

## Original Research Article

# How aware are we regarding vector borne diseases? A community based study in a slum of Kolkata, India

Sanjaya Kumar Sahoo<sup>1\*</sup>, Pranita Taraphdar<sup>2</sup>, Ashok Kumar Mallick<sup>3</sup>,  
Aparajita Dasgupta<sup>4</sup>, P. S. Preeti<sup>5</sup>, Dhiraj Biswas<sup>5</sup>

<sup>1</sup>Department of Community Medicine, MKCG Medical College, Berhampur, Odisha, India

<sup>2</sup>Department of Community Medicine, Nil Ratan Sarcar Medical College and Hospital, Kolkata, West Bengal, India

<sup>3</sup>Maternal and Child Health, All India Institute of Hygiene and Public Health, Kolkata, West Bengal, India

<sup>4</sup>Department of Preventive and Social Medicine, All India Institute of Hygiene and Public Health, Kolkata, West Bengal, India

<sup>5</sup>Department of Preventive and Social Medicine, All India Institute of Medical Sciences, Bhubaneswar, India

**Received:** 01 April 2017

**Accepted:** 28 April 2017

### \*Correspondence:

Dr. Sanjaya Kumar Sahoo,

E-mail: sanju\_dr97@yahoo.co.in

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Vector borne diseases (VBDs) form a major part of the communicable diseases in India. Ignorance and impoverished conditions of people contribute in creating source and spread of vector borne diseases and hinder disease control strategy. Slums are more vulnerable to vector borne diseases because of poor environmental condition, standard of living, poverty and ignorance of the people. This study is a small endeavour to highlight the awareness of residents of slum area of Chetla, Kolkata, West Bengal, India regarding vector borne diseases. Objectives were to assess the awareness of the study population regarding different vector borne diseases and to find out the association of awareness with relevant demographic variables.

**Methods:** A community based observational, cross-sectional study was conducted among adult population in a slum area of Chetla, Kolkata, West Bengal, India. Multivariate logistic analysis was done to find out association of awareness with relevant variables.

**Results:** Awareness regarding malaria was good and that of dengue was satisfactory while awareness regarding other vector borne diseases was poor. Age, sex, caste, education and social class were found significantly associated with satisfactory awareness. Younger population i.e. age  $\leq 35$  years, males, general caste people, literacy status above primary school and social class III and above had better awareness regarding vector borne diseases.

**Conclusions:** This study uncovered the lacunae regarding awareness of the study population regarding vector borne diseases. It can be concluded that intensified efforts towards creating public awareness and mobilizing the community regarding the identified issues should be addressed.

**Keywords:** Awareness, Chikungunya, Kala-Azar, Dengue, Filariasis, Vector borne diseases

## INTRODUCTION

A disease that is transmitted to humans or other animals by an insect or other arthropod is called a vector borne disease.<sup>1</sup> The vector borne diseases of public health

importance are complex and their occurrence depends on the interaction of various biological, ecological, social and economic factors. Though several measures for their prevention and control are followed, yet the problem density is too high. According to the WHO report (March 2014) vector-borne diseases account for more than 17%

of all infectious diseases, causing more than 1 million deaths annually.<sup>2</sup> The most deadly vector borne disease, malaria, caused an estimated 627 000 deaths in 2012. However, the world's fastest growing vector-borne disease is Dengue, with a 30-fold increase in disease incidence over the last 50 years. More than 2.5 billion people in over 100 countries are at risk of contracting dengue alone. The economic costs of malaria and dengue are very high as reported in India and in Puerto Rico.<sup>3,4</sup> Considering the burden and impact the World Health Day 2014 focused on vector borne diseases.<sup>2</sup> The theme for world health day 7<sup>th</sup> April 2014 was "Small bite: Big threat" highlighting a priority area of public health. The mosquito-borne diseases result in avoidable ill-health and death which also has been emphasized in National Health Policy and Millennium Development Goals (MDGs).<sup>5-8</sup> In India the National Vector Borne Disease Control Programme (NVBDCP) under the aegis of National Rural Health Mission (NRHM) is an umbrella programme for prevention and control of major vector borne diseases of public health importance viz. malaria, Japanese encephalitis (JE), dengue, chikungunya, kala-azar and lymphatic filariasis.<sup>9,10</sup>

India has been fighting to control this menace of vector borne diseases since 1953 with the launch of the National Malaria Control Programme (NMCP) and millions of rupees have been spent for implementation of the numerous programmes that followed. However having a national programme is in itself not enough to control this problem. It is imperative to ensure community participation to make the programme a success. Also ignorance and impoverished conditions of people contribute in creating source and spread of vector borne diseases and hinder disease control strategy. Slums are more vulnerable to vector borne diseases because of poor environmental condition, standard of living, poverty and ignorance of the people. For this, awareness about vector dynamics, personal protection and the role of the individuals as well as the community as a whole is absolutely crucial. In spite of mass communication and educational approaches, community participation is still far below expectation.

Thus in the present study an attempt was made to find out the current awareness regarding different vector borne diseases in the study area which may be helpful in designing further community based, evidence-based effective prevention and control strategies. Being a community based study many issues regarding the prevention and control of the vector borne diseases would emerge which might have been overlooked even after implementation of a robust programme like NVBDCP.

## **METHODS**

### **Study design**

It was a Community based observational, cross-sectional study.

### **Study settings**

The study was conducted in a slum area of Chetla, the field practice area under the purview of All India Institute of Hygiene and Public Health, Kolkata, West Bengal, India.

### **Study period**

The study period of the present study was from October 2014 to September 2015, total period of one year.

### **Study population**

Adult population who were permanent residents of the study area.

### **Inclusion criteria**

Adult population above 18 years of age and Permanent resident of the slum area.

### **Exclusion criteria**

Migrants and not willing to participate in the study.

### **Sample size**

In a recent community based study by Kumar BA et al on vector borne diseases among urban slum dwellers, good awareness for malaria was found to be 46.7%.<sup>11</sup> By considering this prevalence with 5% absolute allowable error sample size was calculated to be 383 after applying the formula-  $Z_{\alpha/2} p q / L^2$

### **Sampling unit**

One adult member (preferably head of the household) from each of the Household was included in the study. Therefore the sampling unit was household.

### **Study tool**

A predesigned and pre-tested schedule was used. There were a total of 12 questions regarding the awareness of different vector borne diseases. While 5 questions were used only for descriptive purposes, other 7 questions were given scores so that they could be used for regression analysis. There were six common vector borne diseases and for each disease one could score minimum 0 and maximum.<sup>9</sup>

So for overall vector borne diseases one respondent could score maximum of 54 and minimum of 0. Attained mean and median scores were calculated. Scores greater than and equal to median scores were categorized as satisfactory and less than median scores were considered unsatisfactory.

### Statistical analysis

Data entry and analysis was done with SPSS-20 software. Multivariate logistic analysis was done to find out association of awareness with relevant variables.

### RESULTS

Among 383 adult study populations 38.9% belonged to the age group of 20-29 years and least (10.7%) were aged 50 years and above. It was also observed that 68.4% of the study subjects were female. Among the study

population literacy status of 43.63% was up to middle school completion level and illiterate people constituted 11.2% of the study population. Among the study population more than half (59.3%) were home makers followed by skilled workers (14.1%) and unskilled worker (10.5%). Majority, i.e. 49.3% of the study population belonged to Class IV socio-economic category followed by 25.6% in Class III socio-economic category as per modified B. G. Prasad's scale 2014. Two third of the study population (67.9%) lived in pucca type of house and 32.1% in semi pucca house. Overcrowding was present in 61.6% of study population (Table 1).

**Table 1: Distribution of study population by demographic and socio-economic characteristics (n=383).**

Variables	n (%)	
Sex	Male	121 (31.6)
	Female	262 (68.4)
Age (in years) (Mean Age (SD)=35.79±11.73years)*	20-29	149 (38.9)
	30-39	87 (22.7)
	40-49	106 (27.7)
	≥50	41 (10.7)
Religion	Hinduism	347 (90.6)
	Islam	36 (9.4)
Caste	General	305 (79.6)
	SC	69 (18)
	OBC	9 (2.3)
Education	Illiterate	43 (11.2)
	Primary (class 1- 4)	53 (13.8)
	Middle (class 4-8)	167 (43.6)
	Secondary (9-10)	78 (20.4)
	HS and above	42 (11)
Occupation	Unskilled worker	40 (10.5)
	Skilled worker	54 (14.1)
	Home maker	225 (58.7)
	Service	18 (4.7)
	Business	38 (9.9)
	Others (students/retired)	8 (2.1)
Marital status	Unmarried	9 (2.3)
	Married	374 (97.7)
Under 5 children present in the family	Yes	24 (6.3)
	No	359 (93.7)
Socio-economic class (modified B.G Prasad scale-2014)	Class 1 (≥5615)	9 (2.3)
	Class 2 (28.8-5614)	61 (15.9)
	Class 3 (1685-2807)	116 (30.3)
	Class 4 (842-1684)	178 (46.5)
	Class 5 (<842)	19 (5)

\*There were no respondents in the age group 18-20 years.

All the study population had heard about Malaria, most (97.9%) about Dengue and least about Japanese encephalitis (15.1%) (Table 2). Among those who heard about the diseases 97.9% had awareness that malaria is transmitted by mosquito followed by dengue (90.9%) and

Japanese encephalitis (13.8%). None of the study population had any idea regarding the vector (Sand fly) causing kala-azar. Only 19.8% of the study population had awareness regarding different types of mosquito but none were able to name them. Out of the study subjects,

only 26.9% and 21.4% had correct awareness regarding the breeding places of the mosquito causing malaria and dengue respectively.

**Table 2: Distribution of respondents according to whether they had heard about common vector borne diseases (n=383).**

Diseases	Heard about the diseases	
	Yes n (%)	No n (%)
Malaria	383 (100)	0
Dengue	375 (97.9)	8 (2.1)
Chikungunya	173 (45.2)	210 (54.8)
Filariasis	166 (43.3)	217 (56.7)
Kala-azar	156 (40.7)	227 (59.3)
JE	58 (15.1)	325 (89.9)

For other diseases none of the study population had any awareness regarding breeding places of the vectors. All the study population had correct awareness regarding biting time of mosquito causing malaria, followed by dengue (20.1%), chikungunya (13.3%) and filariasis (7.7%). Awareness regarding preventive measures was good for malaria (80.9%) followed by dengue (69.1%), chikungunya (17.3%), filariasis (11.4%) and negligible for JE and kala-azar. Among the preventive methods common responses were elimination of breeding places and personal protective measures like Sleeping under bed nets and using mosquito repellents. All the study population had awareness regarding major signs and symptoms of Malaria, followed by dengue (63.2%), filariasis (52.4%) and kala-azar (5.1%). None of the study population had awareness regarding major signs and symptoms of Japanese Encephalitis (Table 3).

**Table 3: Distribution of respondents according to their awareness regarding the vector borne diseases.**

Heard about the diseases	Awareness					
	Transmitted by mosquito	Breeding places	Preventive measures	Biting time of mosquito	Major signs and symptoms	Fatality of the diseases if untreated
Malaria (n=383)	375 (97.9)	103 (26.9)	309 (80.9)	383 (100)	370 (96.6)	366 (95.6)
Dengue (n=375)	341 (90.9)	82 (21.8)	259 (69.1)	77 (20.5)	237 (63.2)	375 (100)
Chikungunya (n=173)	112 (64.7)	0	30 (17.3)	20 (11.5)	18 (10.4)	25 (14.4)
Filariasis (n=166)	62 (37.3)	0	19 (11.4)	29 (20.1)	87 (50.2)	35 (21)
JE (n=58)	8 (13.8)	0	0	0	0	17 (29.3)
Kala-azar (n=156)	NA	0	0	NA	8 (5.1)	42 (26.9)

**Table 4: Association of Satisfactory knowledge with its determinants.**

Co-variates		Satisfactory knowledge (≥median score:14) no. (%)	OR (CI)	AOR (CI)
Age	≤mean	139 (61)	2.47 (1.62-3.75)	6.17 (3.43-11.11)**
	>mean	60 (38.7)	Ref	Ref
Sex	Female	121 (46.2)	0.47 (0.30-0.73)	0.25 (0.13-0.46)**
	Male	78 (64.5)	Ref	Ref
Caste	General	173 (56.7)	2.62 (1.55-4.42)	2.72 (1.43-5.17)**
	Others	26 (33.3)	Ref	Ref
Education	Above primary	176 (66.4)	8.16 (4.84-13.76)	9.30 (5.27-16.42)**
	Primary and below	23 (19.5)	Ref	Ref
Socio-economic class (modified B. G. Prasad)	Upto class III	109 (58.6)	1.68 (1.12-2.52)	1.82 (1.11-2.98)**
	Class IV and above	90 (45.7)	Ref	Ref

The variables already found significant in bivariate analysis were entered into the multivariate logistic model. \*\*Significant (P<0.05). For the multivariate model, the Hosmer-Lemeshow test gave a Chi-square value of 11.75 (p=0.63 not significant) indicating good model fit. Nagelkerke R2 was 0.409 showing that the variables included in the model predicted 40.9 % of satisfactory knowledge.

95.6% of the population had awareness that malaria is fatal if untreated but also think that dengue is more fatal (100%). Majority (91.38%) of the households had family members who suffered from malaria, 15.92% from dengue and only 2.34% suffered from chikungunya. None of the study population had history of filariasis, JE and kala-azar. Most common source of awareness among

study population was found to be health personnel (61.1%) from UHC, Chetla followed by neighbours and friends (35.24%). Satisfactory awareness was assigned to those who scored ≥14 (median). Age [OR= 2.47(1.62-3.75)], Sex [OR= 0.47(0.30-0.73)], caste [OR= 2.62(1.55-4.42)], education [OR= 8.16(4.84-13.76)], and social class [OR= 1.68(1.12-2.52)] were significantly associated

with Satisfactory awareness. Strength of association of variables such as Age [AOR= 6.17(3.43-11.11)], Sex [AOR= 0.25(0.1-0.46)], Caste [AOR= 2.72(1.43-5.17)], education [AOR= 9.30(5.27-16.42)] and social class [AOR= 1.82(1.11-2.98)] stayed significant when adjusted with other variables in the multivariate analysis (Table 4).

## DISCUSSION

In the current study most of the study population (97.9%) had awareness that malaria is transmitted by mosquito followed by dengue (90.9%) and Japanese encephalitis (13.8%). This finding was similar as found in many other studies regarding malaria transmission. In a study by Yerpude PN et al from Andhra Pradesh, India found in his study found that 70.09% of study population had awareness that mosquito bite is the cause for malaria but only 33.72% of the study population knew that Dengue, Chikungunya was transmitted by mosquito.<sup>12</sup> Pandit N et al of Vadodara, Gujarat, India in his study found that almost 71% of study population had awareness that mosquito bite is the cause for malaria but only 39% of the study population knew that dengue, chikungunya and filariasis etc. are transmitted by mosquito.<sup>13</sup> Boratne AV et al in his study in Puducherry, India found that 63.51% males and 54.84% females clearly stated mosquitoes as vector for malaria followed by chikungunya and filaria but only 19.12% listed dengue as a mosquito-borne disease.<sup>14</sup> In a study done by Joseph N et al in Lady Hill area of Mangalore, Karnataka, India, city 90.7% were aware that mosquitoes transmit Malaria but only 19.1% participants knew that mosquitoes transmit filariasis, 18.4% about dengue and 13.2% about chikungunya.<sup>15</sup> Dhaduk KM et al conducted study in a coastal district of west Gujarat, India found that most common mosquito borne diseases known by the respondents were malaria (91%), chikunguniya (39%), dengue (19%) and filariasis (8%).<sup>16</sup> Patel AB et al in his study in Rajkot city, Gujarat, India found that regarding awareness of diseases transmitted by mosquito, 62% answered malaria, and 37.4% interviewees were unaware of any disease being transmitted, only few (8.8%) people mentioned about filariasis, dengue or Japanese encephalitis.<sup>17</sup> But in the present study awareness regarding diseases transmitted by mosquitoes were better as most study subjects (97.9%) had awareness that malaria was transmitted by mosquito followed by dengue (90.9%), chikungunya (64.7%), filariasis (37.3%) and Japanese encephalitis (13.8%). In the present study awareness regarding transmission of other diseases by mosquito was better with respect to above mentioned studies. This increased awareness regarding mosquito borne diseases was probably due to good IEC activities in the area. None of the study population had any idea regarding the vector of kala-azar. Among the respondents who had heard about the disease, most thought that it was transmitted by mosquito. In the present study it was found that out of the study subjects, only 26.9% and 21.4% had correct awareness regarding the breeding places of the mosquito causing malaria and dengue respectively. For other diseases none of the study

population had any awareness regarding breeding places of the vectors. 18.3% of the study population still had the idea that garbage was the breeding place of the mosquito causing malaria. Though malaria is the most common vector borne disease in India including West-Bengal, India most of the study population had wrong awareness regarding the breeding place of mosquitoes. Most of them were of the opinion that collection of dirty water was the breeding place of mosquitoes causing malaria. Awareness regarding breeding place is one of the most important aspect for prevention of vector borne diseases. The present study revealed this lacunae and is an important area for health information, education and communication. In a study by Yerpude PN et al from Andhra Pradesh, India found that 91.50 % of the study participants had awareness about breeding places of mosquito. 22.29 % of study population still had myths that garbage was the breeding place for mosquito.<sup>11</sup> Pandit N et al in his study in Vadodara showed that 98.7% of the study participants had awareness about breeding places of mosquito.<sup>13</sup> 19.3% of study population still believed that garbage was the breeding place for mosquito. Boratne AV et al in his study in Puducherry found that 59.79% male and 61.06% female respondents knew that stagnant water was the breeding place for vectors followed by ditches and ponds in the vicinity.<sup>14</sup> In a study by Mayur V et al among people of urban and rural areas of Rajkot district found that water collection was widely accepted as mosquito breeding place (90.05%), around (52.55%) respondents told ditches as mosquito breeding place and (6.25%) respondents did not know about mosquito breeding places.<sup>18</sup> Anand T et al in his study conducted in a resettlement colony of central Delhi found that majority of the participants (68%) knew about the breeding site of anopheles and Dengue mosquito.<sup>19</sup> In comparison to above mentioned studies, the population of the present study had very poor awareness regarding breeding places of the mosquitoes. So this issue should be addressed immediately for better prevention of the diseases. In the present study all the study population had correct awareness regarding biting time of mosquito causing malaria i.e. at night time followed by dengue (20.1%) i.e. day time, chikungunya (13.3%) i.e. day time, filariasis (7.7%) i.e. at night and no awareness regarding biting time of mosquito causing JE. In a study by Ghosh A et al of Bankura Town found that regarding preferred time of biting of mosquitoes, majority (42.15%) answered night though they did not take different types of mosquitoes into consideration.<sup>20</sup> Kumar KR et al in his study in an urban and a rural area in Karnataka state of India observed that most respondents (76.2% in urban and 95.7% in rural area) mentioned night-time and only a few mentioned daytime as the biting time of mosquito.<sup>21</sup> In the present study participants were asked about their awareness regarding different preventive measures against the vector borne diseases. All the respondents knew at least one of the most important methods to personally prevent Malaria. But for Dengue 11.25% respondents still had no idea regarding any one of the preventive methods, for

Chikungunya it was 47.3% and for Filariasis it was 62.2%. For JE and Kala-Azar participants didn't have any awareness regarding preventive measures. A Study done by Nitin Joseph et al<sup>15</sup> in Lady Hill area of Mangalore city found that most participants 57(38%) felt liquid repellents to be the most effective personal protective method to prevent mosquito bites compared to other methods. Anand T et al in their study in a resettlement colony of central Delhi showed that the awareness regarding personal protective methods (93%) was very high followed by source reduction (47%).<sup>19</sup> Awareness regarding other preventive measures such as cleaning of coolers and cleaning the surroundings was poor. In the present study awareness regarding preventive measures was elicited by a multiple choice question which included both ppms and source reduction. Awareness regarding preventive measures was good (i.e. they had awareness of both ppms and elimination of breeding places) for malaria (80.9%) followed by dengue (69.1%). Awareness was poor for chikungunya (17.3%), filariasis (11.4%) and negligible for JE and kala-azar. In the present study all the study population had awareness regarding major signs and symptoms of malaria (fever with chills and rigors), followed by dengue (fever with body ache and joint pain) (63.2%), filariasis (swelling of any body parts) (52.4%), chikungunya (10.4%) and kala-azar (fever with darkening of face, feet and abdomen) (5.1%). In the present study majority (91.38%) of the households had family members who suffered from malaria, 15.92% from dengue and only 2.34% suffered from chikungunya. None of the study population had history of Filariasis, JE and kala-Azar. This could be one reason that awareness was good regarding Malaria as most of them suffered from the diseases. That the field staff of the urban health center at Chetla were active in disseminating information is evident from the study findings. Most common source of awareness among study population in the current study was found to be health personnel (61.1%) from UHC, Chetla followed by neighbours and friends (35.24%). Other sources being T.V (29.5%), Newspaper (6%) and Radio (3.7%). But in most of studies like Yerpude PN et al, Pandit N et al, Boratne AV et al and Kumar BA et al television was the most common source of information.<sup>11-14</sup> A study done by Anand T et al in Delhi found that family and friends were most common source of information, and contrary to the findings of the present study.<sup>19</sup> Ghosh A et al in their study in Bankura town found that majority of the people (49.01%) had accumulated information regarding mosquito borne diseases from their daily observations on sick people.<sup>20</sup> This finding was contrary to most other studies and also the current study.

## CONCLUSION

From the present study it can be concluded that awareness regarding malaria was good and that of dengue was satisfactory while awareness regarding other vector borne diseases was poor. Dengue is a menace for the society, yet the awareness regarding this disease is not up

to the standard leaving a large slum population vulnerable to this disease. This study highlighted the lacunae of the people regarding awareness of other vector borne diseases. The current study also highlighted the ignorance of the study population about sand fly which should be taken care of. Most of the study population were not aware that different mosquitos cause different diseases. It can be concluded that intensified Information about breeding sites of mosquitoes, mortal outcomes of mosquito bite and control measures should be conveyed to community in innovative and efficient ways, to improve awareness of the community and thereby help in social mobilization for full involvement of the community in control of vector borne diseases. Days are not far off when even malaria and dengue are replaced by chikungunya and JE, so to prevent epidemics of these diseases we need to be proactive.

## ACKNOWLEDGEMENTS

Authors would like to acknowledge Dr. Aparajita Dasgupta, Professor and Head of the Department, Department of Preventive and Social Medicine, All India Institute of Hygiene and Public Health, Kolkata, Dr. Ashok Kumar Mallick Professor, Department of Public Health Administration, All India Institute of Hygiene and Public Health, Kolkata and Dr. Pranita Taraphdar, Associate Professor, Department of Community Medicine, NRS Medical College and Hospital, West Bengal, India.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. WHO | About vector-borne diseases. Available from: <http://www.who.int/campaigns/world-healthday/2014/vector-borne-diseases/en/>. Accessed October 13, 2015.
2. WHO Factsheet Vector-borne diseases. 2014. Available from; <http://www.who.int/campaigns/world-health-day/2014/aboutdiseases/en/index.html>.
3. Gupta I, Chowdhury S. Economic burden of malaria in India: The need for effective spending. *WHO South-East Asia J Public Health.* 2014;3:95-102.
4. Halasa YA, Shepard DS, Zeng W. Economic Cost of Dengue in Puerto Rico. *Am J Trop Med Hyg.* 2012;86(5):745-52.
5. NHP. National Health Policy- 2002:1-36. Available from: <http://mohfw.nic.in/np2002.htm>.
6. NHP. National Health Policy 2015 Draft. 2015:0-57.
7. UN Millennium Project | About the MDGs. Available from: <http://www.unmillenniumproject.org/goals/>. Accessed October 5, 2015.
8. Goals MD. Eight Goals for 2015. Available from: <http://www.undp.org/>.

9. National Vector Borne Disease Control Programme (NVBDCP). Available from: <http://nvbdc.gov.in/>. Accessed October 5, 2015.
10. National Health Mission- Government of India. Available from: <http://nrhm.gov.in/>. Accessed October 5, 2015.
11. Kumar BA, Madhavi KVP. Awareness and practice regarding vector borne diseases among slum dwellers of Guntur district, Andhra Pradesh. *J Evol Med Dent Sci.* 2013;2(1469):4756-62.
12. Yerpude PN, Jogdand KS, Jogdand M. A Study on awareness and practice about preventive methods against mosquito bite among households in an urban slum area of South India. *Int J Rec Trends Sci Tech.* 2013;1(8):69-71.
13. Pandit N, Patel Y, Bhavsar B. Awareness and practice about preventive method against mosquito bite in Gujarat. *Heal J indian Assos Prev Soc Med.* 2010;1(1):16-20.
14. Boratne AV, Jayanthi V, Datta SS, Singh Z, Senthilvel V, Joice YS. Predictors of knowledge of selected mosquito-borne diseases among adults of selected peri-urban areas of Puducherry. *J Vector Borne Dis.* 2010;47(4):249.
15. Nitin J, Maria N, Shashidhar MK, Omar MR, Aswin S, Saiteja D, Jugnu SPC. Awareness, practices and expenditure towards mosquito bite prevention methods in urban and semi-urban areas of South India. *Int J Mosq Res.* 2015:53-59.
16. Dhaduk KM, Gandha KM, Vadera BN, Mehta JP, Parmar DV, Yadav SB. A community level KAP study on mosquito control in Jamnagar district. *Nat J Comm Med.* 2013;4(2):321-8.
17. Patel AB, Rathod H, Shah P, Patel V, Garsondiya J, Sharma R. Perceptions regarding mosquito borne diseases in an urban area of Rajkot city. *Nat J Med Res.* 2011;1(2):45-7.
18. Mayur V, Umed P, Nirav J, Dipesh Z, Chirag B, Ankit V. Awareness and Practices regarding commonly occurring mosquito borne diseases among people of urban and rural areas of Rajkot District, Gujarat. *J Res Med Dent Sci.* 2013;1(2):46-51.
19. Anand T, Kumar R, Saini V, Meena G, Ingle G. Awareness and use of personal protective measures against mosquito borne diseases in a resettlement colony of Delhi. *Ann Med Health Sci Res.* 2014;4(2):227-32.
20. Ghosh A, Mukherjee S, Dutta T, Roy S, Mondal FB. Community perceptions regarding mosquito borne diseases in some selected localities of Bankura, a peri-urban area of West Bengal, India. *Journal of Mosquito Research.* 2013 Apr 25;3(1).
21. Kumar KR, Gururaj G. Community perception regarding mosquito-borne diseases in Karnataka State, India. *Dengue Bull.* 2006;30:270-7.

**Cite this article as:** Sahoo SK, Taraphdar P, Mallick AK, Dasgupta A, Preeti PS, Biswas D. How aware are we regarding vector borne diseases? A community based study in a slum of Kolkata, India. *Int J Res Med Sci* 2017;5:2629-35.