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Community perception regarding mosquito borne diseases in sullia taluk of Dakshina Kannada district, Karnataka state, India

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Abstract

The general perception of the community on mosquito borne diseases may be helpful in designing successful eradication of mosquitoes and control of MBDs. A cross-sectional study was carried out covering 200 people in some selected urban and rural areas of Sullia taluk, Karnataka, India to understand the level of perception regarding mosquito-borne diseases. Out of 200 participants, 177 (88.5%) were aware that mosquitoes are the vectors for the transmission of diseases. 63.5%, 58.5% and 56.5% respondents were knowing that mosquitoes transmit dengue, chikungunia and malaria respectively. The majority of the people acknowledged fever (57%) as the most common symptom of any mosquito borne disease. The study population was also able to recognize standing water and container water as the preferable breeding sites of mosquitoes. The respondents were able to recognize the characters of *Aedes* mosquitoes.

Keywords: Perception, urban and rural areas, vectors, fever, standing water, breeding site

1. Introduction

The incidence of mosquito borne diseases depends on the interaction of the various ecological and social factors of the community. Though several measures for their avoidance and management are taken by the various government agencies, yet the crisis compactness is too high with 300–500 million cases and 1.1–2.7 million deaths due to malaria alone globally per year [1]. The ignorance of people contributes to the establishment of simple breeding habitats which eventually responsible for the intensification of mosquitoes population. The outcome is responsible for the steady increase in the cases of vector borne diseases which hinders the disease control strategies. General public is ignorant of mosquito borne diseases and symptoms and so promptness in treatment is not realized. People are still confused over symptoms of various mosquito borne fevers and its control measures. Major part of the population is poor in disease evaluation, ignorance towards health and control of mosquito population. So it is very crucial for the community to understand the importance of environmental cleanliness and utilization of water bodies in a effective way. Efforts are being put by the government to eradicate mosquito breeding and disease prevalence. One of the important components of Vector borne disease control programme is to bring down disease transmission to a level at which it would cease to be a major public health problem.

National Vector Borne Disease Control Programme (NVBDCP) under the aegis of National Rural Health Mission (NRHM) is one of the most comprehensive and comprehensive public health activities in India aiming to control epidemic diseases especially mosquito borne diseases [2, 3]. Despite the strengthening of anti-malaria and other drive, the cases have been reported from this taluk, largely because of the permanent water sources and mismanagement of these watery habitats. The mosquito-borne disease has reached epidemic proportions in Sullia taluk. Of the affected areas, Kamila, Panja, Katta, Guthigaru, Kayambadi villages of this taluk are the severely affected regions. An outbreak of chikungunya in Sullia (1600 suspected cases) indicates the severity of the disease in the taluk (Deccan Herald, May 2008). The cases of other vector born diseases like dengue, filariasis and malaria have also been reported from this coastal city in the recent years [4, 5].

Any vector management practice requires the ecological study of vector species to come out

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with the promising actions. These measures are of less significance without the active involvement of the communities especially in remote and inaccessible areas. Hence, for the development of a suitable health education approach and for the success of community based programmes, it is also necessary to understand the level of knowledge and awareness of the community about mosquitoes and their breeding habitats, diseases transmission, the preventive measures taken and how best the people can participate in the control efforts. Hence a community perception study was taken to identify the level of perception of the community regarding mosquito borne diseases.

2. Materials and Methods

2.1 Study area

Sullia (12°33'29"N 75°23'21"E) is a taluk in the Dakshina Kannada district of the state of Karnataka, India. It is bordered by Puttur taluk in the north, Kodagu district in the east and south and Kerala in the west.

2.2 Sampling

The multi-stage random sampling method was used covering town, rural and interior villages of the study area. The questionnaire contained questions concerning information on various aspects of a mosquito bite, why they perceived mosquitoes as a problem, where do the mosquitoes breed,

when do the mosquitoes bite, knowledge of diseases transmitted by mosquitoes, Knowledge of symptoms of various mosquito borne diseases, breeding places of mosquito, etc.. Before the interview informed permission was taken. Questions were asked in local language and collected in the questionnaire. The answers were compared between the urban and rural sample and between males and females by the Chi-square test of proportions.

3. Results

A total 200 respondents were interviewed and there were 110 (55%) males and 90 (45%) females. The social-demographic characteristics of respondents are given in table 1 revealed that about 35.5% (70/200) respondents were having an education upto PUC, 23.5% respondents were having a high school education, 19.5% respondents were having primary education, 13.5% were having a degree or diploma education and 3% of the participants were having post graduation. Only 5.5% (11/200) respondents were illiterate.

The annual income of 45.5% respondents (91/200) was low (<50,000), 35% were between 50,000 to 1,50,000, 14.5% were between 1,50,000 to 3 lakhs and only 5% of respondent had more than 3 lakhs income. The majority of the family was nuclear (78%) and only 22% had joint family. The majority of the family was a small family with 5 or less than 5 members (136/200) and only 64 members had 6 or more members.

Table 1: Socio-demographic characteristics of respondents

Characteristics	Numbers (n)	Percentage (%)
1. Age (yr)		
1-20	55	27.5
21-40	30	15
41-60	93	46.5
61-80	21	21
80 and above	01	0.5
2. Gender		
Male	110	55
Female	90	45
3. Educational status		
Primary	39	19.5
High school	47	23.5
PUC	70	35.5
Degree/Diploma	27	13.5
Post graduate	6	3
Illiterate	11	5
4. Occupation		
a. Agriculture	94	47
b. self employ	21	10.5
c. student	47	23.5
d. business	4	2
e. Govt. employ	15	7.5
f. Other	12	6
5. Annual income		
a. 0-50,000	91	45.5
b. 50,000-1,50,000	70	35
c. 1,50,000-3 lakhs	29	14.5
d. 3 lakhs and above	10	5
6. Family		
a. Nuclear	156	78
b. joint	44	22
7. Members in the family		
a. <5	136	68
b. >5	64	32
8. Area of residency		
a. Urban	39	19.5

b. Rural	128	64
c. Remote village	15	7.5
d. Forest area	18	9
9. Type of house		
a. RCC	68	34
b. Tiles	115	57.5
c. Mixed	17	8.5
d. Hut	0	
10. Water source for house:		
a. Pond or well	110	55
b. tap water	48	24
c. river	10	5.0
d. bore well	13	6.5
e. Mixed	19	9.5
11. Method of water collection:		
a. closed tank	126	63
b. open tank	24	12
c. containers	32	16
d. Mixed	18	9

Out of 200 households visited, 68 (34%) were RCC houses, 115 (57.5%) were tiled roofed houses and 17 (8.5%) were mixed (RCC and tiled roof) houses. The majority of houses (55%; 110/200) had a pond or well for their domestic needs water. 24% of houses had tap water, 6.5% had bore well and only 5% had their water supply from a river. Most of the respondents (63%; 126/200) used to store water in closed

tanks. Out of remaining 37%, 16% respondents used to store water in small containers like drum, buckets, etc., 12% had open tank and remaining 9% respondents used multiple methods of water storage. The occupations of 47% (94/200) respondents were agriculture, 23.5% (47/200) were students, 10.5% were doing self employees, 7.5% of respondent were government employees.

Table 2: Awareness and knowledge regarding mosquito and their life cycle

	Numbers (n)	Percentage (%)
1. Why mosquitoes are nuisance to you?		
a. Can't sleep at night	49	24.5
b. Blood suckers	34	17
c. Disease causing	47	23.5
d. Disease transmitters (vectors)	11	5.5
e. Blood suckers and vectors of diseases	66	33
f. Don't know	3	1.5
2. Mosquitoes are abundant in		
a. Inside the home	18	9
b. Outside the home	50	25
c. Cattle shed	53	26.5
d. Plantations/field	36	18
e. Dumping area	42	21
f. None of these	1	0.5
3. Preference of mosquito bite:		
a. Early morning	12	6
b. Throughout the day	11	5.5
c. Dusk	132	66
d. Night	45	22.5
e. Can't say	-	-
4. Mosquito breeding sites:		
a. clean water	44	22
b. dirty water	52	26
c. Flowing water	03	1.5
d. Standing water and container water	78	39
e. In the waste materials dumping area	21	10.5
f. None of these	02	1

Table 2 depicts awareness and knowledge regarding mosquito and their life cycle activities. A maximum of 33% respondent told mosquitoes are nuisance to them because they suck the blood and transmit diseases. 24.5% respondent said mosquitoes are disturbing their sleep, 17% and 5.5% people said mosquitoes are blood suckers and vectors of diseases respectively. Because of lack of knowledge, 23.5 % of

respondent assumed that mosquitoes are the disease causing organisms. When the abundance of adult mosquitoes were asked, 26.5% (n=53) said, the cattle shed is the most favorable habitat followed by outskirts of house (25%), waste dumping area (21%), areca and rubber plantation (18%) and inside the home (9%).

Regarding the timings of mosquito bite, most of them had

opinions that, evening time (66%) was the most preferred time, succeeded by night time (22.5%). 6% of the people knowing that the mosquitoes bite during early morning and 5.5% said that mosquitoes bite mainly during day time. When details regarding mosquito breeding places was asked, 78 respondents (39%) told standing stagnant water and water

holding containers are the breeding places of mosquitoes followed by dirty water (n=52; 26%), clean water (n=44; 22%) and flowing water (n=3; 1.5%). About 10% of the respondent told, waste materials dumping area also act as mosquito breeding places especially during the monsoon period.

Table 3: Awareness and knowledge regarding mosquito borne diseases

	Numbers (n)	Percentage (%)
1. Mosquito are the vectors for the transmission of diseases:		
a. Yes	177	88.5
Urban	37	
Rural	140	
b. No	23	11.5
Urban	02	
Rural	21	
2. Diseases transmitted by mosquitoes		
a. Malaria	113	56.5
b. Chikungunya	117	58.5
c. Dengue	127	63.5
d. Yellow fever	01	0.5
e. Elephantiasis	22	11
f. Hepatitis	01	0.5
g. Dysentery	01	0.5
h. None of these	02	1
3. Have you suffered from any Mosquito Borne Diseases (MBDs) in recent years?		
• yes (males +Females)	63 (40+23)	31.5
○ within 2 years	33	16.5
○ 2- 5 years	30	15
• No (males +females)	137 (70+67)	68.5
4. Symptoms of MBDs		
a. Fever	114	57
b. Shivering	56	28
c. Vomiting	28	14
d. Headache	62	31
e. Joint pain	59	29.5
f. Don't know	10	05
5. Disease transmitting mosquitoes		
a. Anopheles-malaria	107	53.5
b. Aedes- dengue & Chikungunya	103	51.5
c. Culex- elephantiasis	31	15.5
d. Don't know	-	
6. Characters of Aedes mosquito		
a. Breeds in clean water	70	35
b. Black and white colouration	52	26
c. Day biter	22	11
d. Itching in biting area	13	6.5
e. Don't know	12	6

Knowledge regarding the various symptoms of mosquito borne diseases is shown in table 3. The majority of the respondents (88.5%) know that the mosquitoes are the vectors of various infectious diseases. Only 11.5% individuals had no idea about the mosquito borne diseases. When the knowledge regarding the role of mosquito in disease transmission was analyzed with the rural and urban participants, no significant difference observed ($\chi^2 = 1.91$, and $P < 0.05$).

When disease transmission by mosquitoes was questioned, the respondents had a good knowledge of fever (n=114; 57%) as a common mosquito borne disease symptom. While 62 (31%), 59 (29.5%), 56 (28%), 28 (14%) respondents had the familiarity of headache, joint pain, shivering and vomiting as symptoms of vector borne disease symptoms respectively. 5% did not know about the symptoms of MBDs. Of the 200

respondents, 63 (31.5%) respondents had suffered from mosquito borne diseases (Within 5 year) and 137 (68.5%) not suffered from any of the mosquito borne diseases. There was no significant difference between the males and females who got affected by mosquito borne diseases ($\chi^2 = 2.65$, and $P < 0.05$).

According to 53.5% (107/200) respondents, malaria is transmitted by *Anopheles*. 51.5% people know that vector of chikunguniya and dengue is *Aedes* and only 15.5% know that *Culex* mosquitoes are responsible for elephantiasis transmission. Regarding the characters of *Aedes* mosquito, 35% of the respondent told, breeding takes place in the fresh clean water in and around the houses. 26% respondents are able to identify the *Aedes* mosquito based on the bright white and black markings on the body. In relation to the biting

behaviour 21% of respondent said, these are day biters and 6.5% told, they cause itching and inflammation reactions in the biting areas.

4. Discussion

It is a well-known fact that community perception and involvement is vital for the effective management of mosquito borne diseases. Several studies in different countries indicate variations in knowledge and practice related to mosquito-borne diseases [6, 7, 8]. During the present study, the majority of the responded accepted that mosquitoes are a nuisance and 33% knew the fact that mosquitoes were sanguivores and disease vectors. In most of the earlier studies also respondents identified the mosquito as a nuisance for human beings and also in various domestic animals [9]. In some cases, people could relate their disease spreading capacity too [10]. When the abundance of mosquitoes was questioned, highest respondents said cattle shed (53/200) was the most abundant area followed by out yards of houses (50/200), dumping area (42/200), plantations (36/200) and inside the home (18/200). Mosquitoes are nuisances for human beings and also for various domestic animals as they suck the blood by which they also transmit several diseases.

Generally mosquito bites occur during dusk and dawn, but it may vary from species to species. The present study revealed that, mosquito biting was highest during dusk (132/200) followed by night and early morning. Only 11 respondents said that, the mosquitoes were also day biters, a unique feature of *Aedes* mosquitoes. Regarding the breeding preference of mosquitoes, the majority of them (78/200) assumed that standing water and container water are the breeding places of mosquitoes. These water bodies are the ideal oviposition sites for *Anopheles* species and *Stegomyia* (*Aedes*) species mosquitoes. A study from Karnataka showed, more than 50% of people having the awareness regarding the habitats of *Anopheles* and *Aedes* mosquitoes which is clean water stored in domestic containers. The widespread understanding about mosquito habitats among the study group reflects the impact of effective activities undertaken by government agencies in this region. People were aware of the fact that water collection is responsible for the breeding of mosquitoes [11, 12, 13]. Several studies showed that, commonest breeding place of mosquito as stagnant water [14], ditches [15], drains and polluted water [9, 10, 15, 16, 17, 18]. However, some studies also revealed that still in some places, people did not know about mosquito breeding places [11, 19].

Awareness about the disease transmission is also crucial for the control of mosquito borne diseases. In the present study, more than 50% of the respondents had knowledge regarding the transmission of malaria, dengue and chikungunya by different mosquito species. This is possibly because the region is marked by the high incidences of MBDs in recent years. However, only 11% and 0.5% of the respondent knew about the transmission of elephantiasis and yellow fever by mosquitoes. Several studies conducted across the India and neighbouring countries showed that, the majority of people were aware about the role of mosquito in disease transmission [9, 10, 20, 21, 22, 23]. However, in some part, sadly people were not aware of vector capacities of mosquito [9] and very few know that mosquito's role in transmission of filariasis, dengue and Japanese encephalitis. If each individual residing in an area is conscious about the reality and consequences that would arise from the outbreak of the diseases, it will lead to the

development of better control measures in that area.

Identification of symptoms of MBDs is very important for the preliminary diagnosis of the diseases. In the present study, 57% of the individuals knew the main symptom as fever in any of the MBDs followed by 31 % as headache, 29.5% as joint pain, 28% as shivering and 14% as vomiting. Only 5% of the individuals had no knowledge regarding the symptoms. Studies conducted in peri-urban areas of Bankura, West Bengal, indicate Symptoms as Fever 50 % Shivering 24.5% Nausea and vomiting 17.64 % and 7.84 % had no knowledge [10]. However a survey in Rajkot District, Gujarat showed Fever (95.60%) and chills (71.06%) as the most general malaria symptoms [12].

The behaviour and morphological features of mosquito is very important for the identification of vector species and its role as disease transmitters. In the present study, 94% could able to identify the distinctiveness of *Aedes* mosquito. It is awareness which initiates behavioral change in the people, which would aid in disease prevention. It is essential that communities are well informed about the disease symptoms, and that may help in implementing vector control activities that are appropriate to their circumstances.

5. Conclusion

The study on community knowledge and perception has a prospective to bring ahead possible preventive measures of MBDs and help to maintain their personal hygiene and cleanliness of the surroundings they are living in. The importance of combining field surveillance activities with the community understanding may provide an inclusive tool for declining the frequency of mosquito borne diseases in the taluk.

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