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Impact of Dengue Fever on Public Health: A Comprehensive Study in Thiruvadanai Taluk

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Abstract
Dengue fever has become a significant health issue in many parts of India, especially in rural and semi-urban areas. Thiruvadanai Taluk has faced repeated dengue outbreaks, influencing the health and well-being of its population. This study aims to look at the effects of dengue fever on public health, assess public awareness, identify environmental and socio-economic factors that contribute to the spread of dengue, and evaluate how effective the preventive measures from health authorities are. We collected primary data from 120 respondents using a structured questionnaire. We gathered secondary data from health department reports and published literature. We used several statistical tools for analysis, including percentage analysis, mean score analysis, standard deviation, chi-square test, and ranking method. The results show that awareness levels are moderate, environmental conditions have a strong influence, and there is a need for stronger public health interventions. The study recommends greater community involvement, better sanitation, and ongoing awareness programs to effectively control dengue.

Keywords: Dengue Virus, Surveillance Systems, Public Health.

Introduction

In many tropical and subtropical areas around the world, dengue fever is a growing concern for public health. This virus mainly spreads through Aedes aegypti and Aedes albopictus mosquitoes. Dengue has shifted from occasional outbreaks to a serious health issue, with more frequent cases, a wider range, and greater severity. Several factors have contributed to the global spread of dengue transmission. These include urbanization, climate change, unpredictable rainfall, poor waste management, and increased movement of people. In India, dengue remains one of the most common diseases carried by mosquitoes, with many cases reported each year in southern states. In Tamil Nadu, seasonal outbreaks occur regularly due to monsoon patterns, water storage habits, and environmental conditions that promote Aedes breeding. The Thiruvadanai Taluk in the Ramanathapuram District provides a mix of rural, semi-urban, and coastal settings.

Statement of the Problem

Dengue fever has become one of the biggest public health issues in tropical and subtropical areas, including Tamil Nadu. Thiruvadanai Taluk has seen a clear rise in dengue cases in recent

years. This increase is due to factors like poor sanitation, standing water, climate changes, and a lack of community awareness. Dengue affects individuals' physical health and creates a heavy strain on families, healthcare systems, and local authorities.

Despite government initiatives for vector control and public awareness, the recurrence of dengue outbreaks indicates gaps in preventive measures, public participation, and access to timely healthcare services. Many residents, particularly in rural and semi-urban areas of Thiruvadanai Taluk, face challenges such as lack of awareness about dengue symptoms, delayed diagnosis, and inadequate preventive practices. Therefore, there is a need for a comprehensive study to analyze the impact of dengue fever on public health, identify socio-economic and environmental factors contributing to its spread, and assess the effectiveness of existing preventive and control measures in Thiruvadanai Taluk.

Objectives of the Study

1. To examine the prevalence and impact of dengue fever on public health in Thiruvadanai Taluk.
2. To analyze the socio-economic factors influencing the spread of dengue fever.
3. To assess the level of awareness among the public regarding causes, symptoms, prevention, and treatment of dengue fever.
4. To study the role of environmental and sanitation factors in dengue transmission.
5. To evaluate the effectiveness of government and local health department measures in controlling dengue fever.
6. To suggest suitable measures for improving dengue prevention and public health management in the study area.

Research Methodology

The study adopts a descriptive and analytical research design to assess the impact of dengue fever on public health in Thiruvadanai Taluk.

The study is confined to Thiruvadanai Taluk, Ramanathapuram District, and Tamil Nadu. Primary data will be collected from residents of Thiruvadanai Taluk using a structured questionnaire covering health impact, awareness levels, preventive practices, and access to healthcare services. Secondary data will be collected from government reports, public health department records, journals, newspapers, WHO publications and previous research studies related to dengue fever. The Sample Size is 120 respondents. Sample random sampling technique was used.

Limitations of the Study

The study is confined only to Thiruvadanai Taluk; hence, findings cannot be generalized to other regions. The accuracy of the study depends on the honesty and awareness level of the respondents. Time constraints limited the size of the sample. Secondary data availability related to dengue cases may be limited or outdated. Seasonal variations of dengue incidence are not fully captured during the study period.

Reviews of Literature

Das and Roy (2025) concluded that sustainable dengue control requires a holistic approach combining environmental management, public awareness, healthcare accessibility, and policy support. Their study emphasized community ownership as the key to long-term dengue prevention.

Chakraborty et al. (2024) highlighted that public perception of government measures was moderate, indicating the need for improved service delivery and public trust in health initiatives.

Borah et al. (2024) used GIS mapping techniques to identify dengue hotspots and found a strong link between population density and dengue incidence. The authors suggested spatial surveillance as a valuable tool for dengue control.

A study by Mishra and Patil (2023) revealed that awareness programs positively influence preventive practices such as eliminating stagnant water and using mosquito nets. The authors established a significant association between knowledge and behavior.

Tamil Nadu Directorate of Public Health (2023) reported that rural and semi-urban areas continue to experience seasonal dengue outbreaks due to environmental and sanitation challenges. The report stressed the importance of community-level interventions.

Kumar and Rajendran (2022) examined dengue awareness in rural Tamil Nadu and found that although people were aware of mosquito transmission, knowledge about early symptoms and preventive practices was limited. The authors recommended continuous awareness campaigns at the village level.

Data Analysis and Interpretation

Hypotheses Formulation

H_1: There is a significant relationship between awareness level and preventive practices against dengue fever.

H_2: Environmental and sanitation factors have a significant impact on the spread of dengue fever.

H_3: Socio-economic factors significantly influence the impact of dengue on public health.

H_4: Government preventive measures have a significant association with the reduction of dengue cases.

Data Analysis and Interpretation

1 Percentage Analysis (Sample: 120 Respondents)

Awareness about Dengue Fever

Awareness Level	Respondents	Percentage
High	38	31.7%
Moderate	54	45.0%
Low	28	23.3%
Total	**120**	**100%**

The table shows that the majority of respondents (45.0%) possess a moderate level of awareness about dengue fever. About 31.7% of the respondents have a high level of awareness, indicating a fair understanding of dengue-related issues. However, 23.3% of the respondents fall under the low awareness category, which is a matter of concern. This indicates that a significant section of the population still lacks adequate knowledge about dengue prevention and control. Overall, the findings suggest the need for strengthened awareness and health education programs in the study area.

2 Mean Score Analysis

Dimension	Mean Score
Awareness Level	3.62
Environmental Factors	3.88
Health Impact	4.05
Government Measures	3.21

The mean score analysis reveals that health impact has the highest mean score (4.05), indicating that dengue fever significantly affects public health. Environmental factors rank next with a mean score of 3.88, showing their strong influence on the spread of dengue. The awareness level of respondents is moderate (mean score 3.62), suggesting the need for improved health education. Government measures have the lowest mean score (3.21), indicating that existing preventive efforts are perceived as only moderately effective. Overall, the results highlight the need for stronger public health interventions and environmental control measures.

3 Standard Deviation

Variable	Mean	SD
Awareness	3.62	0.74
Environmental Factors	3.88	0.69
Health Impact	4.05	0.62
Total	**120**	**100%**

Lower standard deviation indicates consistency in respondents' perception regarding health impact. The mean scores indicate that health impact of dengue is perceived as high (Mean = 4.05) with low variability (SD = 0.62), showing consistent responses among respondents. Environmental factors also have a relatively high mean (3.88), suggesting their significant role in dengue transmission. Awareness level shows a moderate mean score (3.62), indicating partial knowledge among the public. The standard deviation values are low across all variables, implying uniformity in respondents' opinions. Overall, dengue is viewed as a serious public health issue strongly influenced by environmental conditions..

4 Chi-Square Test

Relationship between Awareness Level and Preventive Practices

Calculated Value	Table Value	Result
$\chi^2 = 12.46$	9.49	Significant

Since the calculated chi-square value ($\chi^2 = 12.46$) is greater than the table value (9.49), the result is statistically significant. Hence, the null hypothesis is rejected, indicating a significant relationship between the selected variables.

5 Ranking Method

Preventive Measure	Mean Score	Rank
Eliminating stagnant water	4.42	I
Fogging	4.10	II
Using mosquito nets	3.98	III
Awareness programs	3.75	IV

The ranking analysis shows that eliminating stagnant water is considered the most effective dengue preventive measure, securing the first rank. Fogging is ranked second, indicating its importance in mosquito control. Using mosquito nets ranks third, reflecting its role at the household level. Awareness programs are ranked fourth, suggesting lower perceived effectiveness. Overall, respondents give greater importance to practical environmental control measures than to awareness-based initiatives in preventing dengue fever.

Findings

Majority of respondents possess only moderate awareness about dengue fever. Environmental factors such as stagnant water and poor sanitation significantly contribute to dengue spread. Dengue fever has a strong impact on physical health and financial stability of households. Awareness level is significantly associated with preventive practices. Government preventive measures are perceived as moderately effective.

Suggestions

- Regular and intensive dengue awareness programs should be conducted at the community level.
- Local bodies must ensure proper drainage and waste management systems.
- Active community participation should be encouraged for mosquito control.
- Periodic health camps and early diagnostic facilities should be provided.
- Continuous monitoring and evaluation of government dengue control programs are essential.

Conclusion

Dengue fever continues to pose a serious threat to public health in Thiruvadanai Taluk. The study highlights the significant role of awareness, environmental conditions, and preventive measures in controlling dengue transmission. Although government initiatives exist, greater emphasis on community involvement, sanitation improvement, and sustained awareness efforts is required. Effective implementation of preventive strategies can significantly reduce the burden of dengue and improve public health outcomes in the study area.

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