Community Perception Regarding Mosquito-borne Diseases in Karnataka State, India

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Abstract

A knowledge, attitude and practice (KAP) study was carried out in an urban and a rural area in Karnataka state of India with the objective of determining the perceived risk by the community of mosquito-borne infectious diseases and the level of knowledge regarding mosquitoes. The study brought out that more than 90% of the people interviewed perceived mosquitoes as a problem. However, this perception was with regard to the nuisance value of mosquito bites rather than their disease-causing potential. Malaria was known as the main disease transmitted by mosquitoes. Quite a large number of people did not know where the mosquitoes bred. Those who knew mentioned drains and stagnant water as the main breeding sites. More than one third of the interviewees did not know of any preventive measures against mosquitoes at the community level. More than 75% were taking some kind of personal prophylactic measures against mosquito bites. Approaches based on social mobilization and communication aimed at bringing behaviour change in the communities are stressed.

Keywords: Mosquito, community perception, malaria, dengue, KAP.

Introduction

The Karnataka state in India is endemic for malaria, dengue, lymphatic filariasis and Japanese encephalitis – all mosquito-borne diseases. Different districts have variable disease rates. During 2000, the state reported a total of 109 118 malaria cases, of which 28 065 were of *P. falciparum*. Of these, Bangalore district accounted for 278 cases, of which 143 were of *P. falciparum*. The annual parasite incidence (API – cases per thousand population during the year) was 0.14. Kolar district reported 4114 malaria cases and 1372 *P. falciparum* cases. The API was 1.48. There were 189 dengue cases reported in the Karnataka state 2000, of which 8 were from Bangalore district and 106 from Kolar district. Japanese encephalitis accounted for 125 cases in the state in 2000, of which 2 were from Bangalore district and 28 from Kolar district *(Source: State Health Department, Karnataka)*.

Insecticides continue to be the mainstay for the control of these infections. However, for reasons of inadequate health infrastructure, particularly in remote and inaccessible areas where most vulnerable groups live, and urban areas where access to houses is a difficult proposition due to security, it is essential that communities themselves undertake interventions against vector mosquitoes. For the success of community-based programmes, it is necessary to know as a first step the community's perceptions about mosquitoes and disease transmission, the breeding habits of mosquitoes and how best the communities can participate in the control efforts[1,2].

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For development of a suitable health education strategy, it is necessary to understand the level of knowledge and perception of the community regarding mosquito-borne infectious diseases, the practices the people follow to prevent mosquito bites at home, and finally to determine the requirements of media type and specific channels for effective communication and efficient dissemination of information.

Materials and methods

There are 21 districts in Karnataka state. By random sampling one district, Kolar, as the rural study area, and Bangalore, the capital city, as the urban study area, were selected. The multi-stage sampling method was used to select district/PHC/sub-centre/village. In the urban area, one Urban Family Welfare Centre (UFWC) area was selected at random by lottery among all the existing UFWCs. Systematic sampling was done at the village/UFWC level by selecting every tenth house to select at least 10% of the houses. The number of sample households was kept as 1000, which was more than the 10% of houses and more than the statistically valid number to account for sampling errors. The study was conducted during 2001 by interview technique, using a questionnaire, by trained interviewers. The results were analysed using the EPI-INFO software.

Results

There were 40.4% male and 59.6% female respondents in the urban sample, whereas 48% were males and 52% females in the rural sample. All the male and female respondents were adults.

Responses to each question have been analysed separately. To begin with, the availability of common communication media was ascertained. The results are shown in Table 1. It can be noted that in the urban sample, more than half the houses had television, while in the rural sample 35% had television at home. About 53% of the rural respondents did not have any other media aids at home whereas these figures were 10.2% in urban areas.

Table 1: *Availability of communication media in the house of the respondent*

Type	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Television	560	56.0%	288	28.8%
Television and newspaper	194	19.4%	21	2.1%
Radio	56	5.6%	107	10.7%
Radio and television	47	4.7%	37	3.7%
Radio, television and newspaper	33	3.3%	13	1.3%
Newspaper	4	0.4%	4	0.4%
Radio and newspaper	4	0.4%	0	0%
None	102	10.2%	530	53%
Total	1000	100%	1000	100%

A question was asked about whether the respondents perceived mosquitoes as a problem. About 93.5% of the respondents in the urban sample and 99.3% in the rural sample did perceive mosquitoes as a problem. They were further queried as to why they perceived mosquitoes as a problem. The answers are shown in Table 2. It can be noted that a large number (79.5% in urban and 84.6% in rural areas) mentioned that was is because they bit and this caused nuisance. Only a small number (20.2% in urban and 14.7% in rural areas) said that mosquitoes caused disease.

Table 2: *Answers provided by respondents as to why they perceived mosquitoes as a problem*

Answer	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Because of biting	743	79.5%	846	84.6%
Because they spread disease	3	0.3%	0	0%
Because they bite and spread disease	189	20.2%	147	14.7%
Total	935	100%	993	100%

A question was asked as to when the mosquitoes bit them most. The results are tabulated in Table 3. Most respondents mentioned night-time. Only a few mentioned daytime. When we compare the urban and rural proportions of people who mentioned that mosquitoes bite at daytime by application of Chi-square test of proportions, we observe that the difference is significant (χ^2=32.7 and P<0.05). Dengue vectors bite during daytime and this infection, in general, is prevalent in urban areas.

A question was asked regarding the breeding places of mosquitoes. The answers are given in Table 4. Regarding the breeding places of mosquitoes, the answers – green plants, garbage, cowshed, cow dung – were clubbed as incorrect answers. The others, namely, drains and stagnant waters, were clubbed as correct answers. The correct answers were compared between the urban and rural sample by Chi-square test of proportions. It showed a clear difference (χ^2=4.42 and P<0.05).

Table 3: *Answers provided by respondents as to when do the mosquitoes bite*

Time	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Night-time	762	76.20%	957	95.7%
Daytime	35	3.50%	1	0.1%
Cannot say	203	20.30%	42	4.2%
Total	1000	100%	1000	100%

Table 4: *Answers provided by respondents as to where do the mosquitoes breed*

Type	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Do not know	280	28%	375	37.5%
Drains	351	35.1%	324	32.4%
Stagnant water	96	9.6%	47	4.7%
Drains and stagnant water	96	9.6%	125	12.5%
Garbage	60	6%	5	0.5%
Drains and garbage	25	2.5%	16	1.6%
Green plants	17	1.7%	37	3.7%
Drains and green plants	12	1.2%	33	3.3%
Cattle shed/cow dung	0	0%	6	0.6%
Clean water	5	0.5%	1	0.1%
Combinations of above	58	5.8%	31	3.1%
Total	1000	100%	1000	100%

When asked what preventive measures they could take against mosquitoes at the community level, about 34% in urban areas and 43.8% in rural areas said that they were not aware of any measure (Table 5).

The health department of the government/municipality, as well as other

Table 5: *Answers provided by respondents as to preventive measures against mosquitoes*

Type	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Do not know	342	34.2%	438	43.8%
Keep surroundings clean	298	29.8%	125	12.5%
Proper drainage	123	12.3%	244	24.4%
Spraying chemicals on water	116	11.6%	107	10.7%
Keep surroundings clean and proper drainage	80	8%	47	4.7%
Combinations of above	41	4.1%	39	3.9%
Total	1000	100%	1000	100%

departments, have a programme of taking various measures for mosquito control. The people were asked whether they were aware that the government was taking some measures and, if so, what measures were these. Tables 6 and 7 give the details of responses. The perception of these people about the governmental efforts was measured by asking whether they thought what the government was doing was enough. Only 12–15% of them mentioned that the work being done was enough (Table 8).

The people were queried about personal protective measures being taken by them. Table 9 gives the details of the responses. The proportions of rural and urban sample that used some method of personal protection were compared by Chi-square test of proportions. This showed a clear difference ($\chi^2=10.53$ and $P<0.05$).

Table 6: *Answers provided by respondents as to whether government was doing something to reduce mosquitoes*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Not known	408	40.8%	431	43.1%
Not doing	340	34.0%	286	28.6%
Yes	252	25.2%	283	28.3%
Total	1000	100%	1000	100%

Table 7: *Answers provided by respondents as to what the government was doing*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Spraying chemicals	126	50.0%	108	38.3%
Drainage cleaning	47	18.6%	162	57.2%
Spraying chemicals and drainage cleaning	0	0%	10	3.5%
Spraying chemicals on water	37	14.6%	0	0%
Garbage cleaning	14	5.7%	0	0%
Govt paying *panchayat* for drainage cleaning	0	0%	1	0.3%
Combinations of above	28	10.1%	2	0.7%
Total	252	100%	283	100%

The people were quizzed about diseases which could be transmitted by mosquitoes. About 51% in urban areas and about 34% in rural areas mentioned malaria (Table 10). Regarding other mosquito-borne diseases, viz. dengue, Japanese encephalitis and lymphatic

Table 8: *Answers provided by respondents as to whether they thought what government was doing was enough*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Not known	26	10.3%	114	40.3%
Yes	38	15.0%	35	12.0%
No	188	74.7%	134	47.3%
Total	252	100%	283	100%

Table 9: *Personal measures being taken by the respondents*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Mosquito coil	268	26.8%	163	16.3%
Mosquito mats	171	17.1%	33	3.3%
Using fans	154	15.4%	0	0%
Covering with blanket/bedsheets	42	4.2%	226	22.6%
Bednets	30	3.0%	144	14.4%
Applying smoke	0	0%	78	7.8%
Combinations of above	116	11.6%	194	19.4%
Nothing	219	21.9%	162	16.2%
Total	1000	100%	1000	100%

filariasis, the majority of the people had no idea of transmission of these diseases. Those who mentioned malaria were further asked whether they were aware of its symptoms. About half the respondents said fever as a symptom (see Table 11 for details). The people were asked as to the source of their information. During analysis, the answers of those who had no knowledge of any of the questions regarding mosquitoes/diseases were left out (see Table 12 for results).

Table 10: *Knowledge of diseases transmitted by mosquitoes*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Malaria	514	51.4%	343	34.3%
Filariasis	3	0.3%	0	0%
Dengue	2	0.2%	0	0%
Japanese encephalitis	2	0.2%	12	1.2%
Combination of above	2	0.2%	40	4%
Others	36	3.6%	14	1.4%
Not known	441	44.1%	591	59.1%
Total	1000	100%	1000	100%

Table 11: *Knowledge of symptoms of malaria*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Fever	158	30.2%	71	18.5%
Fever and shivering	86	16.4%	75	19.5%
Fever, shivering and bodyache	43	8.2%	43	11.2%
Fever and bodyache	0	0%	54	14.1%
Combination of above	58	11.2%	35	9.1%
Not known	178	34.0%	106	27.6%
Total	523	100%	384	100%

A question was asked whether the respondent or any of his/her family member had suffered from fever during the previous one month (Table 13). In the urban sample, there were 347 fever cases. They were further asked about the action taken for treatment. In

Table 12: *Source of knowledge*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Experience/ observation	277	36.0%	182	28.2%
Neighbours	174	22.6%	220	34.1%
School/college	171	22.2%	155	24.0%
Television/ cinema	95	12.3%	5	0.8%
Doctors/health workers	53	6.9%	66	10.2%
Family members			8	1.4%
Others*	14	1.8%	9	1.4%
Total	784	100%	645	100%

*Hand bills, radio, and *Mahila Swasthya Sangha* (Women's Health Club)

Table 13: *Source of treatment*

Response	Urban		Rural	
	Freq	Per cent	Freq	Per cent
Private practitioner	233	67.15%	87	32.83%
Self-medication	87	25.07%	48	18.11%
Non govern-mental hospital	16	4.61%	11	4.15%
General hospital	6	1.73%	20	7.55%
Sub-centre/ primary health centre	0	0%	69	26.04%
No action	5	1.44%	30	11.32%
Total	347	100%	265	100%

the urban sample, a majority (67%) consulted the private medical practitioner. In the rural sample, there were 265 cases of fever. The action taken indicated that 33% went to the private practitioner. About 26% approached the health worker.

Discussion

The study brought out certain important perceptions of the sampled community, the understanding of which is deemed vital for planning a health education programme. The study showed that more than 90% of the people interviewed perceived mosquitoes as a problem only rather than their disease-causing potential. Of the diseases transmitted by mosquitoes, it was mainly malaria that was mentioned.

In view of the foregoing conclusions, health education campaigns may stress the disease potential of mosquito bites. The campaigns must also convey that, apart from malaria, there are other mosquito-borne diseases, viz. dengue, Japanese encephalitis and lymphatic filariasis, which are equally dangerous in terms of morbidity and mortality, and are preventable.

Since a considerable proportion of people are seen to go to private medical practitioners, especially in urban areas, the competency of these practitioners in the private sector needs to be strengthened for management of cases and for imparting health education to patients/ family members. There is a need to improve the health-seeking behaviour of the community, family and care-givers so that they can recognize signs of severe illness and seek appropriate care when referral is indicated.

The knowledge of the community, as seen in the sample, regarding the breeding places of the mosquitoes and the preventive measures is quite limited. None of the respondents mentioned about indoor breeding of mosquitoes and indoor mosquito larval control. Therefore, vector-borne disease control

programmes should stress the importance of source reduction as a method for control of indoor mosquito breeding for dengue/urban malaria prevention activities. The daytime biting nature of *Aedes* mosquitoes and the breeding of *Anopheles* and *Aedes* mosquitoes in relatively clean water stored in domestic water containers must be conveyed to the community[3]. A sound knowledge-base about vector-borne diseases and methods of vector control must be built among the community[4].

A sizeable proportion of the respondents were using personal prophylaxis measures against mosquitoes. However, a considerable number was not aware of preventive measures against mosquitoes at community level. Regarding the measures being taken by the government for mosquito control, people mentioned about spraying chemicals, cleaning the drains, etc. However, they did not mention about health education activities. This shows that the reach of health education campaigns has been quite limited.

The current control strategy for mosquito-borne diseases, especially dengue, rely on health education efforts aimed at preventing mosquito breeding inside houses and in the vicinity of households. The study has shown that among the people surveyed the reach of these efforts was inadequate.

The study has also shown that appropriate communication channels are to be used to make the health education strategy effective. Television and cinema have been quoted as important sources of information. In the sampled population in the urban area, television and newspapers were the major available media at home. In the rural area, television and radio were the major media available at the household level. These media have to be effectively used. There is need to build appropriate information, education and communication materials to achieve social mobilization. It is disappointing to note that doctors/health workers form a rather infrequent source of knowledge. This shows poor interpersonal communication taking place between doctors/health workers and people. This needs significant improvement.

It is now being increasingly realized that social mobilization and communication are critical for control of urban malaria and DF/DHF through source reduction as the vectors of both these diseases are container-habitat species and breed indoors. Parks et al[5] has emphasized that to achieve sustainability, there is a need to switch over to new strategies in which resources and decision-making are decentralized; emphasis is placed on negotiating behaviour and social change as opposed to education for knowledge change; targeted government and private sector advocacy is deployed to increase political and financial commitment, extensive partnerships and support networks are developed with the private sector/NGOs, inter and intra ministries of governments with focus on improvement of liquid and solid waste disposal, improved drinking water supplies and its proper management with active involvement of communities. WHO has already developed guidelines on social mobilization for prevention and control of DF/DHF[6].

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