Research Article

An assessment of community participation in control and prevention of Japanese encephalitis in rural Uttar Pradesh

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ABSTRACT

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Background: Mosquito-borne disease poses a great burden to the society. It can be easily prevented through appropriate knowledge, positive attitude, and good practices. Japanese encephalitis (JE) is among one of these diseases, transmitted by culex mosquito. It is a major public health problem in India. **Objective**: The objective of this study was to assess the level of community participation in control and prevention of JE in rural area of Uttar Pradesh (UP). **Materials and Methods**: It was a cross-sectional observation study. The study area was selected purposively. Non-probability consecutive sampling was done. A pre-designed and semi-structured questionnaire used for this study. Cronbach's reliability test applied to access the internal consistency of various domains of knowledge, attitude, and practice (KAP). Assessment was done using a scoring system. Respondent level was defined as "good" and "poor." A 60% cutoff point was taken for this. The sociodemographic characteristics, KAP of the sample was described using frequency and percentage table. KAP scores were calculated and categorized as "good" and "poor" as above-mentioned criteria. **Results**: A total of 401 households were interviewed during study period. Most of the respondents were aged between 21 and 35 years (60.1%). Almost 70.1% have pucca house. In 67.3% of houses, water drainage was unsatisfactory. Only 52.9% of respondents heard about JE. Knowledge about symptoms of JE was fair, while about its spread, reservoir of virus, breeding place of mosquito, and biting habit were poor. Attitude of one-third of respondent was satisfactory for all items asked. Practices were comparatively good. Although nearby stagnant water was a major issue. 80.5% respondents never removed this water. Correlation between knowledge and attitude was very strong (r_s = 0.880). A bivariate logistic analysis revealed the sociodemographic variables such as gender, age, education, occupation, and category has no significant effect on KAP level of respondents. **Conclusion:** There was a felt need of mass communication and education program specifically oriented for mosquito-borne disease. This can enhance positive attitude and good practices further.

KEY WORDS: Japanese Encephalitis; Control; Prevention; Mosquito; Breeding

INTRODUCTION

Japanese encephalitis (JE) is a major public health issue. It is highly epidemic in nature. Case fatality is also high. Long-term neuropsychiatric complication is frequent after recovery. It was identified in 1871 in Japan and known as "Summer encephalitis.[1]" During 1933-1934, virus causing JE was reisolated, and its properties were established.[2] First human case in India was reported from Tamil Nadu in 1955.[3,4] Thereafter, its spread in other part of India. Uttar Pradesh (UP) has high endemicity for JE. It was reported earliest in 1978 in UP. Since then extensive and recurrent outbreaks have been reported from eastern UP. An epidemiological data for JE over the past 32 years reported UP as a major contributor of JE cases and related deaths.[3,5] Children under age of

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15 years are major victim of JE.[6] Studies showed that in JE endemic area, nearly all cases occur in children <10 years of age. Those who survived, majority of them followed by some sort of morbidity.[6,7] JE infections are mostly asymptomatic. 1 in 300 infections is symptomatic.[1,6,7]

Siddharthnagar was created in 1988 out of Basti district in UP. JE emerged for the first time as a problem in Siddhart Nagar district in 1989. Basti was highly endemic for JE. Geographic affinity between both districts was responsible for cases in Siddharthnagar Nagar. During the period from 1998 to 2007, it was one of the most JE problematic districts in UP. In 2006, the Government of India launched a JE vaccination campaign for children 1-15 years of age. Reported coverage in this district was above 95% of estimated target.[3] Studies from peninsular and eastern parts of India reported that pigs are the major reservoir of JE virus.[3,8] Domestic pigs are an important risk factor of JE transmission to humans. Virus of JE is maintained between mosquitoes and pigs and/or birds. Transmission is very predominant in rice-producing areas.[6,9] Pigs population estimated to be more than 135 million in India. UP contributed 31.7% of this. As per 17th livestock census, UP has the largest pig population in the country.[3]

JE is a rapidly spreading mosquito-borne disease in UP. It is problematic in Siddhart Nagar district. However, no data on the local knowledge, attitude, and practice (KAP) of JE in this area exist although such information is very essential for prevention and control measures. In this context, we carried out this study with the objective of assessment of community participation in control and prevention of JE.

MATERIALS AND METHODS

It was a descriptive cross-sectional study. The study area was Naugarh and Uska block of Siddhart Nagar district. These blocks were purposively selected. This was followed by random selection of two villages from each block. The study period was June 2017-July 2017. We carried a house-to-house survey. Head of the household was contacted for the interview. In case of their absence, any other member, willing to be interviewed, and gave consent, included in this study. During this process, we tried to ensure representation of all clusters of a particular village. These clusters were usually caste based. A semi-structured, pre-designed, and pre-tested proforma forma used as study tool. We searched the earlier literature on JE related to our objective. We selected relevant research paper to design our questionnaire.[10-12] We asked various aspect of the dynamics of disease transmission, epidemiological triad, and its prevention and control. Cronbach's reliability test applied to access the internal consistency of various domains of KAP. Cronbach's α value for various domains of was as knowledge (0.718), attitude (0.992), and practice (0.517). A value of Cronbach's α > 0.7 indicated good reliability and high degree of correlation between items.

Assessment was done using a scoring system. For respective domains, all the correct responses were added, and participant score was calculated. Each correct answer was scored "1" and wrong answer as "0." There was a total of 24 responses. We assumed "do not know" as wrong answer. It was scored "0." It is a conventional practice.[13] Respondent level was defined as "good" and "poor." A 60% cutoff point was taken for this. The sociodemographic characteristics KAP of sample were described using frequency and percentage table. KAP scores were calculated and categorized as "good" and "poor" as above-mentioned criteria. We calculated the correlation values between the KAP scores. Spearman's rank correlation (r_s) was used for this purpose. The confidence interval of correlation was calculated using z-transformation. Logistic regression analysis was carried out to identify the determinant of KAP. Separate KAP level (good vs. poor) used as dependent variable. Independent variables included were age and gender. Informed consent was taken before the start of interview. Data entered into Microsoft Excel student edition 2016. Same was used for analysis.

RESULTS

During the study period, a total of 401 households were interviewed. Table 1 shows sociodemographic characteristics of the respondents. Most of them were in age group of 21-35 years (60.1%). Both genders were equally represented (M:F, 49.4% vs. 50.6%). Almost two-third of respondents were literate, and two-third were married. The majority (93.1%) belonged to Hindu religion. Category wise, 33.4% were other backward classes while 25.4% were scheduled castes and scheduled tribes. An assessment of basic housing environment showed that majority have pucca house (70.1%). Source of water was either hand pump (46.4%) or tap (13.7%) or both (39.7%). Water drainage from house was unsatisfactory in 67.3% households (Table 2).

As observed in Table 3, 11 items were used to access the knowledge of respondents. 52.9% had heard about JE. Most common symptoms reported was fever (61.3%) followed by headache (23.1%) and seizures (10.8%). Only 35.6% mentioned JE spread by mosquito. 79.7% do not know anything about the reservoir of JE virus. 36.9% were aware about one or more breeding place of mosquito. <1% of respondent was aware about culex mosquito and was able to identify it also. Only 21.7% were aware that JE vaccine available in Government hospital.

Table 4 shows the attitude of respondent about JE disease. Only one-third agreed that JE was a serious illness, while 30.1% believe that JE can affect their children. Only one-third felt that it was a preventable disease, mosquito control, and vaccination against JE can prevent it. 36.3% opined that water collection can be favorable to mosquito.

Table 1: Sociodemographic profile of respondents (*n*=401)

Variables	Category	Number (%)
Age-group (years)	11-20	79 (19.7)
	21-35	241 (60.1)
	41-60	64 (16.0)
	Above 60	17 (4.2)
Gender	Female	203 (50.6)
	Male	198 (49.4)
Education	Literate	296 (73.8)
	Illiterate	105 (26.2)
Marital status	Married	267 (66.6)
	Unmarried	132 (32.9)
	Others	2 (0.5)
Religion	Hindu	313 (78.1)
	Muslim	87 (21.2)
	Others	1 (0.5)
Family type	Joint	225 (56.1)
	Nuclear	176 (43.9)
Category	Others	165 (41.4)
	OBC	134 (33.4)
	SC/ST	102 (25.4)
Occupation	Farmer	11 (2.7)
	Homemaker	142 (35.5)
	Student	99 (24.8)
	Job	60 (15.0)
	Unskilled worker	36 (9.0)
	Unemployed	53 (13.0)

OBC: Other backward classes, SC/ST: Scheduled castes and scheduled tribes

Table 2: Housing environment of respondent (*n*=154)

Variables	Category	Number (%)
Type of house	Kutcha	36 (9.0)
	Pucca	281 (70.1)
	Others	84 (20.9)
Source of water	Hand pump	187 (46.6)
	Tap	55 (13.7)
	Both	159 (39.7)
Water drainage	Satisfactory	131 (32.7)
	Unsatisfactory	270 (67.3)

Various prevention measures taken by the respondent were shown in Table 5. Majority, 95.5%, were using one or more personal protective measures against mosquito bite. Only 10.7% respondents remove nearby stagnant water to prevent mosquito breeding, while 7.5% did anti-adult mosquito spray in their house. In <5% of household, pigs were present. 82.5% respondents were unaware about the vaccination status of their children against JE.

Table 3: Knowledge of respondents in relation to JE

Variables	Category	Number (%)
Heard about JE	Yes	212 (52.9)
	No	189 (47.1)
Knowledge about symptoms	Fever	130 (61.3)
	Headache	49 (23.1)
	Vomiting	4 (1.9)
	Loose stool	2 (0.9)
	Seizures	23 (10.8)
	Others	4 (1.9)
Knowledge about spread	Mosquito	76 (35.6)
	Garbage	7 (3.4)
	Dirty water	1 (0.5)
	Water	3 (1.5)
	Do not know	125 (59.0)
Knowledge about reservoir of JE		38 (17.9)
	Pig	
	Birds	1 (0.5)
	Cattle	4 (1.9)
	Do not know	169 (79.7)
Knowledge of mosquito breeding place		36 (17.0)
	1 breeding site	
	2 breeding sites	30 (14.2)
	>2 breeding sites	12 (5.7)
	Do not know	134 (63.1)
Knowledge about mosquito type involved in JE		2 (0.9)
	Aedes	
	Anopheles	1 (0.5)
	Culex	2 (0.9)
	Do not know	207 (97.6)
Can identify culex mosquito	Yes	2 (0.9)
	No	210 (99.1)
Knowledge about biting habit of JE mosquito		26 (12.3)
	Only in day	
	Only in night	21 (9.9)
	Throughout day	32 15.1)
	Do not know	133 (62.7)
Source of knowledge	TV	9 (4.2)
	Children	2 (0.9)
	Radio	1 (0.5)
	Health worker	9 (4.2)
	Cannot specify	191 (90.2)
Knowledge of vaccine availability in government hospital		46 (21.7)
	Yes	
	No	2 (0.9)
	Do not know	164 (77.4)
Any person in family suffered JE		4 (1.9)
	Yes	
	No	208 (98.1)

JE: Japanese encephalitis

Table 4: Attitude of respondents in relation to JE

Variables	Category	Number (%)
JE is a serious illness	Agreed	70 (33.0)
	Not agreed	7 (3.3)
	Cannot say	135 (63.7)
Can JE effect your children	Yes	64 (30.1)
	No	148 (69.8)
Is it preventable	Yes	73 (34.4)
	No	3 (1.4)
	Cannot say	136 (64.2)
Can mosquito control prevent it	Yes	74 (34.9)
	No	3 (1.4)
	Cannot say	135 (63.7)
Can vaccination prevent it	Yes	71 (33.5)
	No	6 (2.8)
	Cannot say	135 (63.7)
Can nearby stagnant water produce mosquito	Yes	77 (36.3)
	No	135 (63.7)

JE: Japanese encephalitis

Table 5: Practices of respondents in relation to JE

Variables	Category	Number (%)
Individual protection measures	1 method	234 (58.4)
	2 methods	108 (26.9)
	>2 methods	41 (10.2)
	Nothing	18 (4.5)
Did you ever remove nearby stagnant water	Always	43 (10.7)
	Sometimes	35 (8.8)
	Never	323 (80.5)
Did you ever do spray to control mosquito	Yes	30 (7.5)
	No	371 (92.5)
Whether pigs are present in house or nearby	Yes	19 (4.7)
	No	382 (95.3)
If pigs are present, whether vaccinated?	Yes	1 (5.3)
	No	14 (73.7)
	Do not know	4 (21.0)
Did you vaccinate to your children for JE	Yes	28 (11.7)
	No	14 (5.8)
	Do not know	198 (82.5)

JE: Japanese encephalitis

Figure 1 shows KAP level of respondent. KAP of respondent measured and converted into scores. Only 18.4% respondents had good knowledge about JE and its spread. Positive attitude was observed in 35% while good practice reported among 46.1% of respondent.

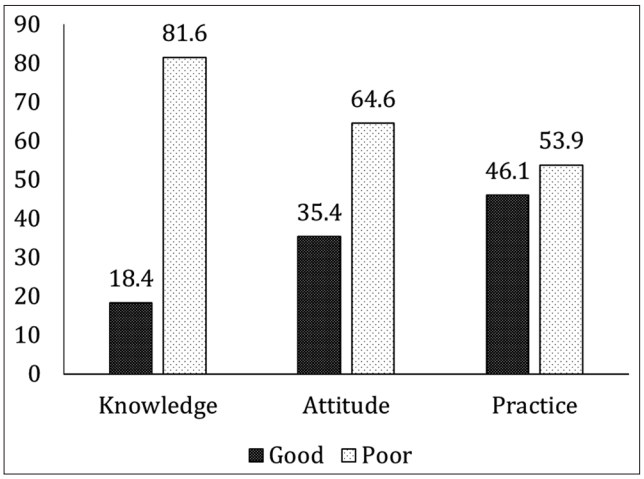

Figure 1: Knowledge, attitude, and practice level of respondents (good vs. poor). (Figures are in percentages)

Table 6: Correlation between KAP scores

Variables	Correlation coefficient with 95% CI	*P*
Knowledge-attitude	0.880 (0.815-0.944)	<0.000
Knowledge-practice	0.180 (0.045-0.306)	<0.009
Attitude-practice	0.215 (0.080-0.339)	<0.02

KAP: Knowledge, attitude, and practice, CI: Confidence interval

A correlation coefficient between various domains of KAP was measured. A very high correlation coefficient (r_s = 0.889) was seen between knowledge-attitude. Between knowledge - practice (r_s = 0.180), and practice-attitude (0.215). All these correlations were statistically significant (Table 6).

We did a bivariate logistic analysis to know about the predictors of KAP (good vs. poor). Table 7 shows that odds ratio (OR) among female was more than one for all the domains of KAP. However, it was not statistically significant. Similarly, with reference to teenager group, all other groups were higher OR for KAP but not significant. Illiterate had lower OR for KAP (0.76, 0.68, and 0.28, respectively). It was only significant for practice component.

DISCUSSION

Outbreak of JE is very common in study area. Despite that there was no study of KAP aspect of JE and its control in this region. The findings of present study showed that there were relatively good attitude and practices regarding control of JE in local population. Although their level of knowledge was very low. In our study, only 52.9% of respondents heard about JE. Almost similar (54%) finding reported by in a study from Nepal (2012) at Rupandehi district.[12] Other studies reported a lower percentage.[2,14] A KAP study from Malwa district on mosquito-borne disease among students revealed that only 6.5% were aware that JE is a mosquito-borne disease.[15] Most respondents could not correctly identify

Table 7: Predictors of KAP among respondents (*n*=401)

Independent variables	Good versus poor		
	Knowledge OR (95% CI)	Attitude OR (95% CI)	Practice OR (95% CI)
Gender			
Male	Ref	Ref	Ref
Female	1.19 (0.37-3.77)	1.10 (0.41-3.00)	3.79 (1.83-7.87)
Age-group (years)			
11-20	Ref	Ref	Ref
21-35	4.67 (0.23-94.6)	4.18 (0.26-65.8)	5.48 (1.24-24.2)
41-60	3.05 (0.21-44.4)	1.14 (0.10-13.0)	1.31 (0.36-4.68)
Above 60	2.60 (0.18-37.9)	1.10 (0.95-12.7)	1.64 (0.45-6.05)
Education			
Literate	Ref	Ref	Ref
Illiterate	0.76 (0.19-3.08)	0.68 (0.23-2.03)	0.28 (0.14-0.56)
Occupation			
Farmer	Ref	Ref	Ref
Homemaker	0.42 (0.03-5.62)	1.1 (0.11-12.1)	0.55 (0.97-3.12)
Student	1.54 (0.23-9.98)	1.35 (0.29-6.21)	1.28 (0.41-4.07)
Job	0.85 (0.14-4.95)	0.83 (0.19-3.60)	0.47 (0.14-1.48)
Unskilled worker	1.31 (0.26-6.37)	1.21 (0.34-4.23)	0.56 (0.20-1.58)
Unemployed	0.42 (0.03-5.62)	1.1 (0.11-12.1)	0.34 (0.11-0.99)
Category			
Others	Ref	Ref	Ref
OBC	0.27 (0.08-0.90)	0.27 (0.11-0.68)	0.25 (0.12-0.50)
SC/ST	1.37 (0.36-5.19)	1.42 (0.54-3.67)	0.49 (0.25-0.96)
Family type			
Joint	Ref	Ref	1
Nuclear	1.93 (0.84-4.43)	1.14 (0.58-2.21)	1.00 (0.61-1.64)

KAP: Knowledge, attitude, and practice, CI: Confidence interval, OR: Odds ratio

the typical symptoms of JE. Fever, headache, and seizures were reported as most frequent symptoms. Knowledge about breeding site of mosquito was poor (36.9%) in this study. In contrast, Shrestha et al., in their study observed higher awareness level about breeding place (50%).[10] While another study from Karnataka had observation similar to the present study.[16] Researcher had physically verified the water drainage condition of household in the present study. It was unsatisfactory in 67.3% of cases. Water getting collected behind the house. These are the potential breeding site of mosquito breeding. 80.5% of respondents agreed that they never removed this collected water. Their attitude was also poor in this regard. Only 36.3% of households agreed that stagnant water can be a potential breeding site for mosquitoes. A similar study from Puducherry supported these findings. Author reported stagnant water collection in 70% of household.[11] This type of community perception favors mosquito breeding in their area.[17]

Awareness about the symptoms of JE was good in our study (61.3%). Although no one could tell all the classical symptoms. Only 35.6% were aware that JE is transmitted by mosquito bite. This proportion was very low in a study by Dhimal et al.[18] An assessment of KAP about JE across gender showed higher OR for knowledge (OR = 1.19), attitude (OR = 1.10), and practice (OR = 3.79) in comparison to male. These findings were statistically insignificant. In contrast, earlier study reported less knowledge and poor attitude but good practice for control and prevention of JE.[19,20] Knowledge was significantly higher in the young population (16-40 years).[12] Our study showed contrasting result, and younger age had more knowledge. 90.2% of respondents in our study could not specify their source of knowledge. Radio,[21] TV,[12,15] and newspaper[15] reported as most important source of knowledge in earlier studies.

Various practices toward JE prevention among respondents were satisfactory (good vs. poor, 46.1% vs. 53.9%) in comparison to knowledge score (good vs. poor, 18.4% vs. 81.6%). It means although community was less aware about control and prevention of JE, their inherited practices were favorable. We observe a very poor correlation between knowledge and practice (r_s = 0.180). Different observation reported in earlier study. Author mentioned that in spite of mass communication and education approach, community participation is very low.[22] Pandit et al. in their study showed

that 97% of the people were using one or more method of personal protective measures against mosquito bite. Most common was repellent (61.4%) followed by mosquito net (10.2%). Our study contradict these findings, 95.5% using one or more methods. The use of mosquito net was most common followed by liquid preparation and coil. Only 10.7% of respondents removed nearby stagnant water in our study. In contrast, Joshi et al. reported a very good practice (66.7%).[24]

It was a community-based study. We ensured inclusion of all groups of local community for proper representation. After the end of interview, we conveyed the correct fact about knowledge regarding JE. We used colored chart showing common type of mosquitoes so that household can identify them in the future. We selected our samples through non-probability consecutive sampling, results of this study could not be generalized.

CONCLUSION

Despite poor knowledge of control and prevention of JE, the attitude and practice of the community were satisfactory. A well-planned mass education and communication strategy can further enhance this attitude and practice.

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