

## Original Article

### Attitude and Practices Regarding Mosquito Borne Diseases and Socio-demographic Determinants for Use of Personal Protection Methods Among Adults in Coastal Pondicherry

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#### Abstract

**Background:** Vector-borne diseases (VBDs) are emerging as a serious public health problem in India and other countries of the South-East Asia Region. The use of personal protection (PP) methods has been advocated as an effective tool against VBDs. The study aimed to determine the attitude and practices regarding mosquito borne diseases and socio-demographic determinants for use of PP methods among adults in coastal Pondicherry.

**Methods:** A community based cross sectional study was conducted during Feb 2010 among 1674 adults in coastal Pondicherry.

**Results:** 1411 (84.29%) of study subjects were using one or the other form of PP methods against mosquito borne diseases. The use of mosquito repellent coil and liquid vapourizer were commonest among PP methods used. Use of PP methods by females was almost same as compared to males. Respondents living in semi-pucca or kutcha houses were more likely to practice PP methods as compared to respondents living in pucca houses (OR: 1.17; 95% CI: 0.87-1.57). Only 1131 (67.56%) respondents had expressed willingness to cooperate with insecticide spraying operation done by local authority.

**Conclusion:** Use of PP methods was found to be low among younger, working respondents and those belonging to economically backward classes. Hence, IEC activities and social marketing strategies need to be intensified among these categories for prevention and control of mosquito borne diseases.

**Key words:** Mosquito control; mosquito nets; demography; attitude; insect vectors

#### Introduction

Vector-borne diseases (VBDs) are emerging as a serious public health problem in India and other countries of the South-East Asia Region [1]. Each year 300 to 500 million clinical cases of malaria occur and at least 1.1-2.7 million people die of malaria annually and over 2400 million are at risk globally [2]. In presence of 64 species of mosquitoes and majority of the population feeling severe mosquito nuisance in their locality with moderate burden of VBDs in Pondicherry [3,4], it is irrational to wait and allow new parasite dominate the burden of VBDs. Reduction in morbidity and mortality due to mosquito borne diseases is important to meet the overall objectives of Millennium Development Goals [5] and National Health Policy, 2002 [6]. The Government of India approved National Vector

Borne Diseases Control Program (NVBDCP) during 2003-04 which now comes under the umbrella of National Rural Health Mission (NRHM) [7]. To achieve targets specified under NVBDCP, it is imperative to have active community participation for prevention and control of mosquito borne diseases. Community participation in turn depends on people's awareness, knowledge and attitude towards the disease [8].

The use of personal protection (PP) methods has been advocated as an effective tool against vector borne diseases. However, success of these measures largely depends on the access, acceptability and proper usage by the target population. Therefore, keeping the above aspects in view, this study was planned to find out the attitude and practice regarding mosquito borne diseases and socio-

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demographic determinants for use of personal protection methods among adults in coastal Pondicherry.

## Methods

The present community based cross-sectional study was conducted among adults in coastal Pondicherry, located 162 km south of Chennai, the capital of Tamil Nadu, a south Indian state. Pondicherry is surrounded by Bay of Bengal on East, and on the other sides by the Cuddalore & Villipuram districts of Tamil Nadu. Pondicherry experiences hot and humid climate except during January & February months which are comparatively colder but the temperature never falls below 20°C. The temperature normally varies between 26°C and 38°C. Pondicherry receives good rainfall during the months from November to January and from July to September [9]. Average annual rainfall at Pondicherry is 1254 mm and relative humidity varies from 70% to 80% [10].

The present study was conducted during February 2010 in selected coastal areas in Pondicherry which are part of field practice area of Department of Community Medicine of Pondicherry Institute of Medical Sciences, Pondicherry. Prior to the start of the study, the community leaders and ward representatives were contacted by authors and resident medical officers of the urban health centre to enlist their support. The help was also obtained from members of self-help groups and volunteers residing in study area to inform study subjects about the purpose of study in advance for eliciting better cooperation. The predesigned and pretested structured questionnaire was used for data collection. The questionnaire was discussed and explained to final year medical students, Auxiliary Nurse Midwives (ANMs), social workers and interns who were well-versed with the local language. They were trained in data collection by the authors and continuously monitored by medical entomologist and doctors from Department of Community Medicine. Attempt was made to fully cover all the areas falling in the geographical jurisdiction of field practice of the department. The households were visited in the study area by house to house visit and study purpose was explained. The information on socio-demographic data, attitude and practice regarding mosquito borne diseases and socio-demographic determinants of use of personal protection methods among adults was collected

from all the available respondents during working hours. The data was collected from 1674 available adults from these areas who consented to participate in the study. For the study purpose, PP methods were defined as use of bed nets, mosquito repellent coil/vapourizers/cream and burning of Neem leaves as protection for mosquito borne diseases. The soakage pits and underground drainage were considered as good drainage systems. Modified Prasad Classification (adjusted as for year 2009) was used as it was thought logical considering the prevailing socio-economic and geographical background of the study population almost akin to the rural area. The respondents were classified as class I (per capita monthly income >Rs. 3600), class II (Rs. 1800-3599), class III (Rs. 1100-1799), class IV (Rs. 550-1099) and class V (below Rs. 550). Pipe water, bore well and hand pump were considered as sources of safe water.

The data was entered in Microsoft Excel and analyzed using SPSS software version 16.0 and Epi version 6.04. The results were projected as proportions and percentages. To study the effect of demographics on use of personal protection methods against mosquito borne diseases, odds ratio was calculated and to compare data sets, chi-square test was used and  $p < 0.05$  was considered as statistically significant.

## Results

Out of 1674 adults studied, 71.03% were females and 28.97% males. The age-sex distribution, literacy, occupation, socio-economic status, family type, type of house, water supply, waste disposal and drainage are enlisted in table 1. Seventy percent of study population was above 30 years and 79.15% were literate. Two-third of the respondents were poor (class IV and V) and three-fourths had nuclear family. Two third of study population was living in pucca houses and safe water supply was accessible to 97.07% respondents. Majority of males (65.77%) and females (62.07%) reported practice of indiscriminate waste disposal, however 60% of the respondents had good drainage system.

Surprisingly, 16% respondents were hesitant to consume Diethylcarbamazine (DEC) tablets during Mass Drug Administration (MDA) by the state health department during December 2009, while 67.56% respondents expressed willingness to co-operate with insecticide spraying operations by government authority.

Table 1- Socio-demographic characteristics of respondents

Characteristics	Male, n=485	Female, n=1189	Total, n=1674
<b>Age</b>			
18-30 yrs	97 (20.00)	400 (33.64)	497 (29.69)
>30 yrs	388 (80.00)	789 (66.36)	1177 (70.31)
<b>Educational status</b>			
Literate	418 (86.19)	907 (76.28)	1325 (79.15)
Illiterate	67 (13.81)	282 (23.72)	349 (20.85)
<b>Occupation</b>			
Working	394 (81.24)	365 (30.70)	759 (45.34)
Non-working	91 (18.76)	824 (69.30)	915 (54.66)
<b>Economic status</b>			
Class I-III	174 (35.88)	384 (32.30)	558 (33.33)
Class IV-V	311 (64.12)	805 (67.70)	1116 (66.67)
<b>Family type</b>			
Nuclear	388 (80.00)	857 (72.08)	1245 (74.37)
Joint	97 (20.00)	332 (27.92)	429 (25.63)
<b>Type of house</b>			
Pucca	329 (67.84)	787 (66.19)	1116 (66.67)
Semipucca /Kutcha	156 (32.16)	402 (33.81)	558 (33.33)
<b>Water supply</b>			
Safe	471 (97.11)	1154 (96.72)	1625 (97.07)
Unsafe	14 (2.89)	35 (3.28)	49 (2.93)
<b>Waste disposal</b>			
Compost pits	56 (11.55)	185 (15.56)	241 (14.40)
Covered pits	110 (22.68)	266 (22.37)	376 (22.46)
Throwing indiscriminately	319 (65.77)	738 (62.07)	1057 (63.14)
<b>Drainage</b>			
Open	180 (37.11)	454 (38.18)	634 (37.87)
Underground	294 (60.62)	702 (59.04)	996 (59.50)
Soakage pits	11 (2.27)	33 (2.78)	44 (2.63)

(Figure in parentheses indicate percentages)

Enquiry on practices regarding prevention and control of mosquito borne diseases revealed that almost all (98.92%) respondents had the habit of sleeping indoors. 1411 (84.29%) of study subjects

were using any one of the available PP methods against mosquito borne diseases. The use of mosquito repellent coil and liquid vapourizers was commonest among PP methods; being used on

Table 2- Attitude and practices of respondents regarding vector borne diseases

	Males, n=485	Females, n=1189	Total, n=1674
<b>Attitude</b>			
<b>Hesitation for consuming DEC tablets</b>			
Yes	66 (13.61)	200 (16.82)	266 (15.89)
No	419 (86.39)	989 (83.18)	1408 (84.11)
<b>Cooperation with insecticide spraying operation</b>			
Yes	322 (66.39)	809 (68.04)	1131 (67.56)
No	163 (33.61)	380 (31.96)	543 (32.44)
<b>Practices</b>			
<b>Sleeping habits</b>			
Indoors	480 (98.97)	1176 (98.91)	1656 (98.92)
Outdoors	5 (1.03)	13 (1.09)	18 (1.08)
<b>Use of personal protection methods</b>			
Yes	407 (83.92)	1004 (84.44)	1411 (84.29)
No	78 (16.08)	185 (15.56)	263 (15.71)
<b>Use of window screen</b>			
Yes	122 (25.15)	270 (22.71)	392 (23.42)
No	363 (74.85)	919 (77.29)	1282 (76.58)
<b>Type of PP method used</b>			
Bed nets	30 (6.19)	63 (5.30)	93 (5.56)
Coil	247 (50.93)	594 (49.96)	841 (50.24)
Liquid vapouriser	213 (43.18)	521 (43.82)	734 (43.85)
Neem leaves burning	10 (2.06)	22 (1.85)	32 (1.91)
Mosquito repellent creams	6 (1.24)	22 (1.85)	28 (1.67)
Others	5 (1.03)	15 (1.26)	20 (1.19)
<b>Motivation for use of PP methods by</b>			
AWW	18 (3.71)	37 (3.11)	55 (3.29)
ANM/MPW	2 (0.41)	11 (0.93)	13 (0.78)
Ward head	17 (3.51)	38 (3.20)	55 (3.29)
Other	16 (3.30)	45 (3.78)	61 (3.64)
None	432 (89.07)	1058 (88.98)	1490 (89.01)
<b>Expenditure for prevention of vector borne diseases</b>			
	<b>n=407</b>	<b>n=1004</b>	<b>n=1411</b>
Up to 50 Rs	109 (26.78)	226 (22.51)	335 (23.74)
50-100 Rs	142 (34.89)	393 (39.14)	539 (37.92)
>100 Rs	156 (38.33)	385 (38.35)	541 (38.34)

AWW - Anganwadi Worker, ANM - Auxiliary Nurse Midwife, MPW - Multi Purpose Worker  
(Figure in parentheses indicate percentages)

50.24% and 43.85% occasions respectively. Only 93 (5.56%) respondents reported use of bed nets. Less than one-fourth (23.42%) adults reported use of window screen in their houses. Respondents motivated by health workers regarding use of PP methods against mosquito borne diseases were very less and so was the expenditure on use of PP methods by the respondents (table 2).

The practice of PP against mosquito borne diseases was almost equal in females as compared to male respondents (OR: 1.04; 95% CI: 0.77-1.40). Use of PP methods was 1.7 times more among respondents aged 30 years and above, compared to respondents aged 18-30 years (OR: 1.73; 95% CI: 1.30-2.29;  $p < 0.001$ ). Illiterate respondents were likely to use PP methods more than literate respondents. However, the difference was statistically not significant (OR: 1.11; 95% CI: 0.79-1.57). Non-working study subjects were more likely to use PP methods as compared to working study subjects (OR: 2.27; 95% CI: 1.72-3.01;  $p < 0.001$ ). The respondents belonging to economic class IV and V were less likely to practice PP methods as compared to the respondents belonging to higher economic class (I-III), which was found to be statistically significant (OR: 0.67; 95% CI: 0.49-0.91;  $p = 0.008$ ). Study subjects living in semi-pucca or kutcha houses and belonging to joint families were more likely to practice PP methods as compared to subjects living in pucca houses (OR: 1.17; 95% CI: 0.87-1.57) and nuclear families (OR: 1.14; 95% CI: 0.83-1.57) respectively, both of which are not statistically significant.

## Discussion

The current study shows that although 15.89% respondents were hesitant to consume DEC tablets during MDA round in the state, two-third (67.56%) respondents had expressed willingness for cooperation with insecticide spraying operations by health workers. Refusal to permit household spraying, for whatever reasons, would inevitably increase the density and longevity of mosquitoes, which in turn would lead to increase in the frequency of mosquito bites, resulting in higher morbidity due to mosquito borne diseases. Sleeping indoors is considered as good practice to avoid mosquito bites and 98.92% respondents in the present study were sleeping indoors during night hours, however this may be attributed to a

comparatively colder season during the study period. 84.29% of study subjects were using any available PP methods against mosquito borne diseases and 23.42% had window/door screening which was quite high as compared to a study conducted at Phet province of Thailand, where it was only 52.64% and 15.04% respectively [11].

When asked about type of PP methods used, mosquito repellent coil (50.24%) and liquid vapourizers (43.85%) were the commonest in practice which was much higher than in Rajasthan where it was only 6.27% and 3.73% respectively [12]. Only 1.91% of study respondents used burning Neem leaves as personal protection method which was in contrast to Rajasthan [12] where its use was 16.44%. The current study also showed that 15.71% respondents were not using any PP method which is however, similar to 18.27% reported from Rajasthan [12].

The present study also revealed that health workers and Aanganwadi workers contributed in motivating less than 5% respondents to use PP methods. Thus, there is a need to initiate measures towards involvement of the government functionaries in motivating community on larger scale regarding prevention and control of mosquito-borne diseases.

The use of PP methods did not vary between male and female respondents, which may be attributed to high literacy rate (>76%) in the study area among both sexes. Use of PP methods among respondents of age less than 30 years was lower as compared to those aged 30 years and above, indicating need of more health awareness campaigns targeting younger population.

Use of PP methods was found more among respondents living in kutcha or semi-pucca house which may be attributed to the fact that these people are more vulnerable to mosquito bites due to their poor living conditions; however, it was not statistically significant.

To conclude, as contribution of health workers (ANMs/MPWs) and AWW in motivating the study subjects to use PP methods against mosquito borne diseases is negligible, it is imperative to involve the health sector to provide active support and commitment to effectively meet the challenges of prevention and control of mosquito borne diseases through intersectoral coordination, community participation and use of all available modern communication strategies.

**Key Points**

- Use of personal protection methods was low among younger, working and economically backward classes. Hence IEC activities need to be intensified towards prevention and control of mosquito borne diseases among these population groups.
- There is a need for social marketing of personal protective measures especially to the poor and/or under-privileged population and ensuring their availability to encourage people to buy and use them.
- The health sector involvement is essential to effectively meet the challenges of prevention and control of VBDs through community participation and intersectoral coordination by using all available means of communication.

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