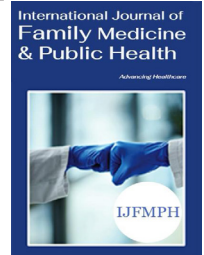


Contents lists available at bostonsciencepublishing.us

International Journal Of Family Medicine And Public Health



Awareness of Prevention of Vector Borne Diseases along with GIS Mapping of Vector Breeding Sites in a Resettlement Community in Delhi.

Dr. Shivani Rao*, Dr Ekta Arora², Dr. M.M Singh³, Dr. Madhvi⁴, Ms. Shikha⁵, Dr. Nandini Sharma⁶

Assistant Professor, Department of Community Medicine, ESIC Medical College & Hospital, Faridabad

¹Associate Professor, Department of Community Medicine, Maulana Azad Medical College, New Delhi²Director Professor & Head, Department of Community Medicine, Maulana Azad Medical College, New Delhi³Senior Resident, Department of Community Medicine, Maulana Azad Medical College, New Delhi⁴Shikha Taneja Malik- Senior Manager, Scientific Affairs, Drugs for Neglected Diseases Initiative⁵Nandini Sharma – Director Professor & Head, Department of Community Medicine, SGT University, Gurgaon

ARTICLE INFO

Article history:

Received 19 December 2024

Revised 13 January 2025

Accepted 15 January 2025

Published 18 January 2025

ABSTRACT

Background: Vector borne diseases have emerged as one of the leading causes of death and illness globally. The current study focusses to assess the knowledge, attitude and practices for the prevention of dengue, chikungunya and malaria amongst people with various sociodemographic parameters. Further the study also identifies and maps various vector breeding sites in a resettlement area of Delhi.

Methodology: Community based interventional study was done on 400 residents of a resettlement colony. For selecting the households in the sampled areas, systematic random sampling procedure at the time of survey was used. The IEC material to be used for health education program was based on previous studies conducted in the similar settings. The validity and reliability of the IEC material was assessed through pilot study while the content validity and expert validation was done through experts from the field of vector borne diseases.

Results: Proportion of the population with knowledge regarding prevention of transmission dengue chikungunya and malaria in a resettlement colony of Delhi was observed. GIS mapping of vector breeding sites in the resettlement colony of Delhi was also done.

Conclusion: By addressing the areas like public awareness & behavioural change, efforts toward mosquito control can be strengthened.

© 2025, Ekta Arora, Shivani Rao, M.M Singh, Madhvi, Shikha Taneja Malik, Nandini Sharma, This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Introduction

Vector borne diseases have emerged as one of the leading cause of death and illness globally accounting for approx. 700 000 deaths from various vector borne diseases like malaria, dengue, schistosomiasis, Japanese encephalitis, onchocerciasis etc. every year [1]. According to the 2022 World Malaria Report, India accounts for approx. 79% and 83% of the region's morbidity and mortality, respectively [2]. The dengue virus, primarily transmitted by mosquito species *Aedes aegypti*, consists of four serotypes (DENV1-4), which contribute to the distinct epidemiological spread of dengue. In recent decades, with increase in the global incidence of dengue, about half the world's population are at risk [3]. However, the incidence rate of dengue in the country remains a critical concern, particularly after the monsoon season, when the primary vectors, breed elaboratively. Delhi has experienced nine major outbreaks of dengue fever from 1967 to 2010. Hence, their endemicity has already been established in Delhi. Effective mosquito borne diseases control demands a comprehensive

strategy including vector surveillance & integrated vector management, with community involvement. Health education serves as a cornerstone in this strategy, and the NVBDCP utilizes diverse communication channels to educate populations in endemic regions.

Novelty of the study: The current study focusses to assess the knowledge, attitude and practices for the prevention of dengue, chikungunya and malaria amongst people with various sociodemographic parameters. Further the study also identifies and maps various vector breeding sites in a resettlement area of Delhi.

Objectives

- ✓ To assess the knowledge, attitude and practices regarding awareness of prevention of vector borne diseases in a resettlement colony of Delhi.
- ✓ To identify and map the breeding sites in a resettlement colony of Delhi.

Materials and Methods

Study design: Community based interventional study

* Corresponding author.

Dr. Ekta Arora, Assistant Professor, Department of Community Medicine, ESIC Medical College & Hospital, Faridabad; Email id: aroraekta.esic@gmail.com; Phone No. 9815720201

Study Site: The study was conducted in resettlement colonies of Gokal Puri, New Delhi

Study Duration: 6 months (May 2024 –Oct 2024)

Study Population: The study was conducted on the residents (≥ 18 years) of resettlement colonies of Gokalpuri, New Delhi.

Inclusion criteria

- ✓ Individuals ≥ 18 years of age of either gender
- ✓ Individuals residing at the current location for atleast a year.

Exclusion criteria

Those suffering from any cognitive impairment or serious health related issues

Study instruments

Patient interview schedule to collect socio demographic data

Pre-designed and pre-tested questionnaire for community survey

IEC material to generate awareness in the community

Sample Size:

A community-based study done by T Anand et al determined 65%, 58% and 13% level of awareness for dengue, chikungunya and malaria among the study participants. Thus, taking prevalence at 65% (highest population proportion for level of awareness), at 95% confidence interval, with 5% absolute error; sample size calculated is 364. Furthermore, adding 10% of lost to follow up cases, the final sample size is estimated to be 400.

Methodology

For selecting the households in the sampled areas, systematic random sampling procedure at the time of survey was used. At each selected household: One adult was selected above the age of 18 years using lottery method. For systematic random sampling, every n th house was visited in the selected area as $n = (\text{total number of houses in the area} / \text{total number of houses to be taken from that area})$. For this, list of houses was procured from ASHA of the area beforehand. Also, data was collected using a patient interview schedule and predesigned questionnaire. The knowledge, attitude and practices regarding prevention of dengue, chikungunya and malaria was assessed before introduction of intervention to the community. Standard definitions were used for assessing various parameters.

Development of IEC Material

The IEC material to be used for health education program was based on previous studies conducted in the similar settings. The validity and reliability of the IEC material was assessed through pilot study while the content validity and expert validation was done through experts from the field of vector borne diseases. People in the community were provided health education on the awareness of prevention of transmission dengue, chikungunya and malaria through distribution of pamphlets/charts and counselling of participants at Gokulpuri UHC by project manager followed by house-to-house visits to ensure implementation of preventive measures related to transmission of dengue, chikungunya and malaria by Field Investigators. For those diagnosed with either of the three diseases, if required, were counselled and referred to higher centers for further management.

Study Outcomes:

1. Proportion of the population with knowledge regarding prevention of transmission dengue chikungunya and malaria in a resettlement colony of Delhi.
2. Generation of baseline data for evidence for association of knowledge, attitude and practices related to dengue, chikungunya and malaria with socio demographic,
3. occupational and other environmental factors.
4. GIS mapping of vector breeding sites in the resettlement colony of Delhi.

Statistical analysis: Microsoft excel was used to analyze descriptive

statistics and inferential statistics. Categorical data were expressed in frequency and proportions. Appropriate statistical tests were applied to find out association between different variables.

Results

Distribution of respondents according to the Sociodemographic profile:

Area Type	Freq.	Percent	Cum.
JJ Cluster	4	1.01	1.01
Resettlement	233	58.69	59.70
Slum	78	19.65	79.35
urban	80	20.15	99.50
Commercial	2	0.50	100.00
Total	397	100.00	
Gender			
Female	269	67.76	67.76
Male	128	32.24	100.00
Total	397	100.00	

Education			
1st-5th Standard	47	11.84	11.84
6th -8th Standard	72	18.14	29.97
College going	70	17.63	47.61
Illiterate	69	17.38	64.99
Secondary	139	35.01	100
Total	397	100	

Religion			
Religion	Freq.	Percent	Cum.
Hindu	378	95.21	95.21
Muslim	17	4.28	99.5
Other	2	0.5	100
Total	397	100	

Occupation			
Government job	2	0.5	0.5
Private Job	48	12.09	12.59
Self-employed	36	9.07	21.66
Unemployed	311	78.34	100
Total	397	100	

The table presents the distribution of 397 individuals across different Area Types, Gender, and Education. In terms of Area Type, the majority participants were from Resettlement areas (58.69%), followed by Urban (20.15%) and Slum (19.65%). The gender distribution shows a higher proportion of Females (67.76%) compared to Males (32.24%). Regarding the Education level of 397 individuals, the highest percentage of individuals fall under Secondary education (35.01%), followed by those with 6th-8th Standard education (18.14%). A notable portion were Illiterate (17.38%) also. The majority participants were Hindu (95.21%), with the majority being Unemployed (78.34%). A smaller proportion were employed in Private Jobs (12.09%) and were Self-employed (9.07%).

Distribution of respondents according to Knowledge regarding vector borne diseases:

Information about Vector Borne Diseases			
Source of Information	Freq.	Percent	Cum.
Doctor	14	3.53	3.53
Friends and relatives	153	38.54	42.07
Health Department staff.	60	15.11	57.18
Hoardings/banners.	10	2.52	59.7
Newspaper/magazine.	26	6.55	66.25
Other	10	2.52	68.77
Television	124	31.23	100
Total	397	100	

Did you anytime suffer from the following			
	Freq.	Percent	Cum.
Dengue	34	8.56	8.56
Chikungunya	24	6.05	98.99
Malaria	4	1.01	100
NA	335	84.38	92.95
Total	397	100	

Did you anytime suffer from the following			
	Freq.	Percent	Cum.
Dengue	34	8.56	8.56
Chikungunya	24	6.05	98.99
Malaria	4	1.01	100
NA	335	84.38	92.95
Total	397	100	

Mosquito breeding	Freq.	Percent	Cum.
Present	216	54.41	100
Absent	181	45.59	45.59
Total	397	100	

Fogging of the area	Freq.	Percent	Cum.
During mosquito breeding season	316	79.6	93.45
During non-breeding season	26	6.55	100
Never	55	13.85	13.85
Total	397	100	

The table shows the sources of information about Dengue, Malaria, or Chikungunya fever for 397 individuals. The majority of individuals received information from Friends and Relatives (38.54%) and Television (31.23%), while a few participants received the information from Health Department staff (15.11%) and Newspapers/Magazines (6.55%). A large number of participants (54.41%) reported the presence of mosquito breeding in and around their area, while 45.59% indicated breeding to be absent. Majority of participants i.e 79.60%, reported that fogging is done during the mosquito breeding season, while 13.85% indicated that no fogging is done during the breeding season.

Distribution of respondents according to awareness regarding the symptoms, transmission and prevention of Vector borne diseases.

Can you identify mosquito causing dengue/malaria/chikungunya	Freq.	Percent	Cum.
Yes	164	41.31	100
No	179	45.09	58.69
Don't Know	54	13.6	13.6
Total	397	100	
Vector borne diseases are transmitted from one infected person to another	Freq.	Percent	Cum.
Yes	60	15.11	100
No	297	74.81	84.89
Don't Know	40	10.08	10.08
Total	397	100	
Does weekly changing or drying out stagnant water (flower pots, buckets) reduces mosquito Breeding in the house	Freq.	Percent	Cum.
Yes	382	96.22	100
No	8	2.02	3.78
Don't Know	7	1.76	1.76
Total	397	100	
Does the use of insecticide sprays reduce mosquitoes.	Freq.	Percent	Cum.
Yes	357	89.92	100
No	30	7.56	10.08
Don't Know	10	2.52	2.52
Total	397	100	

When asked whether the participants can identify the mosquito causing dengue/malaria/chikungunya, approx 45.09% said they couldn't identify, while 41.31% responded that they can identify the mosquitoes. The table also shows responses to whether Dengue, Malaria, or Chikungunya is transmitted from one infected person to another. The majority, 74.81%, indicated they do not believe the diseases are transmitted this way whereas a smaller percentage, 15.11%, answered yes. The table shows responses to whether weekly changing or drying out stagnant water (in flower pots, buckets) reduces mosquito breeding in the house. A large majority, 96.22%, believed that it does reduce mosquito breeding. The table shows responses to whether the use of insecticide sprays reduces mosquitoes. A significant majority, 89.92%, believed that insecticide sprays are effective in reducing mosquitoes.

Distribution of respondents according to awareness regarding the prevention of vector borne diseases.

Keeping surroundings clean prevents mosquito breeding	Freq.	Percent	Cum.
Yes	388	97.73	100
No	5	1.26	2.27
Don't Know	4	1.01	1.01
Total	397	100	

The table shows responses to whether keeping surroundings clean prevents mosquito breeding. A vast majority, 97.73%, believed that maintaining cleanliness helps prevent mosquito breeding.

Distribution of respondents according to awareness about prevention of dengue with educational status of the participants.

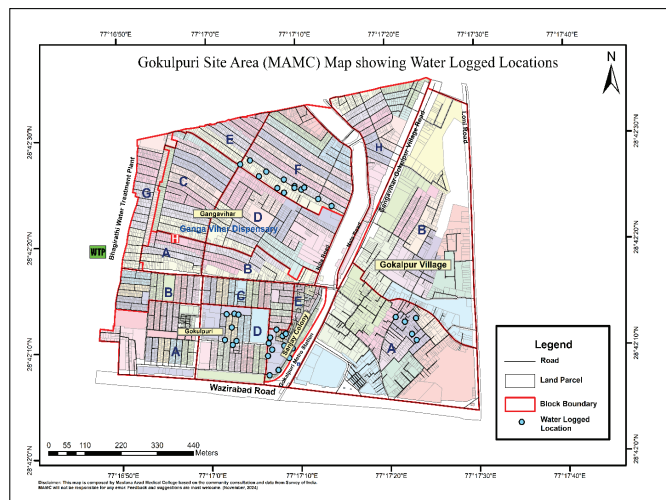
a. Role of keeping surrounding clean in prevention	Yes	No	Don't Know	Total
1st-5th Standard	46 (97.8%)	0	1	47
6th -8th Standard	70 (97.2%)	1	1	72
College going	68 (97.2%)	1	1	70
Illiterate	68 (98.5%)	0	1	69
Secondary	136 (97.85)	3	0	139
Total	388 (97.7%)	5	4	397
a. Educational status & Role of use of insecticides in prevention	Yes	No	Don't Know	Total
1st-5th Standard	45 (95.7%)	2	0	47
6th -8th Standard	64 (88.8%)	5	3	72
College going	66 (94.3%)	3	1	70
Illiterate	59 (85.5%)	9	1	69
Secondary	123 (88.5%)	11	5	139
Total	357 (89.9%)	30	10	397
a. Educational status & Role of proper drainage in prevention	Yes	No	Don't Know	Total
1st-5th Standard	46 (97.8%)	0	1	47
6th -8th Standard	70 (97.2%)	0	2	72
College going	69 (98.5%)	0	1	70
Illiterate	66 (95.6%)	1	2	69
Secondary	132 (94.9%)	5	2	139
Total	383 (96.5%)	6	8	397

The Table (a) shows responses about keeping surroundings clean to prevent Dengue fever. Out of 397 individuals, 388 believe in its importance, with the all the groups showing awareness regarding the role of keeping surrounding clean in prevention of vector borne diseases. This Table (b) shows responses regarding the use of insecticides for prevention of vector borne diseases. Out of 397 individuals, 357 believe in its effectiveness,

Dr. Shivani Rao*, Dr. Ekta Arora, Dr. M.M.Singh, Dr. Madhvi, Ms. Shikha, Dr. Nandini Sharma (2025) Awareness of Prevention of Vector-Borne Diseases along with GIS Mapping of Vector Breeding Sites in a Resettlement Community in Delhi. Int J Fam Med Pub Health, 4(1):1-4

with the awareness increasing with the educational status regarding the role of use of insecticides in prevention of vector borne diseases. The **Table (c)** shows responses about the importance of proper drainage for preventing vector borne diseases. Out of 397 people, 96% support proper drainage, with increasing awareness with higher educational status. The data reflects high awareness of various Dengue prevention methods, particularly among those with higher education levels.

GIS mapping of Vector Breeding sites in the resettlement colony of Delhi



GIS mapping of vector breeding sites using Geographic Information Systems (GIS) to identify and map areas where vectors, such as mosquitoes, breed has been done. By integrating environmental data (e.g., water bodies, vegetation) with vector population data, GIS helps target vector control efforts, track the spread of diseases, and optimize resource allocation for public health interventions. Here various vector breeding sites were identified, like open drains, tyres, broken vessels, potholes and other related sites and mapping of those sites have been done.

Discussion

This study provides insights into public awareness and behaviors related to mosquito control and disease prevention. A significant majority of respondents (96.22%) believe that weekly changing or drying stagnant water reduces mosquito breeding, highlighting a strong awareness of basic preventative measures. Furthermore, 89.92% of individuals agree that insecticide sprays help reduce mosquito populations, reflecting confidence in chemical control methods.

Regarding environmental management, nearly all respondents (97.73%) understand that keeping surroundings clean prevents mosquito breeding. These findings suggest that the community is largely aware of the importance of environmental cleanliness in combating mosquito-borne diseases. When it comes to disease prevention, there is overwhelming agreement (99.50%) that Dengue, Chikungunya, and Malaria can be prevented, indicating a positive attitude toward disease prevention efforts. A study by Dinkar et al observed that the age group of 20–30 years was the most affected group with male predominance. The urban population was more affected as 75.05%, and maximum cases were detected in October month followed by November. (4)

Another study observed that only half of the total participants have good knowledge (50.7%) and 50.2% reported poor practice for dengue control [5].

A study by Hossain et al observed that though majority (93.8%) of the respondents had heard about dengue, however, they had misconceptions about their breeding and other habits. Level of education of the respondents was identified as an independent predictor for both knowledge ($p < 0.05$) and awareness ($p < 0.05$) of dengue. The preventive practice level was moderately less than the knowledge level though there was a significant association ($p < 0.05$) between the two [6].

Overall, the results indicate a strong public awareness of the link between environmental hygiene, mosquito control, and disease prevention, though some gaps in knowledge remain.

Conclusion: The data indicates public awareness and proactive behavior concerning mosquito control and the prevention of mosquito-borne diseases such as Dengue, Chikungunya, and Malaria. A significant majority of individuals believe that maintaining cleanliness, changing stagnant water, and using insecticides are effective measures in preventing mosquito breeding. Additionally, there is overwhelming support for the idea that these diseases can be prevented. However, there are some gaps in knowledge, particularly regarding the identification of mosquitoes causing these diseases and the understanding of transmission mechanisms. By addressing these areas, efforts toward mosquito control can be strengthened, leading to a more effective reduction in mosquito breeding and a decrease in the incidence of mosquito-borne diseases.

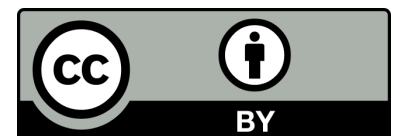
Acknowledgement: Mr. Himanshu, Mr. Sheez & Staff, Gokulpuri Community

Ethical considerations: Written and informed consent was taken from all study subjects. Anonymity of the subjects was ensured.

Conflict of Interest: None

References:

1. Vector-borne diseases [Internet]. [cited 2024 May 2]. Available from: <https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases>
2. World malaria report 2022 [Internet]. [cited 2024 Dec 3]. Available from: <https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022>
3. Dengue- Global situation [Internet]. [cited 2024 Dec 3]. Available from: <https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON498>
4. Dinkar A, Singh J. Dengue infection in North India: An experience of a tertiary care center from 2012 to 2017. *Tzu-Chi Med J.* 2019 Apr 2;32(1):36–40.
5. Knowledge, attitude and practice on dengue prevention and dengue seroprevalence in a dengue hotspot in Malaysia: A cross-sectional study | *Scientific Reports* [Internet]. [cited 2024 Dec 3]. Available from: <https://www.nature.com/articles/s41598-020-66212-5>
6. Knowledge, awareness and preventive practices of dengue outbreak in Bangladesh: A countrywide study | *PLOS ONE* [Internet]. [cited 2024 Dec 3]. Available from: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0252852>



Submit your manuscript to Boston science publishing journal and benefit from:

- ▶ Convenient online submission
- ▶ Rigorous peer review
- ▶ Immediate publication on acceptance
- ▶ Open access: articles freely available online
- ▶ High visibility within the field
- ▶ Retaining the copyright to your article

Submit your manuscript at [† bostonsciencepublishing.us †](https://www.bostonsciencepublishing.us)