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**Maria Nelliyanil**  
Assist Professor,  
Dept of Community Medicine  
A J Institute of Medical sciences  
Mangalore-575004

**Nitin Joseph**  
Associate Professor,  
Dept of Community Medicine  
Kasturba Medical College  
MAAnipal University  
Mangalore-575001

**Srinivas R**  
Post graduate,  
Dept of Community Medicine  
A J Institute of Medical sciences  
Mangalore-575004

**Diwaker singh**  
Post graduate,  
Dept of Community Medicine  
A J Institute of Medical sciences  
Mangalore-575004

**Manjula Anil**  
Assist Professor,  
Dept of Community Medicine  
A J Institute of Medical sciences  
Mangalore-575004

**Jayaram S**  
Professor &head,  
Dept of Community Medicine  
A J Institute of Medical sciences  
Mangalore-575004

**Correspondence:**  
**Maria Nelliyanil**  
Assist Professor,  
Dept of Community Medicine  
A J Institute of Medical sciences  
Mangalore-575004

## **A study of perceptions practices and expenditure towards mosquito bite prevention among construction workers in Dakshina Kannada District**

**Maria Nelliyanil, Nitin Joseph, Srinivas R, Diwaker singh, Manjula Anil, Jayaram S**

### **Abstract**

**Background:** Mosquito-borne diseases are a major public health problem. The boom of construction industry has increased the occurrence of mosquito-borne diseases. This has lead to considerable economic, ecological, and public health impacts. The objective of the present study was to assess the perceptions and practises regarding mosquito bite prevention and also to assess the average monthly expenditure towards mosquito bite prevention.

**Methodology:** A cross sectional study was conducted among the construction workers of an urban field practice of a private medical college. From the randomly selected 15 construction sites, 177 participants were interviewed regarding perceptions practises and expenditure towards mosquito bite prevention methods.

**Results:** Majority of the population belonged to the age group of 16 to 35 years, with mean age of 32 years (sd =10). Majority of the study population resided at Katcha (97%) houses. Most of the respondents perceived mosquitoes as a nuisance (94.9%) and were aware that it transmitted disease. Mosquito net (45%) was the most common method used for mosquito bite prevention followed by coil. Most of the participants stated that artificial and contaminated water collection water collection were present in their surroundings. The mean monthly expenditure for mosquito bite prevention reported in the study was INR 104. Twenty one per cent provided history of mosquito-borne disease in the family in the last one year, of which malaria was the most prevalent disease followed by dengue.

**Conclusion:** Temporary settlements of the construction workers which lack adequate sanitation is a major cause for the occurrence of mosquito-borne diseases.

**Keywords:** Mosquito bite prevention, expenditure, construction workers.

### **1. Introduction**

Man and mosquitos seem to have evolved together. Mosquito-borne diseases had always and also will remain as a public health problem. Every year there are more than one billion cases and over one million deaths from vector-borne diseases globally [1]. Malaria causes the most number of deaths among the vector-borne diseases. WHO estimated that there were 627,000 deaths and 207 million cases in 2012, mainly in Sub-Saharan Africa followed by South East Asia [2]. Dengue is a fast emerging pandemic-prone viral disease and up to 100 million infections are estimated to occur annually in over 100 endemic countries [3]. The economic costs of malaria and dengue are very high as reported in India [4]. The considerable economic, ecological, and public health impacts of vector-borne diseases are expected to continue, given limited domestic and international capabilities for detecting, identifying, and addressing likely epidemics [5]. Karnataka is one state with high prevalence of mosquito-borne diseases viz., malaria, dengue and chikungunya. Morbidity due to malaria and dengue are very high in Dakshina Kannada district. The district has been witnessing a great spurt in construction activities in the recent years, owing to rapid industrialization and this has brought dreaded diseases like malaria [6]. There is abundant scope for water collection in and around the construction sites: water stored in tanks; the layer of water on the surface of the cement concrete (used for 'curing' the concrete and left as such for three weeks); puddles of water in and around the place of construction, and all these provide scope for mosquito breeding. To add to the problem, construction workers tend to harbour the parasites causing diseases like malaria due to frequent infections owing to their poor standards of living. Thus, construction sites not only provide for mosquito breeding but also supply the parasites [7].

It might be the reason why diseases viz., malaria tends to be more common in cities where construction activities are in full swing. With the current boom in real estate and urban development, the unorganized sector in India will continue to grow in future which acts as impetus for future outbreaks of mosquito-borne diseases. Hence, a cross-sectional study was planned among the constructions workers of an urban field practice of a private medical college, to assess the perceptions and practises regarding mosquito bite prevention and average monthly expenditure towards mosquito bite prevention.

**2. Methodology**

A cross sectional study was conducted among the construction workers of an urban field practice of a private medical college. The objective of the study was to assess the perceptions and practises regarding mosquito bite prevention and asses the average monthly expenditure towards mosquito bite prevention. (Repetition) Of the total 33 construction sites in the urban field practise area 15 sites were randomly selected. Migrant labours staying in these construction site were included in the study. A total of 177 participants were included in the study. The selected construction sites were visited by the investigators and information was collected from the head of the family for each family. Informed consent was also obtained from each individual respondent during data collection after a through thorough explanation of the purpose of the study. Data was collected regarding perceptions practises and expenditure towards bite prevention methods using a pretested structured questionnaire. Questions regarding place of breeding, diseases transmitted, preventive methods used, average monthly expenditure etc. were include in the questionnaire. Following which the workers were advised regarding how to practise the mosquito bite prevention methods effectively. The site supervisors were also advised regarding the measures to avoid water stagnation and mosquito breeding at construction site.

Data entry and analysis was performed using the Statistical Package for Social Sciences (SPSS) 16.0 for windows and the results were summarized using tables. Univariate analysis and T test were carried out to assess associations between having suffered from mosquito borne diseases and sex, type of method used etc. The level of significance at 0.05 was used for all tests of statistical significance.

**3. Results**

Majority of the population belonged to the age group 16-35 years (68%) mean age 32 years (sd= 10). Most of the respondents were males (86%) since head of the family was the preferred respondent.

The average income of the study population was INR 7097 (Sd= 1667). Majority of the study population lived in Katcha (97%) houses. Most of the respondents perceived mosquitoes as a nuisance (94.9%) and were aware that it transmitted disease (99%). Most of them responded that malaria was the most common disease transmitted (95%) followed by dengue (5%) and mosquitoes breed in bush and water 55% followed by water stored in tanks 42% and garbage one per cent. One hundred and seventy three respondents reported that there was collection of water around their houses, which half of them cleaned once in two days followed by once in three days and weekly. Contaminated water was present around 170 (96%) of the houses, which most of them cleaned once in two days

followed by daily, once in three days and weekly. Some sort of spraying activity was done in half of the houses it was usually done once in six months in majority of the houses (45%).

**Table 1:** Method used for mosquito bite prevention, effective method and types of discomfort with the various methods in the study population

Variable	Frequency	Percentage
Method used for mosquito bite prevention(n=177)		
Mosquito coil	75	42
Net	79	45
Coil and net	12	7
Odomos, coil	5	3
Odomos	4	2
Fan	2	1
Effective method for mosquito bite prevention(n=177)		
Net	108	61
Mosquito coil	61	34
Coil and net	7	4
Liquidator	1	1
Discomfort in method for mosquito bite prevention(n=177)		
Yes	27	15
No	150	85
Type of discomfort(n=27)		
Nasal irritation	22	81
Allergy	5	9

Mosquito net (45%) was the most common method used for mosquito bite prevention followed by coil (Table 1). Mosquito net was perceived as the most effective method (Table1). Of the total 75 subjects using mosquito coil, 43(57%) perceived it to be effective and 27(36%) perceived net to be effective. Of the total 79 who used mosquito net, 65(82%) perceived net to be effective and only 10 (12%) felt mosquito coil to be effective. Fifteen per cent of the study subjects complained of discomfort on use of mosquito coil, most of them complained of having nasal irritation on use of coil (Table1). The mean monthly expenditure for mosquito bite prevention reported in the study was INR 104 (Sd= 94), however there was no statistical difference in expenditure pattern in those who suffered from mosquito-borne disease and those who did not (P <0.05). Of the total 37(21%) gave history of mosquito-borne disease in the family in the last one year, malaria was the most prevalent disease seen in 36 (97%) subjects followed by dengue which was reported in one individual (Table 2).The mean age of those who suffered from mosquito borne diseases in this study was 28 years (sd=14.maximum age=52 years, minimum age = 4 months)

**Table 2:** Profile of patients who suffered from mosquito borne disease in the study population

Variables	Frequency	Percentage
Disease		
Malaria	36	97
Dengue	1	3
Sex		
Male	20	54
Female	17	46
Type of treatment		
Allopathic	29	78
Homeopathic	8	22

**Table 3:** Factors associated with occurrence of mosquito borne diseases in the study population-Univariate analysis

Factors		N	Mosquito borne diseases Yes (%)	OR	95%CI
Sex	Female	24	6 25	1	0.4-3.5
	Male	153	31 20	1.3	
Education	Illiterate	28	6 21	1	0.3-2.5
	Literate	149	31 20	0.9	
Nuisance	Yes	168	36 21	2.1	0.2-18
	No	9	1 11	1	
Frequency of changing water collection	<=7 days	157	32 20	1	
	>7 days	20	5 25	1.3	0.4-3.8
Method used for mosquito bite prevention	Mosquito net	79	15 19	1	
	Others	98	22 22	0.8	0.3-1.6

#### 4. Discussion

The mean age of the respondents in the present study was mean age 32 years (sd=10), which was similar to the study done by Verma *et al.*, where the mean age of the respondents were found to be 31.55 ( $\pm 9.75$ ) years and for female it was 32 ( $\pm 7.31$ ) years [8]. Most of the respondents perceived mosquitoes as a nuisance (94.9%), which is similar to the observations made by Thulliez *et al.* in their study, where 90% of interviewees considered mosquitoes a nuisance [9]. In the study, 10% of the study subjects claimed they eliminate sources of stagnant water in and around their households daily, 77% declared that they did this few times a week, 10% weekly and 2% stated they did it few times per month. However in the study done by Thulliez *et al.* the frequency of such behaviour varied, however, with 17% claiming that they would eliminate these sources at least once per day, 45% declaring that they did this a few times per week, 11% stating that they did it a few times per month, and about 2% stating once per year [9]. Source reduction activities was reported to be practised more frequently in this study could be due to the regular information education activities done by field staff dedicated for vector-borne disease control from the city corporation. Ninety nine percent of the participants were aware that mosquitoes transmitted disease Tyagi *et al.* reported from New Delhi in 2005 that 100% of study participants knew that mosquito bites transmit malaria [10]. Surendran *et al.* reported that 71% were able to name at least one disease transmitted by mosquitoes, while in this present study 99% were able to name at least one disease transmitted by mosquitoes probably because of the information education activities undertaken by the health workers [11]. Surendran *et al.* observed that in a study conducted at Jaffna 96% used personal protective measures against mosquito bites while 99% of the participants in the current study reported to have used personal protective measures against mosquito bites [11].

Mosquito net was the preferred method for mosquito bite prevention with 79% reporting that they used mosquito net which was similar to the observation made by Dhavan *et al.* in their study which reported that bed nets were used by a large majority of respondents in construction sites (83%) [12]. The mean monthly expenditure for mosquito bite prevention reported in the study was INR 104 similar to the observation

made by Babu *et al.* in their study that the mean monthly expenditures on personal-protection measures was 101 Indian rupees [13]. Of the total 37 (21%) gave history of mosquito-borne disease in the family in the last one year, malaria was the most prevalent disease seen in 36 subjects. However Balakrishna *et al.* in their study among migrant construction workers in Mumbai reported that the slide positivity rate for the malaria was 8.11% [14]. The higher numbers may be attributed to the massive increase in construction activities in the study area.

Thus the present study exhibits that despite the fact that the construction workers having rational practises for mosquito bite prevention, mosquito-borne diseases especially malaria continues to be prevalent. One of the major factor is the temporary settlements they stay in which lack adequate sanitation.

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