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Construction Site Workers Knowledge and Practices on Vector Born Disease in Urban Area of Bangalore, Karnataka

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ABSTRACT:

Background: Construction sites are potential breeding places for some species of mosquitoes. Construction workers usually stay at the construction sites, thus being extremely susceptible to malaria and dengue. Mosquito-borne diseases are a major public health problem. The boom of construction industry has increased the occurrence of mosquito-borne diseases. The objective of the present study was to assess the knowledge and practises regarding vector born disease prevention.

Methodology: Cross-sectional study was conducted in four randomly selected construction sites of Bangaluru, a high-risk city for Dengue, malaria, chickengunya etc. Total 200 participants were interviewed regarding knowledge and practises regarding vector born disease prevention. Results: Majority of 143 (71.5%) participants knew about dengue. It was found that nearly 191 (95.5%) residents did not know the name of the mosquito that spreads the illness. Many of them know Major Symptoms of vector borne diseases. Participants Knowledge regarding prevention of vector borne diseases was average. Conclusion: They are aware regarding malaria, dengue and chickengunya while awareness regarding other vector borne diseases such as Japanese Encephalitis and filaria was poor. Study exhibits that the construction workers having moderate practises for mosquito bite prevention. Temporary settlements of the construction workers which lack adequate sanitation are a major cause for the occurrence of vector borne diseases.

Keywords: Vector borne disease, construction workers, knowledge and practices

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1. Introduction

Vector-borne diseases result from parasites, viruses, and bacteria transmitted by mosquitoes and cause over 700,000 deaths annually. These diseases have the greatest impact in tropical and subtropical regions and disproportionately affect the most impoverished populations. Many of these diseases can be prevented through protective measures and community mobilization¹.

Karnataka is a state where mosquito-borne diseases such as malaria, dengue, and chikungunya are prevalent².

The Bengaluru district experiences high rates of malaria and dengue cases. In recent years, Bengaluru has seen a surge in construction activities due to rapid industrialization, leading to an increase in diseases such as malaria.

The State Health Department's data shows that Karnataka has documented 19,313 cases of dengue and ten deaths from January to August 3 this year³. Mosquitoes typically appear before the monsoon months, but the significant rise in their numbers has raised concerns among citizens about the potential spread of diseases transmitted by vectors. Construction sites in and around the city provide ample opportunity for water accumulation, including water stored in tanks, the water layer on the surface of cement concrete left for curing, and puddles of water, all of which create breeding grounds for mosquitoes. The unorganized sector in India will keep expanding in the future, driven by the current real estate and urban development boom, which will serve as a catalyst for future outbreaks of mosquito-borne diseases⁴.

Construction workers constitute nearly 10 % of the unorganized sector.⁵ Construction workers are vulnerable to various health hazards. They often settle on lands unfit for settlement and hence are extremely susceptible to malaria and other vector borne diseases^{6,7}.

Urbanization that is unplanned, industrialization, and rapid population growth along with migration from rural to urban areas have led to a rise in mosquito-borne diseases in urban areas. Dengue is the quickest growing vector-borne disease globally, experiencing a 30-fold increase in disease incidence over the past 50 years. Over 100 countries have more than 2.5 billion people at risk of contracting dengue⁸.

Urban malaria cases in India have risen significantly since 1970. This increase is mostly linked to unplanned urban development and the arrival of many laborers who have made their homes in urban slums or areas without essential facilities.⁹

The National Vector Borne Disease Control Program (NVBDCP) has been fighting dengue and other vector-borne diseases for a while, but there are still gaps in its knowledge and application¹⁰. Therefore, in order to help with the development of future community-based, evidence-based, effective prevention and control strategies, an attempt was made in the current study to ascertain the current awareness regarding various vector-borne diseases in the study area.

2. Materials and Methods

A cross sectional study was conducted among the construction site residents of Bengaluru district, Karnataka, India for a period of 1 month. The objective of the study was to assess the construction site workers Knowledge and practises regarding mosquito bite prevention. A total of 150 participants were included in the study. One adult member preferably head of the household from each of the Household was included in the study. Therefore the sampling unit was house hold. The study period of the present study was from October 2023 to September 2023 as it is the monsoon season and highly favorable for the breeding of vector mosquitoes.

Out of 20 mega construction sites, four sites (madiwala, kammanahalli, chandapura and Bommanahalli) were included in the study by random selection. Each of the selected sites has around 70–100 households having an average family size of five, with about five hundred population. The sampling technique used was systematic random sampling technique. Systematically, every second house was chosen and data were collected from 50 individuals from each of the four construction sites. All adults aged 18 years and above staying at construction site for minimum 3 months, who are available at the time of the visit and have given consent to participate in the study were included in the study, while those who were not available on two consecutive visits to their household, who are staying less than 3 months and those who could not comprehend for the interview were excluded from the study. Formal permission was obtained from the institution and the selected construction sites were visited by the investigator 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 thorough explanation of the purpose of the study. Data was collected regarding knowledge on mosquito born diseases, its spread and prevention methods using a pretested structured questionnaire. Data were entered into an Excel spreadsheet and double-checked for errors and analyzed using SPSS Statistics. 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.

Table-1: Distribution of study population by demographic characteristics N=200

Variables		Frequency and percentage
Gender	Male	82 (41%)
	Female	118 (59%)
Age in years	18- 30	38 (19%)
	31-40	108 (54%)
	41-50	40 (20%)
	> 50 years	14 (7%)
Type of worker	Local	126 (63%)
	Migrant	74 (37%)
Religion	Hindu	184 (92%)
	Muslim	12 (6%)
	Christian	4 (2%)
Education	Illiterate	28 (14%)
	Primary	36 (18%)
	Middle	72 (36%)
	Secondary	58 (29%)
	Higher secondary and above	3 (1.5%)
Occupation	Unskilled worker	142 (71%)
	Skilled worker	26 (13%)
	Home maker	4 (2%)
	Service and Business	28 (14%)
Marital status	Unmarried	20 (10%)
	Married	180 (90%)
Socio economic status	Upper and Upper middle	22 (11%)
	Lower middle	34 (17%)
	Upper lower	54 (27%)

	Lower	90 (45%)
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Total 200 residents from four different construction sites at Bengaluru took part in the study. The majority of the study participants consisted of 118 (59%) females and 82 (41%) males. The majority of the participants 108 (54 %), were between the ages of 31 and 40. Locals participants were 126 (63%), followed by migrants, who made up 74 (37%). The majority of the 184 (92%) participants were found to be Hindus.

The study population's literacy status revealed that 28 (14%) of the participants were illiterate and 72 (36%) had completed middle school. The majority of them 142 (71%), were unskilled laborers. Nearly 180 (90%) of the participants were married and 90 (45%) of them belong to a lower socioeconomic class (Table.1).

Table-2: Knowledge regarding vector born diseases among construction workers N=200

Heard about the disease cause by mosquito*	Frequency and percentage
Malaria	137 (68.5%)
Chickengunya	141 (70.5%)
Dengue	143 (71.5%)
Jaapanese Encephalitis and Filaria	2 (1%)
Do not know	57 (28.5%)
Name of mosquitoes*	
Aedes	3 (1.5%)
Culex	4 (2%)
Anopheles	2 (1%)
Do not know	191 (95.5)

Findings about residents' knowledge of vector-borne illnesses revealed that 57 (28.5%) knew nothing about vector-borne illnesses, while the majority of 143 (71.5%) knew about dengue. It was found that nearly 191 (95.5%) residents did not know the name of the mosquito that spreads the illness (Table-2).

Table-3: Workers Knowledge regarding occurrence, spread and major symptoms of vector borne diseases N=200

Knowledge regarding frequent occurrence of vector borne diseases	
Yes	89 (44.5%)
Do not know	111 (55%)
Seasonal variation in vector borne diseases*	
In summer	59 (29.5%)
In winter	34 (17%)
In rainy season	146 (73%)
All seasons	26 (13%)
Don't know	5 (2.5%)
Variation in mosquito density*	
In the morning	17 (8.5%)
In the evening	56 (28%)
In the night	168 (84%)
Throughout the day	22 (11%)
Mosquitoes larvae seen	
Yes	156 (78%)

No	44 (22%)
Breeding of Larvae (if larva seen)	
In clean water	56 (35%)
In dirty water	85 (54%)
Don't know	15 (9.5%)
Spread of vector borne diseases	
Bite of infected mosquito	143 (71.5%)
Do not know	57 (28.5%)
Major Symptoms of vector borne diseases	
Fever and chills	168 (84%)
Body and joint pain	142 (71%)
Vomiting	22 (11%)
Headache	98 (49%)
Cold	24 (12%)
Dizziness	15 (7.5%)
Do not know	32 (16%)

Regarding seasonal variation, 146 (73%) of the study participants responded that disease occurs during the rainy season, and 168 (84%) responded that mosquito density was high at night, 111 (55%) did not know that the vector-borne disease occurs frequently. A significant proportion of the 156 (78%) participants has witnessed mosquito larvae, and 143 (71%) of them were aware that disease is spread by mosquito bites, while 57 (28%) were unaware of this fact. Regarding disease symptoms, almost 168 (84%) of them know fever and chills as a symptoms of vector borne disease followed by 142 (71%) body pain, head ache 98 (49%), cold 24 (12%), vomiting 22 (11%), dizziness 15 (7.5%), where as 32 (16%) of them did not know any symptoms of the disease (Table-3).

Table-4: Workers Knowledge regarding prevention of vector borne diseases

Prevention of vector borne diseases	
Use of repellents (spray, lotion, coil, liquid vapor)	54 (27%)
Use of mosquito net	129 (64.5%)
Use of smoke	8 (4%)
Emptying satgnent water at regular intervals	12 (6%)
Indoor spraying	32 (16%)
Outdoor fogging	21 (10.5%)
Use of long sleeved clothes	42 (21%)
Environment sanitation	17 (8.5%)
Do not know	13 (6.5%)

Residents practices on preventive measures found 129 (64.5%) of them were using mosquito net as a preventive measure followed by 54 (27%) were using repellents such as spray, lotion, liquid vapor and coil as a preventive measure, use of long sleeved clothes 42 (21%), out door fogging 21 (10.5%), indoor spraying 32 (16%), Emptying satgnent water at regular intervals 12 (6%), Use of smoke 8 (4%), where as 13 (6.5%) of them stated that they did not know any type of preventive measure to control vector borne disease

3. Discussion

The present study found 118 (59%) were females and 82 (41%) were males. Majority 108 (54%) were belongs to age group 31- 40 years, literacy status found 72 (36%) was studied upto middle school and illiterate residents constituted 28 (14%) of the study population. Majority 142(71%) of them were unskilled workers. Marital status found almost 180 (90%) of the participants were married and majority 90 (45%) of them belongs to lower socio economic status. An investigation by Nagoor et al¹¹. discovered that there were 43% females and 57% men, while Senthil Kumar et al¹². In their investigation, discovered that the average age of the study subjects was 37.47 years. Males made up about 61.2% of the subjects. A little over 45.8% had studied below the tenth grade, and the remaining 54.12% had completed higher education. This variation might result from the various environmental and sociodemographic factors that exist in various regions. In the present study majority 143 (71.5%) residents were herd about dengue, malaria 137 (68.5%), chickengunya 141 (70.5%) are caused by mosquitoes and 57 (28.5%) residents did not know any vector borne diseases. Similar studies Kumar V et.al. Revealed that, out of 212 participants, 99.1% were aware that malaria is spread by mosquito bites, and 75% were aware that malaria is carried by female Anopheles mosquitoes¹³. Tyagi et al. stated that all research participants were aware that malaria is spread by mosquito bites¹⁴. In this study it was observed almost 191 (95.5%) residents were not able to name the mosquito which causes the disease which may be due to lack of informational source, Kumar V et.al., in their study on school teachers in New Delhi, discovered that 75% of them were aware that the female Anopheles mosquito is the carrier of malaria, and 73.6% were aware that the Aedes mosquito is the vector for dengue.¹³

Regarding frequent occurrence of vector born disease majority 111 (55%) of them did not answer, regarding seasonal variation 146 (73%) of them responded disease occur in rainy season and 168 (84%) were responded mosquito density was high during night time. The investigations conducted by Shidaraddi K et al., demonstrated that a substantial 71.25% of the participants believed the mosquito population density to be more prominent at night, while 25.5% of them suggested this density to be higher in the evening.¹⁵

Many of the 156 (78%) residents did not seen mosquito larva and 143 (71.5%) of them know disease is caused by bite of infected mosquitoes while 57 (28.5%) of them did not know the cause of disease spread. Higher awareness regarding larvae and its breeding place was found in research done by Dhaduk KM et al. in Jamnagar (76%)¹⁶, Shinde L et al. in Maharashtra found 88%¹⁷ and Nanjesh KS et al. in Karnataka found 76%¹⁸, this is probably due to higher literacy rate. Regarding disease symptoms, almost 168 (84%) of them know fever and chills as a symptoms of vector borne disease followed by 142 (71%) body pain, head ache 98 (49%), cold 24 (12%), vomiting 22 (11%), dizziness 15 (7.5%), where as 32 (16%) of them did not know any symptoms of the disease, which is similar to study done Kumar V et.al in their Study 75% school teachers knew the common symptoms of malaria i.e high-grade fever with chills and rigors) and dengue such as headache, muscle and joint pain, and pain behind the eyes.¹³

Regarding preventive measures in the present study found 129 (64.5%) of them were using mosquito net as a preventive measure followed by 54 (27%) were using repellents, use of long sleeved clothes 42 (21%), out door fogging 21 (10.5%), indoor spraying 32 (16%), Emptying satgnent water at regular intervals 12 (6%), Use of smoke 8 (4%), where as 13 (6.5%) of them stated that they did not know any type of preventive measure to control vector borne diseases, the study findings is in contrast to a study by Nagoor et al. Comparatively speaking, fewer people used protective measures: 33% of respondents frequently used mosquito repellents, 19% used mosquito coils, 21% did not use any protective measures,

and the remaining respondents used creams 7%, bed nets 12%, and mesh 8%¹¹. Comparing this study to others, it revealed a rise in the use of protective measures. Surendran et al. investigation at Jaffna, observed that 96% used personal protective measures against mosquito bites¹⁹. Dhavan et al, according to their study, 83 % of respondents said they used bed nets on construction sites²⁰.

4. Conclusion

The knowledge about malaria, dengue, and chickengunya is good, but awareness about other vector borne diseases like Japanese Encephalitis and filaria is lacking. Many of the people in the study were unaware that different types of mosquitoes can cause different diseases. The study shows that construction workers have moderate practices for preventing mosquito bites. One of the main reasons for this is the temporary settlements they live in, which lack proper sanitation. In conclusion, it is important to provide construction workers with more comprehensive information about where mosquitoes breed, the serious consequences of mosquito bites, and effective control measures in order to improve their awareness and help in the control of vector borne diseases. Sufficient use of the health educational material in local languages and effective use informal communication methods for health education are needed. Involvement of labour employers and building contractors in this regard is imperative.

5. References

1. WHO, About vector borne diseases. Available from <https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases>
2. Malaria in Mangaluru. Available from: <http://www.malariasite.com/malaria/MalariaInMangalore>.
3. Niranjana Kaggere, Mosquitoes multiply as Bengaluru sees drastic change in summer pattern-Times of India / TNN / Updated: Apr 8, 2023,
4. Mosquito Control. Source reduction Available from: <http://www.malariasite.com/malaria/source.htm> accessed December, 28, 2014.
5. Government of India, Ministry of Labour & Employment. 2014. Available from: Government of India, Web site: <http://www.labour.nic.in/content/aboutus/about-ministry.php>.
6. Ghosh SK, Tiwari SN, Raghavendra K, Sathyanarayan TS, Dash AP. Observations on sporozoite detection in naturally infected sibling species of the *Anopheles culicifacies* complex and variants of *Anopheles stephensi* in India. *J Biosci.* 2008;33:333–6.
7. Dash AP, Adak T, Raghavendra K, Singh OP. The biology and control of malaria vectors in India. *Curr Sci.* 2007;92:1571–8.
8. Padartha PK, Maddela S, Bhavsar H, Mehta N, Padmakar BM, Choudhary P, Banerjee A, Barik R, Singh S. A COMPREHENSIVE REVIEW ON THE ETHNO-MEDICINAL AND PHARMACOLOGICAL PROPERTIES OF *Ecklonia cava*. *Biochemical & Cellular Archives.* 2024 Apr 1;24(1).
9. Ministry of Health and Family Welfare, Government of India. Directorate General of Health Services, National Vector Borne Disease Control Programme. 2005. Available from: Government of India, Web site: <http://www.nvbdcp.gov.in/UMS.html>. Accessed 14 Jul 2014.
10. Lavanya KM, Andey UV, Mishra SK, Vutharkar NR. Knowledge and practice about dengue fever among urban slum dwellers in one district of Andhra Pradesh, India: A study on current status. *MRIMS J Health Sci* 2022;10:93-8.

11. Nagoor K, Babu SD, Reddy BN, Kahn S, Kalluri RJ, John KR.. Knowledge, attitude and practice on dengue fever and its prevention and control measures in urban slums of South India. *Int J Community Med Public Health* 2017;4:3013-7.
12. Bhatti M, Kumar J, Kareemulla S, Vishvakarma P, Deka P, Singh SP, Pujari NM, Singh S, Dixit CK. EXPLORING MARINE-DERIVED BIOACTIVE COMPOUNDS AND THEIR IMPACT ON DIVERSE DISEASES. *Biochemical & Cellular Archives*. 2024 Apr 1;24(1).
13. M. shama, "CRISPR-Cas9 gene editing in pharmaceuticals : Current applications and future prospects," *Biochemical and Cellular Archives/Biochemical and cellular archives*, vol. 23, no. S1, Dec. 2023, doi: <https://doi.org/10.51470/bca.2023.23.s1.1655>.
14. Tyagi P, Roy A, Malhotra MS. Knowledge, awareness and practices towards malaria in communities of rural, semi-rural and bordering areas of east Delhi (India). *J Vect Borne Dis*. 2005; 42:30-35.
15. Kantesh Shidaraddi, Madhavi Gajula, Neelesh M. N, Geeta V. Bathija. An Insight into the Knowledge and Practises Concerning Mosquito Borne Diseases in Urban Slums of old Hubli. *Journal of Evolution of Medical and Dental Sciences* 2015;4(18):3093-100.
16. Dhaduk KM, Gandha KM, Vadera BN, Mehta JP, Parmar DV, Yadav SB. A Community level KAP study on mosquito control in Jamnagar district. *Natl J Community Med* 2013;4(2):321-28
17. Ghai R, Goel R, Singh A, Bhatt P, Shishodia T, Yadav D, Nagarajan K. Safety Concerns Of Drugs And Vaccines Used In The Treatment Of COVID-19. *Journal of Pharmaceutical Negative Results*. 2022 Nov 9:1665-73.
18. Nanjesh Kumar S, Rahul Hegde, Sanjeev Badiger. A study of mosquito borne diseases awareness, attitude and practices among the rural population in Karnataka, India. *Int J Community Med Public Health* 2017;4(11):4178-81.
19. Surendran SN, Kajatheepan A. Perception and personal protective measures toward mosquito bites by communities in Jaffna District, northern Sri Lanka. *J Am Mosq Control Assoc*. 2007; 23:182-186.
20. Dhawan G, Joseph N, Pekow PS, Rogers CA, Krishna C, Bulzacchelli PM. Malaria-related knowledge and prevention practices in four neighbourhoods in and around Mumbai, India: a cross-sectional study. *Malar J*. 2014; 13:303.