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Exploring the Knowledge, Attitude and Practice Regarding Mosquito Borne Diseases among Migrants in Thrissur District and the Need for Implementing One Health Approach in the Control of Vector Borne Diseases; A Mixed Method Study

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Abstract: Background: Mosquito borne diseases are a major public health threat especially in developing countries like India. The situation is not that much different in Kerala too. Especially in states like Kerala, un-predictable climate change is a great matter of concern behind the outbreak of vector borne diseases. Objective: To assess knowledge, attitude and practices related to mosquito borne diseases among migrants working in Amala Medical College Hospital, Thrissur. Method: A cross-sectional study to assess the knowledge, attitude and practices regarding vector borne diseases was conducted among migrant laborers working in Amala Medical College using a structured questionnaire. Data was entered in Microsoft excel and analyzed using SPSS version 23. In addition to this, a comprehensive exploration using qualitative methodology on the need for implementing one health approach in control of mosquito borne diseases was also done by conducting 4 key informant interviews. Results: All of the participants (all 50 of them) were aware that mosquito borne diseases are a major public health problem. 90 % knows only Dengue as the only serious mosquito borne disease and 12% knows that Malaria was the most serious mosquito borne disease. Most of the participants were using mosquito nets as part of prevention; 75%. Out of the 50 participants, 5 of them were using coils to prevent mosquito bites. Media was the main source of information to 60% of the participants. All the participants think that mosquito borne diseases can be prevented and in case they get the diseases, they have to be managed at the healthcare setting to avoid complications. Conclusion: Study shows good knowledge, positive attitude and satisfactory practices regarding mosquito borne diseases.

Keywords: Mosquito borne diseases, Dengue, personal protection, mosquito nets, cross-sectional study, migrant laborers, climate change.

INTRODUCTION

Vector-borne diseases are the illnesses caused by parasites, viruses or bacteria and are transmitted by the bite of infected arthropod species such as mosquitoes, ticks, flies, fleas and bugs. Malaria, Lymphatic filariasis, Dengue, Yellow fever, Leishmaniasis, Chikungunya, Japanese Encephalitis, are some of the important vector borne diseases of public health importance in India. According to WHO, vector borne diseases account for more than 17% of all infectious diseases, causing 7000,000 deaths annually. The burden of these diseases are highest in tropical and subtropical areas and it disproportionately affects poorest of the poor people from low income countries. Since 2006, India reports frequent outbreaks of Malaria, Chikungunya, Dengue fever etc. Most of these vectors borne diseases are

preventable through proper protective measures, health awareness and community mobilization. Major outbreaks of Dengue, Malaria, Chikungunia, Yellow fever and Zika have affected population, claimed lives and overwhelmed health systems in many countries. Leishmaniasis, Lymphatic filariasis causes chronic sufferings, morbidity, disability and occasional stigmatization. Distribution of vector borne diseases are determined by a complex set of demo-graphic, environmental and social factors. Global travel, trade, unplanned urbanization and globalization are the key factors that adds on to this[1]

The National Framework for Migrant health recognizes migrants as a vulnerable and underserved population with very poor access to preventive and promotive care services. Migrant mobility across endemic and nonendemic areas can lead to importation and spread of various vector borne diseases[2]. Knowledge, attitude and practice studies help us to understand migrant behavior and practices that affect disease transmission and findings from such studies can guide the development of culturally appropriate, language specific IEC interventions tailored to migrant population. One health approach is collaborative, multi-sectorial and a transdisciplinary approach that works at the local, national and global levels to achieve optimal health outcomes by recognizing the interconnection between human health, animal health and the shared environment. Understanding the barriers to one health approach in vector borne disease control will improve surveillance and enables early detection of outbreaks, predicts the disease emergence, addresses the environmental and climatic drivers like climate change, deforestation etc. This collaborative approach will further enhance community participation and induce behavioral changes among people and ultimately supports the national and global goals in vector borne disease control and elimination[3].

Aim: To assess the knowledge, attitude and practices on vector borne diseases among migrant labours working at Amala Medical College, Thrissur and to understand the barriers in implementing one health approach in vector borne disease control program.

METHODOLOGY

Mixed method study that integrates qualitative and quantitative research methods have been used. A cross-sectional study to assess the knowledge, attitude and practices regarding vector borne diseases was conducted among migrant labours working in Amala Medical College, Thrissur. Universal sampling of all migrants working at the Institute was done. Informed consent was taken from all the respondents and a pre-designed semi-structured questionnaire was used to gather information regarding sociodemographic characteristics, knowledge, attitude and practice towards mosquito borne diseases Data was entered in Microsoft excel and analyzed using SPSS version 23. Key informant interviews were employed to elicit expert perspectives on barriers in implementing one health approach in vector borne disease control. Participants selected for key informant interviews were contacted via phone and email. If interested, interviews were conducted on online platform. Researcher trained in qualitative interview techniques conducted interview using interview guide. The data obtained from interviews were recorded in English. Thematic analysis of the data was done and transcripts were read multiple times by the researchers. The analysis was done manually using hybrid coding technique. Patterns within data are grouped into categories and then developed themes and subthemes. Theoretical triangulation was done by comparing and contrasting the themes with the published literature.

Table 1: Interview guide used in the study

Topic	Main question	Follow-up question	Probe question
Challenges	What are the major challenges in implementing one health approach in a country like India?	What are the challenges with respect to migrants in implementing one health approach?	Have you experienced any barriers in getting information or support to prevent vector borne diseases among migrants?
Migrant health needs with respect to vector borne diseases	What are factors that make migrants more vulnerable to develop vector borne diseases?	Gaps in knowledge and health seeking behaviors among migrants	Role of one health approach among migrants to tackle vector borne diseases
Research gaps	Need for more research among migrants to reduce vector borne diseases among migrants?	Need and necessity for integrating different sectors to implement one health approach to reduce the burden of vector borne diseases among migrants?	How to address the knowledge gaps among migrants related to control of vector borne diseases

RESULTS QUANTITATIVE PART

Out of the 50 participants, all were males. Most of the study participants belong to the age group of 25-30 years. Most of the study participants were having primary level of education; 86%.

Table 2: Sociodemographic characteristics of the study participants

Age in years	Frequency (N)	Percentage (%)
20-25	8	16
25-30	30	60
30-35	7	14
>35	5	10
Gender		
Male	50	100
Female	-	
Education		
Illiterate	-	-
Primary	43	86
Secondary	7	14

All responders have heard about mosquito borne diseases. 90% knows only dengue as a mosquito borne disease. Only 6 of the participants have heard about malaria and only 3 of them heard about chikungunya. 50 % of the participants responded that mosquito bites in night time only. 66% of the participants answered that drains are the most common breeding sites of mosquitoes. 22% responded that mosquitoes breeds in stagnant water and 6% of the participants are aware of the fact that mosquitoes breeds in artificial containers.

Table 3: Knowledge towards mosquito borne diseases

Statement	Yes (%)
Are you aware about the fact that mosquitoes can transmit diseases?	50(100)
Heard about various mosquito borne diseases like	
Dengue	45 (90%)
Malaria	6 (12%)
Chikungunya	3 (6%)
Kala-azar	-
Filariasis	-
Japanese Encephalitis	-
Mosquito usually bites during which part of the day?	
Day	25 (50%)
Night	25 (50%)
Both	-
Don't know	-
Common breeding sites of mosquito	
Discarded tyres/ containers	3 (6%)
Overhead tanks	
Stagnant dirty water	11(22)%
Drains	33(66%)
Don't know	3 (6%)
Methods to prevent mosquito bites	
Sprays	-
Repellants	-
Coil	5(10%)
Liquid vapourizer	
Nets	38(76%)

Table 4: Attitude towards mosquito borne diseases

Statement	Yes
Can mosquito borne diseases be prevented	100%
What will you do if you/ your family members get affected with mosquito borne diseases?	
Treat at home	
Treat at hospital	- 100%

Table 5: Practice questions

Statement	Yes
What will you do to eradicate breeding sites of mosquitoes?	
Prevent water stagnation	26 (52%)
Cover tanks/containers	18 (36%)
Prevent collection of garbage and waste	6 (12%)
What you use to prevent mosquito bites	
Net	38 (76%)
Coil	5 (10%)
Fan	50 (100%)
Liquid vapourizer	-

All respondents think that mosquito borne diseases can be prevented and for which they would seek medical care.76% of the study participants were using mosquito nets.10% were using coils.

RESULTS- QUALITATIVE PART

The analysis led to the emergence of four main themes with subthemes and categories.

Table 6: Themes, subthemes and categories emerged in the study are as follows….

Sl.no	Theme	Subtheme	Categories
1.	Challenges in implementing one health approach in control of mosquito borne disease in India	Lack of public awareness in control of mosquito borne diseases No strict policies in scientific disposal of waste Lot of artificial breeding sites for mosquitoes Needs coordination across various sectors to control emerging vector borne disease	Public not actively involved Improper waste management Ornamental plants- emerging business Intersectoral collaboration and funding
2.	Migrant health and demands- migrants being vulnerable to mosquito borne diseases	Lack of awareness and existing gap in knowledge regarding vector borne diseases among migrants	Migrants importing mosquito borne diseases from their native places Migrants- not aware about the screening programs
3	Programmatic challenges with respect to capacity building and research	Strengthening the existing system	Address gaps in research Inadequate infrastructure Proper training to workforce Early detection and treatment
4	Climatic changes and environmental challenges	Climate change and deforestation – major and key drivers to emerging vector borne diseases	Changes in temperature, humidity Vectors more adapted Resistance to conventional control methods

RESULTS OF THE KEY INFORMANT INTERVIEWS

“Lack of public awareness is the major challenge in implementing one health programme in India. Even if the public is aware, they are not actively involved in vector control activities like source reduction. Especially in states like Kerala, household waste management is not streamlined and people used to throw the garbage at any convenient corner which becomes a possible vector breeding site. With the emergence of Harithakarmasena, there is a solution for plastic waste currently. However, many other wastes like rubber tyres, thermocol pieces from parcel packages etc are often dumped in the courtyard. Another important vector breeding sites are the plates below the garden pots, which collects water and acts as potential vector breeding sites. Apart from these sites, which breed Aedes mosquitoes,

there are water canals and ponds which breed Culex mosquitoes. Reducing vector breeding in these sites requires an integrated effort by the public, as well as from the Government and other funding agencies.

The state of Kerala, the so- called hotspot for migrants as a huge proportion of migrants do work here and it is important to consider them into the equation. They do lack awareness regarding vector control. Their temporary settlements usually have a high number of vector breeding sources. This is complicated by the fact that they may be coming from the places which have various vector borne diseases. Thus, the chance of outbreaks of various vector borne diseases are high if proper control is not practiced. Vector control requires a dedicated and continuous effort. The typical example for this lies in the soul of the Program, AFACC; Aedes free Amala Campus campaign, at Amala Institute of Medical Sciences, Thrissur. Awareness classes were given to all the staff and students in a phase-wise manner, from cleaning staff to students and was coupled with continuous weekly source reduction efforts by the staff and students. Sustained efforts led to declaring the campus Aedes mosquito free. This is possible to achieve good vector control".

Key informant 1(Public Health Expert)

"Recent years, vector borne diseases have emerged as a serious public health problem in the country. Key factors that are favoring the spread of these diseases include 1) abundance of vectors and reservoirs 2) the prevalence of these diseases causing pathogens are more suitably adapted to human/ animal host 3) changes in the local environmental conditions like variations in temperature, rainfall, humidity etc. 4) behavioral factors and immune status of the human beings. Majority of the vectors survive in the nature by utilizing animals as their vertebrate host; Xenosis. Small number of the vector borne diseases like Malaria, Dengue, human beings are the main host with no significant involvement of the animal host. Therefore, we find that human, animal and environmental factors are involved in the transmission cycle of vector borne diseases. When we consider about the control of vector borne diseases, we find that there are many impediments in the way of effective management and control of vector borne diseases such as growing urbanization, unregulated construction works that attracts migrant population to our state. Migrants play an important role in the spread of vector borne diseases. In this contest, it is important to integrate human, animal and environmental health to improve vector borne disease control especially among migrant population''.

Key Informant II (State Entomologist, National Health Mission)

"Climate change is a major driving factor that can lead to the outbreaks of vector borne diseases. Changes in temperature, humidity , rainfall can lead to vector proliferation, change their habit, habitat and favours the spread of vector borne diseases across the geographical areas. Deforestation too can contribute to the emergence of many vector borne diseases. The fact is that vectors are becoming more adapted to these climatic changes and continue to cause outbreaks and are becoming more resistant to the conventional method of vector control. In addition to this, migrants are more vulnerable to vector borne diseases. Proper measures to address these vulnerable population from the risk of developing vector borne diseases by incorporating the concept of one health approach is the need of the hour.

Key informant III (Head, Integrative Agroecology and Environment, Research division)

"Rapid urban growth, construction works and changing weather create good conditions for mosquito breeding. Environmental changes play a major role in vector breeding. Water collection at construction sites, poor waste management, and land changes increases mosquito breeding. Changes in climate can also extend transmission season. Current control methods focus mainly on treating human cases and reducing mosquito numbers. Fragmented approach to VBD control misses early warning signals. At present, different departments often work separately, this limits data sharing and joint action. The role of animal reservoirs in certain infections reinforces the need of coordination beyond the health sector. Joint monitoring of human cases, vector density and animal reservoirs enables early detection of outbreaks.

Migrant workers are particularly vulnerable in this context. They live in crowded conditions with inadequate sanitation and poor waste management, which increases their exposure to vectors. Their work environment also bring them into close contact with mosquito breeding sites. Delayed healthcare seeking behavior and language barriers make them more vulnerable to vector borne diseases. Migrant population are usually missed out from the routine surveillance measures. Local governance and environmental services must align with public health goals, especially in migrant settlements. Unless specifically targeted and followed up, problems among migrant people will remain an unimportant hurdle for disease control efforts.

Strengthening interdepartmental collaboration, improving local surveillance, training frontline workers to identify environmental risks and targeted health education for migrant workers in simple and practical languages understood by migrants are essential to make prevention more effective. In a setting with changing climate and high migration, integrating one health approach is not optional. It is a must needed concept for the hour. In simple terms, one health approach is a beautiful seal that closes all the existing challenges with regard to vector borne disease control.

Key Informant IV (Public health expert)

DISCUSSION

In the present study, all participants had knowledge about different vector borne diseases. Dengue was the most common disease known to the participants [90%]. Among the 50 study participants, 6 % of the participants answered that malaria as the most common vector borne disease. This is in line with the study conducted by Soorya et al in a rural area of Thrissur district and the study revealed that all the participants were aware about the different mosquito borne diseases and 90.9% of the participants were aware of the fact that Dengue fever is a disease that is transmitted by mosquitoes. Regarding the biting habits of the mosquitoes, 50% responded that mosquito bites day time and the other half responded that mosquito bites only in night time. The knowledge about biting habit is high compared to the above-mentioned study[4].

Regarding knowledge on breeding places, 66% responded to drains ,22% to stagnant water and 6% to artificial containers. These findings are in contrast to studies done in Gujarat and Puducherry, were the most common breeding place of mosquitoes were reported as stagnant water[5,6].

All of the study participants knew that mosquito borne diseases are preventable and all would seek medical management, if necessary if they get any mosquito borne diseases. Compared to a study by Mehta D in Gujarat, only 88% of the study participants were aware about these facts[7].

CONCLUSION

Most of them knew Dengue as a major mosquito borne disease. All of the study participants had a positive attitude towards mosquito borne diseases and majority of the participants; 76% of them uses mosquito nets as a personal protective measure against mosquito borne diseases.

RECOMMENDATION

Migrant populations are more vulnerable to develop mosquito- borne diseases due to poor living conditions, lack of awareness etc. Improving their knowledge on mosquito borne diseases, promoting personal protective measures and improving their living & environmental conditions by improving surveillance, IEC, BCC activities and strengthening their access to health services can contribute to drastic reduction in the burden of these vector borne disease among them. Encouraging migrant screening camps like MIST camps, integrating one health approach in vector control, adopting the strategies of integrated vector management with the help of district vector control unit etc can contribute to reduction in the burden of vector borne diseases and hence reduce the preventable morbidity and mortality it accounts to. AFACC; Aedes free Amala Campus Campaign is one such initiative that focused on aedes control by conducting awareness sessions, observing regular dry days, placing ovitraps, planting mosquito repellant plants like Tulsi's, mint, citronella etc.

STRENGTH OF THE STUDY

These were the findings from the survey to test the knowledge, attitude and practices related to mosquito borne diseases among migrants in the institute where study was conducted. As part of the on- going Aedes Free Amala Campus Campaign, awareness class related to mosquito borne diseases was given to study participants and during the feedback survey following this, significant improvement in the knowledge among migrants was observed.

Conflict of interest: nil

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