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Knowledge, awareness, practice and preventive method against mosquito borne diseases in Tezpur, Assam, Northeast India

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Abstract

The current investigation was conducted in the Tezpur town of Sonitpur district, Assam, India, to determine the level of people's knowledge and awareness regarding various issues related to mosquito-borne diseases, such as the timing of mosquito bites, mosquito breeding grounds, diseases spread by mosquito bites, prevention methods, and so on. The study underlines the importance of these elements in designing effective long-term strategies to encourage residents to take precautions against mosquito-borne diseases. A total of 470 households were chosen for the study using systematic random sampling. The current study found that mosquito bites were more likely to occur at night (420/470) and in the evening (6–8 pm; 342/470). Standing stagnant water was identified as a mosquito breeding site by 67.87% of respondents, followed by contaminated or dirty water (64.25%). Approximately 10.42% of respondents were unaware of mosquito breeding places, and only 4.68% were aware that mosquitoes reproduce in clean water. The current study revealed that the use of a bed net against mosquito bites is the most preferred strategy (91.42%). Active participation of community volunteers and members of self-help groups is required to promote community awareness about the dangers of mosquito bites in Tezpur.

Keywords: Mosquito, Tezpur, breeding grounds, mosquito bites, knowledge

1. Introduction

Mosquitoes are vectors of a number of contagious and potentially fatal diseases, such as protozoan (Malaria), viral (Chikungunya, West Nile virus, yellow fever, and Japanese encephalitis), or helminthic (Filariasis) infections. In the northeastern states of India, mosquito-borne illnesses such as malaria, Japanese encephalitis, lymphatic filariasis, and dengue are serious public health issues. The most common infections among these are malaria and Japanese encephalitis, which are distributed throughout the state of Assam. One of the main causes of the resurgence of these various diseases is the development of insecticidal resistance and a lack of knowledge regarding vector-borne illnesses [1]. Despite comprehensive and multifaceted public health activity under the aegis of the National Vector Borne Disease Control Program (NVBDCP) of the Govt. of India for integrated, chemical, biological, or mechanical vector management, the prevalence of diseases spread by mosquitoes has been rising in recent years. The containment and prevention of the spread of vector-borne diseases depend greatly on public education and awareness. In almost all parts of India, community engagement is significantly below expectations, despite several mass media and educational strategies [2]. A person's knowledge, awareness, and attitude toward diseases fully determine their level of community involvement [1]. Human knowledge, attitudes, and use of various means of personal and household protection against mosquito bites vary in different endemic regions of tropical countries [3, 4]. To ascertain the level of people's knowledge and awareness regarding different issues related to mosquitoes and mosquito-borne diseases, the present investigation is conducted in the Tezpur town of Sonitpur district, Assam, India. The study emphasises how crucial these factors are in developing appropriate long-term policies that are customised to local requirements in order to encourage the local community to take precautions against mosquito-borne infection.

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2. Materials and Methods

The current community-based study was carried out in the municipal area of Tezpur, Sonitpur district, Assam, India, between March 2023 and September 2023. Sonitpur District's administrative center lies in Tezpur. Tezpur town is situated at 92° 47' 1.72" East Longitude and 26° 39' 4.38" North Latitude. The largest of the north bank cities, Tezpur is located on the banks of the Brahmaputra River, 175 kilometers northeast of Guwahati. The city is 75 meters above sea level and has a pleasant, subtropical climate. The summers have a lot more rain than the winters do. Tezpur experiences an average temperature of 24.4 °C.

A cross-sectional study was conducted among the residents of Tezpur using the interview approach. For the study, 470 homes were chosen with systematic random sampling. One respondent, preferably the head of the family, was interviewed from each home. Data was collected during the period when vector-borne illnesses were most contagious. At the time of data collection, a pre-tested, standardized questionnaire was given to the participants. The questionnaire asked about time of mosquito bites, mosquito breeding grounds, diseases spread by mosquito bites, prevention methods, the sources of information on mosquitoes and diseases, and the cost of precautions people take to avoid mosquito bites. MS Excel was used to examine the data that was gathered.

3. Results and Discussions

The findings of the current inquiry are based on observations obtained from the responses of 470 respondents. Among respondents, all were adults; 41% were male and 59% were female. The majority of the respondents were literate (96.59%). Table 1 depicts the study population's demographic profile. Separate analyses have been done on each response to each question.

3.1 Awareness about the preferred time for mosquito bite

The respondents provided a variety of responses in response to a question about the timing of mosquito bites, as shown in Table 2. The majority of them said that evening (72.76%) and night (89.36%) were the most preferable times, whereas 22.34% and 42.76% of them reported seeing mosquito bites in the early morning and during the day, respectively, and 1.27% reported seeing no mosquito bites at all in their home. According to Prasad ^[5] from the Indian state of Karnataka, mosquito bites often occur between dusk and dawn; however, this varies by species. The majority of people (42.15%) in West Bengal, India, feel that mosquito bites are most common at night ^[2]. The current study reveals that nighttime (420/470) and evening hours (6–8 pm) are the most preferred time of mosquito bites. Only 201 people claimed the mosquitoes bite during the day, which is a characteristic of *Aedes* mosquitoes, matching the findings of Shinde *et al.* ^[1] in Maharashtra, India.

3.2 Knowledge about mosquito and disease transmission

Table 3 depicts the awareness and knowledge of the study population regarding mosquito breeding sites and disease transmission. When questioned about mosquito breeding sites, 67.87% said that stagnant water was the best area to breed mosquitoes, followed by dirty water (64.25%). Approximately 10.42% of respondents were unaware of mosquito breeding locations, and only 4.68% knew mosquitoes reproduce in clean water. Only 45.74% of those interviewed were aware of

the container breeding behaviour of *Aedes* mosquitoes that spread dengue. The majority of respondents are aware that mosquitoes are transmitters of infectious diseases such as malaria and dengue. About 95.10% of the respondents are aware that malaria is spread by mosquitoes, followed by 91.06% for dengue. However, almost 50% of the respondents are unaware of the transmission of Japanese encephalitis by mosquitoes, and 2.34% of the study population is totally unaware of the disease transmission by mosquito.

It is established that raising awareness of mosquito breeding sites among the general public is crucial for stopping the spread of illnesses caused by mosquitoes. In the current study, only 4.68% of respondents could identify clean water as a mosquito breeding place, while nearly 65% of respondents connected stagnant water in drains and dirty water with mosquito breeding. 10.42% of responders were unsure of mosquito breeding sites. The results of the present study are in agreement with those of Ghosh *et al.* ^[2], who discovered that stagnant water in drains and polluted water were the two main sources of mosquito breeding. Similar results were also reported by Kumar *et al.* ^[6] in Karnataka, where 86% of the study population thought that polluted water was the breeding ground of mosquitoes. The majority of the respondents in the present investigation perceived that malaria and dengue were the only two diseases transmitted by mosquitoes. Knowledge regarding the breeding grounds of *Anopheles* mosquitoes, which breed relatively in clean water, and the container breeding behavior of *Aedes* mosquitoes transmitting dengue is not widespread among the study participants. More than 70% of the study populations do not know about JE and lymphatic filariasis and the mosquitoes transmitting these diseases. It emphasizes more intensive IEC activities among the study population. The same findings were obtained in a study conducted by Patel *et al.* ^[7] among the urban population of Rajkot, India.

Table 1: The study population's demographic information

Study Participants			
Sex	Male	Literate	187
		Illiterate	6
	Female	Literate	267
		Illiterate	10
Age range	No.	%	
21-30	84	17.87	
31-40	62	13.19	
41-50	142	30.21	
51-60	110	23.40	
61-70	54	11.48	
71-80	18	03.80	
Total	470		

Table 2: General perception of the participants about the preferred time of mosquito bite

Preferred time of mosquito bite	Respondent (n=470) (%)
All time of the day	22 (4.68%)
Day biter	201 (42.76%)
Early morning	105 (22.34%)
Evening	342 (72.76%)
Night	420 (89.36%)
Don't observe	6 (1.27%)

(Note: The study participants provided multiple responses)

Table 3: Knowledge about mosquito breeding grounds and disease transmission (n=470)

Knowledge details	Respondents	%
Knowledge about the breeding places of mosquito		
▪ Clean water	22	04.68
▪ Polluted or dirty water	302	64.25
▪ Flowing water	0	0
▪ Stagnant water in drains	319	67.87
▪ Container breeder (cement tank, old tyres, earthen pot, plastic container, flower vase, coconut shells)	215	45.74
▪ Don't know	49	10.42
Knowledge about diseases transmitted by mosquitoes		
▪ Malaria	447	95.10
▪ Dengue	428	91.06
▪ Japanese Encephalitis	137	29.14
▪ Filariasis	99	21.06
▪ Don't know	11	2.34

(Note: The study participants provided multiple responses)

3.3 Practices for avoiding mosquito bites

The study participants provided multiple responses about the protective behaviours that were common among them. The current study discovered that using a bed net (91.42%) is the most preferred practice against mosquito bites. Applying a mosquito repellent liquid vaporizer (64.25%) and using mosquito coils - the repelling incense (62.85%)—are also frequent practices as a protective strategy against mosquito bites (Table 4). In addition to the aforementioned techniques, relatively few participants (11.27%) used insecticidal spray to eradicate mosquitoes, and 6.8% employed window and door screens to shield themselves against diseases carried by mosquitoes. The community also makes extensive use of smoke from the age-old practice of burning Dhuna (44.68%).

Table 4: Practices for avoiding mosquito bites (n=470)

Practices	Household No.	Household %
Mosquito net	429	91.27
Mosquito coil	295	62.76
Mosquito repellent liquid vaporizer	302	64.25
Use of window screens or window nets	32	6.8
Insecticide spray	53	11.27
Burning Dhuna	210	44.68

(Note: The study participants provided multiple responses)

Different places clearly follow different precautions against mosquito bites. Concerning preventive measures against mosquito bites, it has been found that nearly all study participants used some form of personal protection. Similar findings have been documented in research conducted in various Indian states. According to findings from Pondicherry, India, 99% and 73% of urban as well as rural respondents, respectively, employ some form of personal protection against mosquito bites^[8]. As reported by Babu *et al.*^[4] from Orissa, 99% of urban families and 84% of rural families used at least one anti-mosquito-bite method. A study conducted in Gujarat found that 97% of study participants employed personal protection equipment to avoid mosquito bites^[9]. However, Panda *et al.*^[10] observed in Madhya Pradesh that over 55% of research participants did nothing to avoid being bitten by a mosquito, which is much below the findings of the current study. The current study's findings

indicate that, among study participants, mosquito coils (62.76%) and liquid vaporizer repellents (64.25%) are the most commonly used protective devices, next to mosquito nets. The results of Kumar *et al.*^[6] from Maharashtra (65% used mosquito coils) and Patel *et al.*^[7] from Rajkot city (61.4% of subjects used mosquito repellent liquid vaporizer) are supported by the current study, although the percentages of those found by Prakash *et al.*^[11] in the Katihar district of Bihar (5.79%) and Yadav *et al.*^[12] (4%), in Rajasthan, are significantly higher. The study participants' socioeconomic status and literacy rate may be the causes of the variation in mosquito repellent use. According to Table 1, the majority of study participants who reside in the Tezpur municipal area are literate and have average to high socioeconomic status. The locals have a propensity to regularly buy liquid vaporizers or mosquito coils as forms of repellent. According to Patel *et al.*^[7], there is a direct relationship between knowledge and use of personal protective measures and literacy level. Commercial products were used by a greater proportion of literate people than uneducated ones.

Our study also revealed that 38.57% of participants were aware of bed nets treated with insecticides. But according to research published in 2010 by Pandit *et al.*^[9], just 10% of survey participants knew about insecticide-treated bed nets. According to Babu *et al.*^[4] from Orissa, 58% of rural and 76% of urban households used untreated bed nets. The studied population has low knowledge of ITBN. Ziba C *et al.*^[13], Babu *et al.*^[4], Snehlatha *et al.*^[8] and Sharma *et al.*^[14] all reported similar results. The monthly expenditure of the majority of the study participants (54.28%) on these protective practices was between Rs. 100 and Rs. 150, and around Rs. 200 for 31.43% of the people. Merely 27 individuals (5.74%) incurred monthly expenses above Rs. 200 on preventative measures, while the remaining 8.55% of the respondents did not incur any such costs.

3.4 Sources of information on mosquito-borne diseases

As shown in Table 5, nearly all research participants (98.57%) stated that their primary source of information regarding mosquitoes and the diseases they spread was television, with newspapers and magazines coming in second (68.57%). Only a small percentage of participants (28.57) stated that they learned about mosquitoes and their involvement in the spread of disease from visiting doctors and physicians' offices as well as from Angan Badi Workers' (AWS) home visits. It is noteworthy that despite many activities now in place in the state of Assam, which includes the study region, pertaining to vector-borne diseases, not a single awareness meeting has been organised by public or commercial entities.

Table 5: Source of information on mosquitoes and mosquito-borne diseases

Source of information	Respondents	%
Television	463	98.57
Magazine & Newspaper	322	68.57
Friends-Relatives	255	54.28
Hoardings/banner/poster of Government programmes	107	22.85
Health care providers	134	28.57
Awareness meeting by any govt or non-govt agencies	0	0

(Note: The study participants provided multiple response)

According to Pandit *et al.* [9] from Gujarat, television was the community's most important means of receiving information, followed by radio and newspapers. The source of the information was not identified as a healthcare provider or member of a healthcare organisation. Boratne *et al.* [15], on the other hand, reported that around 75.93% of the sample population learned about mosquito-borne illnesses from television, followed by medical professionals (16.43%) and newspapers (12.84%), which validates the current study's findings. It is disheartening to learn that, despite the Government of India's ongoing NVBDCP and Integrated Disease Surveillance Programme in Assam during the study period, information education and communication-based awareness initiatives remain ineffective in the study area.

4. Conclusion

According to current survey data, the majority of people are familiar with mosquito breeding places and mosquito-borne diseases such as malaria and dengue. It is also necessary to educate people about other mosquito-borne diseases. The study discovered that people are highly conscious of mosquito bite times, which vary based on species and location. According to the survey results, the majority of respondents used one or more precautionary measures against mosquito bites, and the majority of them experienced no negative consequences as a result. Television was found to be the most widely used source of information, and this platform can be used to generate enormous awareness. The involvement of mass media, particularly television and the internet, can be extremely beneficial in emphasising health education and awareness initiatives about mosquito breeding places, mosquito bite results, and mosquito control techniques. Active participation of community workers is critically essential to increase community awareness on dangers of mosquito bites and to keep the environment clean. It was also discovered that spraying operations had not been carried out in many sections of Tezpur, and so the government, with the assistance of the local people, should take active measures to investigate the cleanliness of the region and help to keep the city green and clean.

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