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Vector-Borne Disease Risk Assessment Among Households: A Cross-Sectional Epidemiological Investigation

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Abstract

The study was conducted to assess the risk of vector-borne diseases among households of the selected ward of Athirampuzha Panchayath, Kottayam. Objectives of the study were to assess the percentage of houses infested with larvae or pupae of mosquito (house index (HI): total number of positive houses/total houses × 100), to identify the percentage of water holding containers infested with larvae or pupae of mosquito (container index (CI): total number of positive containers/total containers × 100) and to determine the number of positive containers per houses inspected (Breteau index (BI): number of positive containers/total houses × 100) among households in the study area. A survey design using a convenience sampling technique was used to select 72 households. The tool for data collection was a self-designed observational checklist. The result showed that among the households surveyed, 11 (15.3%) were infested with larvae or pupae of mosquitoes, HI ≥ 5%: high risk of vector-borne diseases. Among the water holding containers inspected, 10 (28.6%) containers were infested with larvae or pupae of mosquitoes. CI ≥ 10%: high risk of vector-borne diseases. Among the households inspected, 10 (13.9%) water holding containers were infested with larvae or pupae of mosquitoes per house inspected, BI 5-19%: moderate risk of vector-borne diseases.

Keywords: Vector-borne diseases, risk assessment, household pupae of mosquito, moderate risk

INTRODUCTION

Vector-borne diseases pose significant public health challenges worldwide. These diseases are transmitted primarily through the bites of infected arthropods, such as mosquitoes, which can lead to severe morbidity and mortality if not properly managed. In India, vector-borne diseases such as malaria, dengue fever, and chikungunya are major problems due to the country's climatic and geographical diversity, which creates ideal breeding places for vectors.

In recent years, Kerala has experienced notable outbreaks of vector-borne diseases. A study conducted in the Malappuram district of Kerala found that high rainfall and waterlogged areas contribute to the proliferation of mosquito breeding sites [1]. Research conducted in the Thiruvananthapuram district reported that dengue fever spread quickly due to factors such as poor waste management, inadequate water storage practices, and a lack of community participation in vector control measures [2].

Studies have shown that the use of entomological indices, such as the house index (HI), container index (CI), and Breteau index (BI), can help identify high-risk areas and guide targeted interventions [3].

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Table 1. Frequency and percentage distribution of households according to infestation of larvae or pupae of mosquito (house index) (n=72).

	Frequency	Percentage
Yes	11	15.3
No	61	84.7

Table 2. Frequency and percentage distribution according to water holding containers infested with larvae or pupae of mosquito (container index) (n=35).

	Frequency	Percentage
Water holding containers infested with larvae or pupae (positive containers)	10	28.6
Water holding containers not infested with larvae or pupae	25	71.4

Table 3. Frequency and percentage distribution according to the number of positive containers per house inspected (Breteau index) (n=72).

	Frequency	Percentage
Water holding containers infested with larvae or pupae per house inspected (positive containers)	10	13.9

A study conducted in the Ernakulam district of Kerala reported that areas with a BI above 50 were at a high risk of dengue transmission [4]. A study conducted in the Thrissur district found that areas with high HI were more likely to experience dengue outbreaks [5]. Research on chikungunya outbreaks in Kerala has indicated that the disease spreads rapidly in areas with poor sanitation and inadequate waste management [6].

This study aimed to conduct vector-borne disease risk assessment among households using HI, CI, and BI. By identifying high-risk areas and understanding the factors that contribute to vector populations, this study will provide valuable insights for designing targeted interventions to prevent vector-borne disease outbreaks in the region.

METHODOLOGY

A quantitative approach was used to study the risk of vector-borne diseases among households. The design selected for the study was a survey research design. The study was conducted in selected wards of Athirampuzha Panchayath, Kottayam. Seventy-two households were selected using convenience sampling. The inclusion criterion was households with land area belonging to Athirampuzha Panchayath. Data was collected using a self-designed observational checklist. Content validity was ensured by providing the tool to experts in the field of Community Health Nursing. Both descriptive and inferential statistical methods were used to analyze the data.

RESULTS

Table 1 reveals that among the households surveyed, 11 (15.3%) of houses were infested with larvae or pupae of mosquitoes, HI ≥ 5%, which demonstrated a high risk of vector-borne diseases.

Table 2 reveals that among the water holding containers inspected, 10 (28.6%) containers were infested with larvae or pupae of mosquitoes, with a CI ≥ 10%, which demonstrated a high risk of vector-borne diseases.

Table 3 reveals that among the households inspected, 10 (13.9%) water holding containers were infested with larvae or pupae of mosquitoes per house inspected, BI 5–19%, which demonstrated a moderate risk of vector-borne diseases.

DISCUSSION

This study aimed to assess the risk of vector-borne diseases among households. The assessment

revealed that among the households inspected, 10 (13.9%) water holding containers were infested with larvae or pupae of mosquitoes per house inspected, BI 5–19%, which demonstrated a moderate risk of vector-borne diseases. The present study was supported by a study conducted in the Ernakulam district of Kerala, which found that areas with a BI above 50 were at high risk of dengue transmission [4, 7–9].

The present study revealed that among 72 households surveyed, 11 (15.3%) of houses were infested with larvae or pupae of mosquitoes, with HI 5%. This is supported by a study conducted in the Thrissur district, which found that areas with a high HI were more likely to experience dengue outbreaks [5, 10].

The study was conducted in selected wards of Athirampuzha Panchayath, which limits generalization. This study was limited to 72 households. Based on the findings of the present study, the following recommendations are made. A similar study can be conducted in various Panchayaths on a large sample.

CONCLUSION

This study aimed to assess the risk of vector-borne diseases among households in selected wards of Athirampuzha Panchayath, Kottayam. The study concluded that among the households surveyed, 11 (15.3%) of houses were infested with larvae or pupae of mosquitoes, HI ≥ 5%, which demonstrated a high risk of vector-borne diseases. Among the water holding containers inspected, 10 (28.6%) were infested with larvae or pupae of mosquitoes, CI ≥ 10%, which demonstrated a high risk of vector-borne diseases. Among the households inspected, 10 (13.9%) water holding containers were infested with larvae or pupae of mosquitoes per house inspected, BI 5–19%, which demonstrated a moderate risk of vector-borne diseases.

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