 4).

**Table 3** Knowledge of care givers about JE (N=90)

Question	Response	Frequency	Percentage
How does the disease get transmitted? ##	Mosquito	23	25.6
	Pig	17	18.9
	Bird	7	7.8
	Don't know	57	63.3
What are the common symptom of JE? ##	Fever	35	38.9
	Paralysis	6	6.7
	Headache	--	--
	Convulsion	--	--
	Don't know	53	58.9
Can it be prevented?	Yes	24	26.7
	No	66	73.3
How it can be prevented? ##	Protection from mosquito	8	8.9
	Vaccine	17	18.9
	Avoid pig habitat near residence	2	2.2
	Environmental control	3	3.3
	Don't know	68	75.6
Is there any specific treatment for JE?	No	2	2.2
	Don't know	88	97.8
Is your child susceptible to JE?	Yes	40	44.4
	No	50	55.6
Does JE disease may cause death of a person?	Yes	41	45.6
	No	49	54.4
Do you think JE vaccine will protect your child from JE disease?	Yes	70	77.8
	No /don't know	20	22.2

## Multiple response

**Table 4** Knowledge score of care givers (N=90)

Knowledge score	Frequency	Percentage	** Total attainable score 0 – 19
0--3	51	56.7	Attained score:
4--7	26	28.9	Min. 0 Max. 11
$\geq$ 8	13	14.4	Mean = 3.72 ; SD=3.17
Total	90	100	Median = 3 ; IQR (1 - 6)

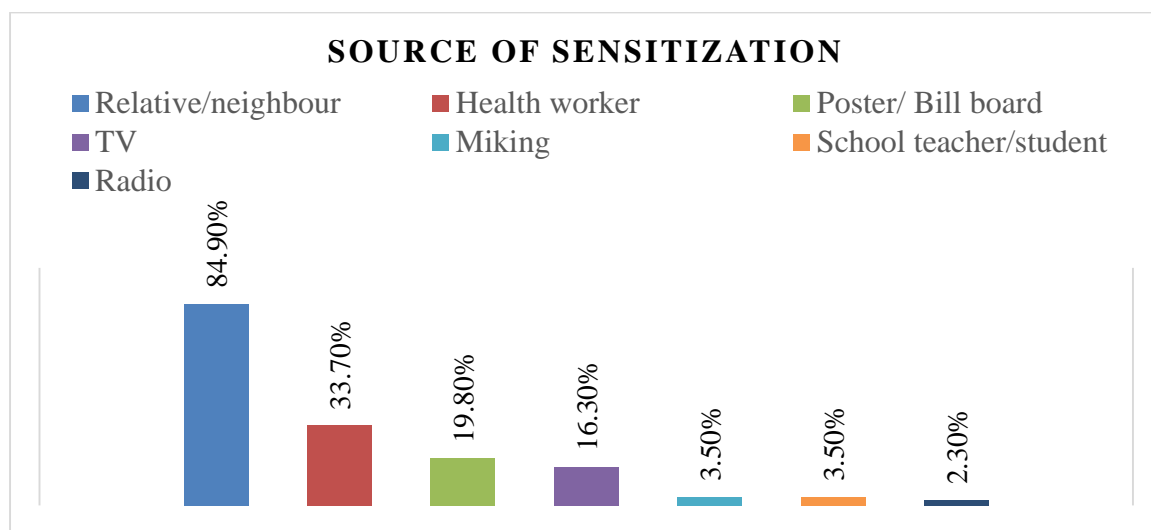
20% of care givers gained their knowledge about JE from posters/hoardings followed by advertisement in television (14.4%). Health workers and neighbours each contribute as source of knowledge in 13.3% of the care givers. 43.3% of

the caregivers did not have any information about JE. Out of total 78.1% had vaccinated their child during campaign. 84.9% of the caregivers were sensitized about the JE vaccination campaign by relatives and neighbours followed by health

workers (33.7%), poster/billboard (19.8%) and TV (16.3%). Four mothers (4.4%) were not sensitized

by any means and their child were unvaccinated (Figure 1).

**Figure 1** Source of sensitization of care givers regarding vaccination campaign among children (N=86) \*\*



## Multiple response , MIKING – It is the use of microphone and speaker to communicate the message among community. \*\* 4 care givers (4.4%) were not sensitized about programme.

During vaccination campaign 11(12%) of the surveyed children were found unvaccinated against JE. Among 11 unvaccinated child 4 were unaware of the campaign and care givers of 2 child felt it was not important, rest 5 failed to get vaccine as they were sick.

Logistic regression was done to find out the predictors affecting the vaccination status of the children of 1-15 years. Bivariate logistic regression shows- low socio-economic status class IV & V

(OR=4.0) and good knowledge of JE (OR= 9.3) had significant association with vaccination of the child and both these variables remain significant in multivariable logistic regression after adjusting with each other (AOR of 4.77 & 10.82 respectively). Final model is fit for predicting vaccination of the children as Hosmer-Lemeshow statistics(p=0.233) was not significant(p>0.05). All the independent variables can explain vaccination status of the children by 24.2%. [Table 5]

**Table 5** Univariate & multivariable logistic regression showing factors affecting the vaccination status of children(1-15yrs) [N=90]

Variables	Vaccination		<sup>a</sup> OR ( <sup>b</sup> CI 95%)	<sup>d</sup> AOR (CI 95%)
	Yes n (%)	No n (%)		
Age of child (yrs)	≤ 6 45 (88.2)	>6 6 (11.8)	1.103(.31– 3.92)	--
Sex of child	Male 41 (83.7)	Female 8 (16.3)	.41 (.1– 1.64)	--
Mother's education	Primary & below 32 (94.1)	Above primary 2 (5.9)	3.06 (.62– 15.13)	--
Father's education	Primary & below 14 (82.4)	Above primary 9 (16.1)	5.74 (.14–2.44)	--
Father's occupation	Unemployed & 37 (82.2)	unskilled 8 (17.8)	3.3 (.082– 1.34)	--
Type of family	Others 42 (93.3)	Nuclear 3 (6.7)	1	--
SES	Nuclear 45 (91.8)	Joint 4 (8.2)	2.32 (.63– 8.56)	--
B.G.Prasad 2016	Joint 34 (82.9)	Class IV & V 7 (17.1)	1	--
	Class I,II,III 24 (77.4)	Class I,II,III 7 (22.6)	4.0 (1.1– 15.0) <sup>#</sup>	4.77(1.19– 19.07) <sup>#</sup>

## Japanese Encephalitis Vaccination Programme

Knowledge of JE	Good (>3 score)	38 (97.4)	1 (2.6)	9.3 (1.1– 75.8) <sup>#</sup>	10.82 (1.27– 92.02) <sup>#</sup>
	Poor (≤3 score)	41 (80.4)	10 (19.6)	1	1

<sup>a</sup>OR= Odds ratio ; <sup>b</sup>CI= Confidence interval ; <sup>c</sup>AOR= Adjusted odds ratio ;  
# = statistically significant. Hosmer-Lemeshow =0.233 ; Nagelkerke R<sup>2</sup> = .242

### DISCUSSION

JE is a vector borne, endemic, preventable disease in India with epidemic potential. JE vaccination is nowadays carried out in UIP (Universal Immunization Programme). JE vaccination in the age group 1-15 yrs was carried out in campaign mode to immunize all the child against JE disease.

In this study it was found that good knowledge of care givers about JE disease and its prevention had significant association (OR=9.3) with the vaccination of the child. In a study by Zhang S. et al. in Shaanxi Province, China, in 2011, it was found that knowledge about JE and education of the caregivers were significantly associated with vaccination of their children.<sup>7</sup>

In our study it was found that 87.8% children were vaccinated during campaign. 43.3% mothers did not have any information about the disease but among them 78.1% had vaccinated their child. 56.7% of mothers were having poor knowledge regarding JE. In a study in Mandya & Koppal district of Karnataka by Ravi Kumar K. et al<sup>8</sup> in 2009, it was found that JE vaccine coverage among 1 to 15 years old children was 92% & 70% in Mandya and Koppal district respectively which is quite similar with that was found in our study. In Mandya, 58% of the household had poor knowledge of JE while in our study 56.7% of mother was found to have poor knowledge about JE.

In our study 86 (95.6%) mothers were sensitized about current campaign of JE vaccination of children and among them 84.9% were sensitized by relatives/neighbour followed by health worker, poster/billboard, television etc (33.7%, 19.8%, 16.3% respectively). It may be due to the fact that in a slum of a metro city like Kolkata people may get the messages of the health workers indirectly through their relatives/friends/neighbours. Among unvaccinated children 5 (45.5%) were sick, 4 (36.4%) were unaware of the programme and 2 (18.1%) of the care givers felt that this vaccine is not important at all. A study among JE vaccination campaign of adults in Assam by Das B.R. et al<sup>6</sup> (2014) showed that majority of the respondents (80%) were informed about the campaign through ASHA/Link worker followed by poster/banner (10%), 27% were not vaccinated due to illness, 8% were unaware of the programme and 15% felt it as unimportant. Though health workers play the crucial role of first contact with the community, majority of the caregivers were sensitized by relatives/neighbour.

In our study 25.6% of care givers knew that JE disease is caused by mosquito bite which is quite similar (24%) with the knowledge of rural people of West Bengal as showed in a study on adult JE vaccination campaign by Bandopadhyay K et al.<sup>9</sup>

In our study 73.3% of care givers thought that JE is not preventable but 77.8% believed that the vaccine will protect their child from getting the disease and 87.8% caregivers vaccinated their child. Despite poor knowledge among more than half of the caregivers it reflects their faith and dependence to the existing health care delivery system and its policy makers.

The major strength of this study was no study on JE vaccination campaign among 1-15 years had been carried out in this setting. Knowledge about JE disease and its prevention had not been assessed earlier in this community. However this study had some limitations that should be mentioned. Firstly recall problems could be there as these are quite common in cross sectional studies. Secondly all the factors affecting the immunization like knowledge of other family members were not being investigated.

### CONCLUSION AND RECOMMENDATION

This study reflects the knowledge of JE disease and its prevention among the slum population of Kolkata. Community awareness and satisfactory knowledge is a must to combat this endemic disease with epidemic potential. Though various strategies are taken through National Vector Borne Disease Control Program, without community awareness it will be very difficult to prevent an epidemic of JE. Health education should be given to the communities with suitable Information Education Communication (IEC) materials to increase their knowledge. Sensitization about the mass campaign should be done more aggressively by the health personnel. Persons with more community acceptance like school teachers, community leaders should be incorporated more actively during IEC programmes.

### REFERENCES

1. WHO; Fact sheet no 386. Available from: <http://www.who.int/media/centre/factsheets/fs386/en/> (Last accessed 07 August 2016).
2. Park K. Park's textbook of preventive and social medicine, 23rd ed. Jabalpur (India): Banarsidas Bhanot; 2015. pp. 285.

3. Operational Guidelines, National Programme for Prevention and Control of JE/AES. Available from: [http://www.nvbdc.gov.in/Doc/JE-AES-Prevention-Control \(NPPCJA\) \(Last accessed 07 August 2016\).](http://www.nvbdc.gov.in/Doc/JE-AES-Prevention-Control (NPPCJA) (Last accessed 07 August 2016).)
4. National Health Mission; Ministry of Health and Family Welfare, Government of India. Available from: [http://nrhm.gov.in/nrhm-components/rmnc-h-a/immunization/background \(Last accessed 07 August 2016\).](http://nrhm.gov.in/nrhm-components/rmnc-h-a/immunization/background (Last accessed 07 August 2016).)
5. Government of West Bengal, Department of Health and Family Welfare; Memo no. HPH/IDSP/11-05-2-12/4567; Date: 22/04/2015. Available from: [http://www.wbhealth.gov.in/go/4567 \(Last accessed 07 August 2016\).](http://www.wbhealth.gov.in/go/4567 (Last accessed 07 August 2016).)
6. Das BR, Kakoti G, Bahety H, Das N, Medhi AH. Adult Japanese Encephalitis mass vaccination campaign: A rapid convenience assessment. *International Journal of Current Research and Academic Review* 2014; 2(10): 30-36.
7. Zhang S, Yin Z, Suraratdecha C, Liu X, Li Y, Hills S, Zhang K, Chen Y, Liang X. Knowledge, attitudes and practices of caregivers regarding Japanese encephalitis in Shaanxi Province, China. *Public Health* 2011; 125(2): 79-83.
8. Kumar KR, Basha R, Harish BR, Sanjay TV, Vinay M, Prabhu S, Babu R., A coverage evaluation survey of JE vaccination in two districts of Karnataka. *J. Commun. Dis.* 2010; 42(3): 179-184.
9. Bandopadhyay K, Dasgupta A, Paul B, Bandyopadhyay L, Mondal S. Perception of Japanese Encephalitis and its vaccination: An experience from a rural area of Hooghly district, West Bengal. *J Commun Dis* 2016; 48(4): 1-5.