

## **“A Comparative Study to Assess the Knowledge Attitude and Practice on Dengue Fever and Its Source Reduction Among Urban and Rural Population”**

MRS. S. SAKTHYPRIYA<sup>1</sup>, DR.G.MUTHAMILSELVI<sup>2</sup>, R.NIRANJAN, D<sup>3</sup>. NIROSHA<sup>4</sup>, V.NISHANTHINI<sup>5</sup>, V.NITHYA<sup>6</sup> & D.NIVEDHA<sup>7</sup>

<sup>1</sup>Assistant Professor, Department of Community Health Nursing, SMVNC, Puducherry,

<sup>2</sup>Principal, SMVNC, Puducherry,

<sup>3-7</sup>B.Sc., Nursing, IV-Year, Sri Manakula Vinayagar Nursing College, Puducherry-605 107.

Corresponding Author: Mrs. S. Sakthypriya

---

### **ABSTRACT**

Dengue fever is a common infectious disease in tropical countries and has become a major public health problem. The study aimed to assess the knowledge, attitude, and practice regarding dengue fever and its source reduction among rural and urban population. A comparative research design was adopted. A total of 100 clients were selected using purposive sampling technique, of which 50 were from rural areas and 50 were from urban areas. Data were collected using demographic variables and a self-structured knowledge, attitude, and practice questionnaire. The study findings revealed that in the urban population, 40% had adequate knowledge, 60% had excellent practice, and 86% had a positive attitude regarding dengue fever and its source reduction. In the rural population, 66% had moderate knowledge, 56% had satisfactory practice, and 60% had a neutral attitude. The study concluded that urban population had better knowledge, attitude, and practice than rural population regarding dengue fever and its prevention.

**Keywords:** Dengue fever, Source Reduction, Comparative research design, self-structured question, urban population, rural population, community awareness.

---

### **I. INTRODUCTION**

Dengue is a mosquito-borne viral infection that is common in warm, tropical climates. Infection is caused by any one of four closely related dengue viruses (called serotypes), and these can lead to a wide spectrum of symptoms, including some which are extremely mild (unnoticeable) to those that may require medical intervention and hospitalization. In severe cases, fatalities can occur. There is no treatment for the infection itself but the symptoms that a patient experience can be managed.

### **NEED FOR STUDY**

Dengue is a mosquito-borne viral infection that is highly prevalent in tropical and sub-tropical regions, especially in urban and semi-urban areas. The global incidence of dengue has increased rapidly, with cases rising from about 505,430 in 2000 to 5.2 million in 2019. Many cases remain underreported due to mild or asymptomatic nature and misdiagnosis. Dengue outbreaks have been reported worldwide, including countries like the United States, Europe, Japan, and China, showing its growing global burden. In India, dengue remains a major public health concern, with increasing cases reported in states like Delhi, Karnataka, Maharashtra, and Uttar Pradesh. Tamil Nadu has also reported thousands of dengue cases in recent years, indicating a rising trend. In Puducherry, dengue cases are commonly seen in urban and suburban areas due to favorable mosquito breeding conditions such as stagnant water in containers and waste materials. Children and adults are both affected, and seasonal variation, especially during monsoon, increases transmission. Lack of awareness, poor environmental sanitation, and inadequate preventive practices contribute to the spread of dengue. Therefore, there is a need to assess knowledge, attitude, and practices regarding dengue fever and its prevention. This study helps in identifying gaps and promoting effective community awareness to reduce dengue incidence and improve public health.

### **STATEMENT OF THE PROBLEM:**

A comparative study to assess the knowledge, attitude and practice on dengue fever and its source reduction among rural and urban population.

**OBJECTIVES:**

- To assess the knowledge, attitude and practice on dengue fever and its source reduction among rural population.
- 2. To assess the knowledge, attitude and practice on dengue fever and its source reduction among urban population.
- 3. To compare the knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population.
- 4. To correlate the level of knowledge with practice, level of knowledge with attitude on dengue fever and its source reduction among urban and rural population with selected demographic variables.
- 5. To associate the level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population with selected demographic variable

**II. RESEARCH METHODOLOGY:**

**RESEARCH APPROACH:**

Descriptive research approach was adopted for this present study.

**RESEARCH DESIGN:**

Comparative research design was adopted for this study.

**SETTING OF THE STUDY**

The study was conducted in Pondicherry.

**POPULATION**

The population of the study include the urban and rural people who met the inclusion criteria.

**SAMPLE**

Both urban and rural people in Pondicherry.

**SAMPLE SIZE**

The sample size consist of 100 samples. In this 50 samples from urban and 50 samples from rural area in Pondicherry.

**SAMPLING TECHNIQUE**

Purposive sampling technique was used for the study.

**DESCRIPTION OF RESEARCH TOOL TECHNIQUE**

**Section A: Demographic Variables**

Demographic variables such as age, gender, area, religion, educational status, occupational status, monthly income, marital status and type of disease.

**Section B: Knowledge Questionnaires**

Multiple choice questionnaires given to assess the knowledge on dengue fever and source reduction to the urban and rural population in Puducherry.

**It consist of totally 30 questions .Each question carries one mark.**

**SCORE INTERPRETATION FOR KNOWLEDGE:**

Scoring	Knowledge level
0 – 10	Inadequate knowledge
11 – 20	Moderate knowledge
21 - 30	Adequate knowledge

**SECTION C: Attitude Questionnaires**

Likert scale questionnaires given to assess the attitude on dengue fever and source reduction to the urban and rural population in Puducherry.

**It consists of totally 5 questions.**

**SCORING INTERPRETATION FOR ATTITUDE:**

Scoring	Attitude scale
3	Agree
2	Neutral
1	Disagree

**SECTION D: Practice Questionnaires**

Checklist given to assess the practice on dengue fever and source reduction to the urban and rural population in Puducherry.

It consist of totally 10 questions.

<b>Scoring</b>	<b>Knowledge level</b>
1 - 3	Unsatisfactory
4 - 6	Satisfactory
7 - 10	Excellent

**STUDY FINDINGS:**

**SECTION A:** Description of demographic variables of urban and rural population.

**SECTION B:** Assessment of the level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population

**SECTION C:** Comparison of level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population

**SECTION D:** Correlation of level of knowledge, attitude and practice on dengue fever and its source reduction between urban and rural population

**SECTION E:** Association of the level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population with selected demographic variables

**SECTION A: Description of demographic variables of urban and rural population.**

The table shows frequency and percentage wise distribution of demographic variables of urban population. Regarding age, 22% of the population fell within the 25- 30 age group, 32% were aged between 35-40 years, and the largest group, comprising 46%, were aged 41-45 years. In terms of gender, females represented the majority at 56%, with males making up 44%, and no respondents identified as transgender. All participants lived in urban areas (100%), with none residing in rural, semi-urban, or semi-rural areas. When examining religious affiliation, all participants (100%) were Hindu, with no representation from other religions such as Muslim, Christian, or others. In terms of educational status, 36% had completed high or primary school, 20% were graduates, 12% had primary education, and 32% were illiterate. Marital status showed that 88% of the respondents were married, 10% were unmarried, and only 2% were widows. Occupationally, 36% of the population were engaged in clerical work, shopkeeping, or farming, while 28% were semi-professionals, 10% were professionals, and 26% were unemployed. The monthly income distribution indicated that 54% earned between ₹10,000 to ₹20,000, 42% earned less than ₹10,000, and only 4% had a monthly income above ₹30,000. The household size varied, with 36% living in homes with four members, 30% with up to three people, 26% with five members, and 8% in households with more than six members. Regarding the type of disease, 48% were predicted that by water-borne diseases like dengue, 46% by vector-borne diseases, and 6% by air-borne diseases. Lastly, the sources of information about dengue and its prevention showed that television was the primary source for 56% of participants, followed by newspapers (24%), radio (14%), and the internet (6%).

The above table shows frequency and percentage wise distribution of demographic variables of rural population. Regarding age, 24% of respondents were aged 25-30 years, 16% were between 35-40 years, and the majority, 60%, were aged 41- 45 years. In terms of gender, 44% of participants were female, while 56% were male, with no respondents identifying as transgender. Although the participants primarily resided in urban areas (88%), a small portion lived in rural (6%), semi-urban (2%), or semi-rural areas (4%). When it came to religion, 86% identified as Hindu, while 6% were Muslim, 6% Christian, and 2% belonged to other religions. Educational status varied, with half of the respondents (50%) being graduates, 42% having primary education, and 8% having completed high or primary school, while there were no illiterate participants. Marital status showed that 78% were married, 16% unmarried, 2% widowed, and 4% separated. Regarding occupation, more than half (54%) of the population were professionals, 12% were semi-professionals, 14% worked as clerks, shopkeepers, or farmers, and 20% were unemployed. In terms of income, 56% had a monthly income of above ₹30,000, 28% earned between ₹10,000 to ₹20,000, and 16% earned less than ₹10,000 per month. Household size revealed that 44% lived in households with up to three members, 26% in four-member households, 24% in households of five members, and 6% lived in households with more than six members. The most common type of disease was air-borne diseases (78%), followed by water-borne diseases (22%). In terms of sources of information about dengue and its prevention, 56% received information from television, 22% from the internet, 12% from newspapers, and 10% from radio.

**SECTION B: Assessment of the level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population**

**Table 1.1: Frequency and distribution of the level of knowledge on dengue fever and its source reduction among urban population. N=50**

S.NO	Level of Knowledge	Frequency	Percentage
1	Inadequate	20	40
2	Moderate	2	4

3	Adequate	28	56
---	----------	----	----

The above table revealed that 40% had an adequate level of knowledge regarding dengue fever and its source reduction practices. The majority, 56%, demonstrated a moderate level of knowledge, while 4% had inadequate moderate knowledge.

**Table 1.2: Frequency and distribution of the level of practice on dengue fever and its source reduction among urban population. N=50**

S.NO	Level of Knowledge	Frequency	Percentage
1	Excellent	30	60
2	Satisfactory	18	36
3	Unsatisfactory	2	4

The above table revealed that the majority (60%) exhibited an excellent practice toward dengue fever and its source reduction practices. Additionally, 36% demonstrated satisfactory practice, while 4% displayed an unsatisfactory practice.

**Table 2.1: Frequency and distribution of the level of attitude on dengue fever and its source reduction among urban population. N=50**

S.NO	Level of Knowledge	Frequency	Percentage
1	Neutral	7	14
2	Positive	43	86
3	Negative	0	0

The above table revealed that the majority (86%) exhibited a positive attitude toward dengue fever and its source reduction practices. Additionally, 14% had a neutral attitude, while no respondents (0%) displayed a negative attitude.

**Table 3.1: Frequency and distribution of the level of knowledge on dengue fever and its source reduction among rural population. N=50**

S.NO	Level of Knowledge	Frequency	Percentage
1	Inadequate	1	2
2	Moderate	16	32
3	Adequate	33	66

The above table revealed that the majority (66%) demonstrated a moderate level of knowledge regarding dengue fever and its source reduction practices among the rural population. Additionally, 32% exhibited inadequate moderate knowledge, while only 2% had an adequate level of knowledge.

**Table 4.1: Frequency and distribution of the level of practice on dengue fever and its source reduction among rural population. N=50**

S.NO	Level of Knowledge	Frequency	Percentage
1	Excellent	11	22
2	Satisfactory	28	56
3	Unsatisfactory	11	22

The above table revealed that the majority (56%) demonstrated a satisfactory level of practice regarding dengue fever and its source reduction practices among the rural population. Additionally, 22% exhibited excellent practice, while another 22% showed unsatisfactory practice.

**Table 4.2: Frequency and distribution of the level of attitude on dengue fever and its source reduction among rural population. N=50**

S.NO	Level of Knowledge	Frequency	Percentage
1	Neutral	30	60
2	Positive	20	40
3	Negative	0	0

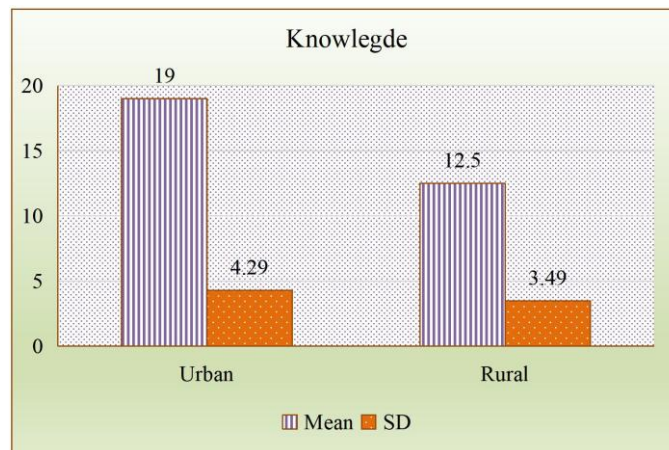
The above table revealed that the majority (60%) exhibited a neutral attitude toward dengue fever and its source reduction practices among the rural population. Additionally, 40% displayed a positive attitude, while no respondents (0%) showed a negative attitude.

**SECTION C: Comparison of level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population**

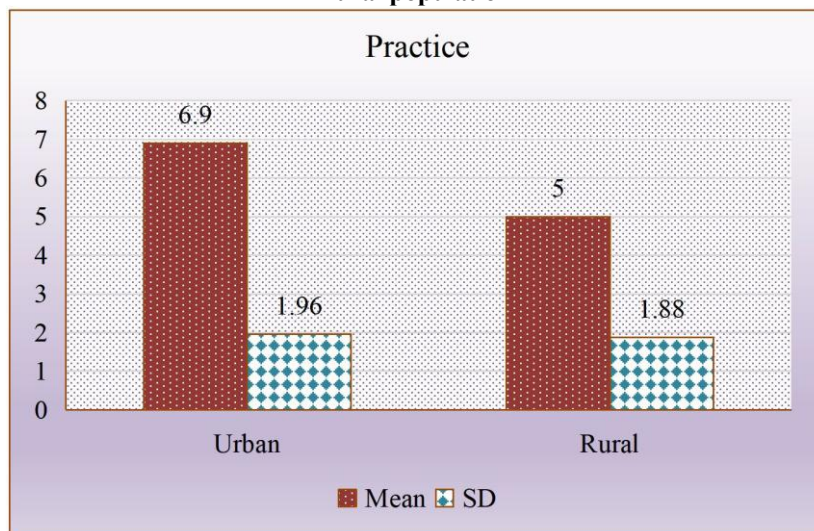
**Table 4.2: Comparison of level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population**

S.NO	Variables	Urban		Rural	
		Mean	SD	Mean	SD
1	Knowledge	19.0	4.29	12.5	3.49
2	Practice	6.9	1.96	5.0	1.88
3	Attitude	12.5	1.77	10.4	1.97

The mean knowledge score for the urban population was 19.0 with a standard deviation (SD) of 4.29, compared to the rural population's mean of 12.5 and SD of 3.49. In terms of practice, the urban population had a mean score of 6.9 with an SD of 1.96, whereas the rural population had a lower mean score of 5.0 and an SD of 1.88. For attitude, the urban population had a mean score of 12.5 with an SD of 1.77, while the rural population had a mean score of 10.4 with an SD of 1.97. These results indicate that the urban population had higher mean scores across knowledge, practice, and attitude compared to the rural population, indicating a better overall understanding and implementation of dengue prevention measures among the urban group.



**Figure 23: Comparison of level of knowledge on dengue fever and its source reduction among urban and rural population**



**Figure 24: Comparison of level of attitude on dengue fever and its source reduction among urban and rural population**

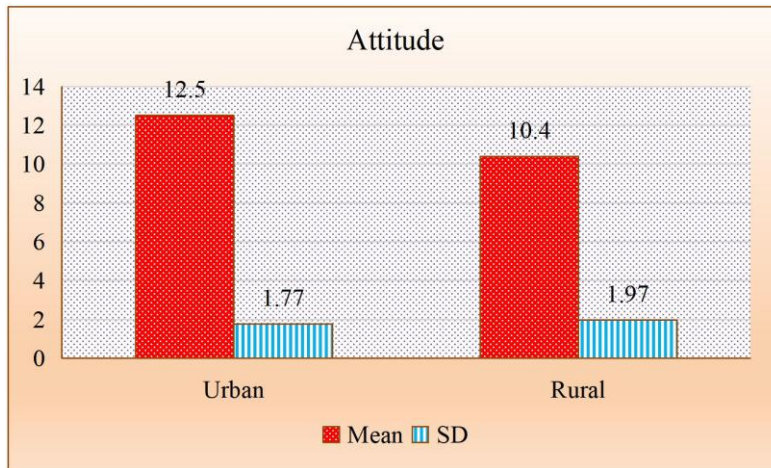


Figure 25: Comparison of level of practice on dengue fever and its source reduction among urban and rural population

**SECTION D: Correlation of level of knowledge, attitude and practice on dengue fever and its source reduction between urban and rural population**

**Table 4.1: Correlation of level of knowledge, attitude and practice on dengue fever and its source reduction between urban population**

S.NO	Correlation	Urban	
		'r' value	P value
1	Knowledge and Practice	0.044	0.764
2	Practice and Attitude	0.431*	0.002
3	Attitude and Knowledge	0.29	0.839

The above table reveals the correlation between the level of knowledge, attitude, and practice on dengue fever and its source reduction among the urban population. The correlation between knowledge and practice shows an 'r' value of 0.044 with a p-value of 0.764, indicating a weak and non-significant relationship. The correlation between practice and attitude is stronger, with an 'r' value of 0.431 and a significant p-value of 0.002, suggesting a moderate positive correlation. Lastly, the correlation between attitude and knowledge has an 'r' value of 0.29 with a p-value of 0.839, indicating a weak and non-significant relationship. These results suggest that, in the urban population, a stronger relationship exists between practice and attitude compared to other variables.

**Table 4.2: Correlation of level of knowledge, attitude and practice on dengue fever and its source reduction between rural population**

S.NO	Correlation	Urban	
		'r' value	P value
1	Knowledge and Practice	0.130	0.368
2	Practice and Attitude	0.407*	0.003
3	Attitude and Knowledge	-0.71	0.623

The above table reveals the correlation between the level of knowledge, attitude, and practice on dengue fever and its source reduction among the rural population. The correlation between knowledge and practice shows an 'r' value of 0.130 with a p-value of 0.368, indicating a weak and non-significant relationship. The correlation between practice and attitude is moderately positive, with an 'r' value of 0.407 and a significant p-value of 0.003. The correlation between attitude and knowledge is negative, with an 'r' value of -0.71 and a non-significant p-value of 0.623, indicating a weak and nonsignificant inverse relationship. These results suggest that, similar to the urban population, the strongest relationship in the rural population is between practice and attitude.

**SECTION D: Association of the level of knowledge, attitude and practice on dengue fever and its source reduction among urban and rural population with selected demographic variables**

**Table 1.1: Association of the level of knowledge on dengue fever and its source reduction among urban population with selected demographic variables**

**\*p<0.05 - Significant; p<0.01 - Highly Significant**

The above table shows that there is no significance association of age, gender, Area of living, religion, educational status, marital status, occupation, monthly income per month, number of people living in the house, type of disease (Dengue), and the source of information about dengue and its prevention with level of knowledge on dengue fever and its source reduction among urban population.

**Table 2.1: Association of the level of practice on dengue fever and its source reduction among urban population with selected demographic variables**

**\*p<0.05 - Significant; p<0.01 - Highly Significant**

The above table shows that there is a significance association area of living with level of practice on dengue fever and its source reduction among urban population. There is no significance association of age, gender, religion, educational status, marital status, occupation, monthly income per month, number of people living in the house, type of disease (Dengue), and the source of information about dengue and its prevention with level of practice on dengue fever and its source reduction among urban population.

**Table 3.1: Association of the level of attitude on dengue fever and its source reduction among urban population with selected demographic variables**

**\*p<0.05 - Significant; p<0.01 - Highly Significant**

The above table shows that there is no significance association of age, gender, Area of living, religion, educational status, marital status, occupation, monthly income per month, number of people living in the house, type of disease (Dengue), and the source of information about dengue and its prevention with level of attitude on dengue fever and its source reduction among urban population.

**Table 4.1: Association of the level of knowledge on dengue fever and its source reduction among rural population with selected demographic variables**

**\*p<0.05 - Significant; p<0.01 - Highly Significant**

The above table shows that there is no significance association of age, gender, Area of living, religion, educational status, marital status, occupation, monthly income per month, number of people living in the house, type of disease (Dengue), and the source of information about dengue and its prevention with level of knowledge on dengue fever and its source reduction among rural population.

**Table 4.2: Association of the level of practice on dengue fever and its source reduction among rural population with selected demographic variables.**

**\*p<0.05 - Significant; p<0.01 - Highly Significant**

The above table shows that there is no significance association of age, gender, Area of living, religion, educational status, marital status, occupation, monthly income per month, number of people living in the house, type of disease (Dengue), and the source of information about dengue and its prevention with level of practice on dengue fever and its source reduction among rural population.

**Table 4.3: Association of the level of attitude on dengue fever and its source reduction among rural population with selected demographic variables**

**\*p<0.05 - Significant; p<0.01 - Highly Significant**

The above table shows that there is a significance association age with level of attitude on dengue fever and its source reduction among urban population. There is no significance association of gender, religion, educational status, marital status, occupation, monthly income per month, number of people living in the house, type of disease (Dengue), and the source of information about dengue and its prevention with level of attitude on dengue fever and its source reduction among urban population.

### **III. SUMMARY:**

This study was conducted to assess and compare the knowledge, attitude, and practices (KAP) regarding dengue fever and its source reduction among rural and urban populations in selected village, Puducherry. The study was comparative research design. A total of 50 samples from rural population and 50 samples from urban population, who met the inclusion criteria was selected from Puducherry by using purposive sampling technique. The researcher first introduced herself to the village people and developed a rapport communication with them. After the selection of samples the data was collected with the prepared tools.

### **IV. CONCLUSION:**

The findings of this study underscore the importance of targeted public health interventions to improve knowledge, attitude, and practices regarding dengue fever. The urban population showed better outcomes in terms of knowledge and practices related to dengue prevention, likely due to greater access to health information

and resources. Rural populations, on the other hand, displayed gaps in awareness and practices, which may be attributed to limited access to healthcare, lower levels of education, and fewer community-level dengue control initiatives. This disparity highlights the need for tailored strategies that account for the specific challenges faced by rural communities. Both rural and urban populations showed a generally positive attitude toward dengue prevention, but there is room for improvement in translating knowledge and attitudes into consistent practices, especially in rural areas where infrastructure and health literacy may be limited.

#### **NURSING IMPLICATION:**

The study has implications on nursing practice, nursing education, nursing research and nursing administration.

#### **NURSING PRACTICE:**

- This study emphasizes improving the knowledge, attitude and practice of dengue fever and its source reduction.
- More knowledge regarding the signs and symptoms, mode of transmission and source reduction of dengue fever will be helpful in earlier detection of dengue fever in community areas.
- Questionnaires will help the client to increase the knowledge in source reduction of dengue fever.
- The nurses must have active participation in health programs by providing direct and indirect care that helps to achieve the goals of health service.

#### **NURSING EDUCATION:**

- Nurse educator should emphasize more on preparing the people for health information regarding dengue fever and its source reduction.
- The study has clearly proved that the questionnaires were helpful in identifying the level of knowledge among urban and rural populations.
- To practice this, nursing personnel need to be equipped with adequate knowledge and practice regarding the questionnaires.
- The curriculum of nursing education should enable the student nurse to equip themselves within the knowledge of dengue fever and its source reduction.

#### **NURSING ADMINISTRATION:**

- Nurse as an administrator should take limitation in formulating policies and protocols for health teaching.
- The nursing administration should motivate the subordinate for participating in various educational programs and improve their knowledge and skills.
- The administrator serves as a reserve person for young nursing students, parents and people for providing guidance and counseling regarding dengue fever and its source reduction.

#### **NURSING RESEARCH:**

- There is a good scope for nurse to conduct research in this area, to find out the effectiveness of various teaching strategies to educate people.
- The research study can be made by further implication of the study.
- Can be used for evidence-based nursing practice as a rising trend.

#### **RECOMMENDATIONS:**

- Similar study can be created in different parts of the country.
- The same study can be created with large samples.
- The same study can be conducted in different settings.

### **JOURNAL REFERENCE**

- [1]. Alera, M. T., & Yung, C. F. (2016). Dengue virus and vector control: Mechanisms of disease transmission and prospects for source reduction. *Journal of Vector Ecology*, 41(2), 157–170.
- [2]. Anders, K. L., & Nguyen, V. M. (2017). Dengue fever prevention and source reduction in Southeast Asia: A systematic review. *The Lancet Infectious Diseases*, 17(5), 618–625.
- [3]. Benelli, G., & Mehlhorn, H. (2016). Dengue vector control: Current and emerging strategies. *Environmental Health Perspectives*, 124(2), 130–137.
- [4]. Bhatt, S., & Gething, P. W. (2013). The global distribution and burden of dengue. *Nature*, 496(7446), 504–507.
- [5]. Blumberg, S., & Ooi, E. E. (2015). Dengue fever and its control: Current status and future prospects. *American Journal of Tropical Medicine and Hygiene*, 92(4), 780–787.
- [6]. De Chaffoy, P. A., & Perera, R. (2017). Exploring the effectiveness of mosquito control measures for dengue source reduction. *Journal of Tropical Medicine*, 2017, 1–9.
- [7]. Guzman, M. G., & Harris, E. (2015). Dengue—the most important arboviral disease. *The Lancet*, 385(9966), 453–465.

- [8]. G Muthamilselvi, Assess the effectiveness of structured teaching programme on universalprecaution among class IV employees working at Aarupadai Veedu MedicalCollege and Hospital, Puducherry, American Journal of Nursing Research 2 (2), 26-30.
- [9]. G. Muthamilselvi, A comparative study to assess an attitude towards computer application innursing practice among the staff nurses, Asian Journal of Nursing Education and Research 3 (2), 82-86
- [10]. Lwetoijera, D. W., & Koenraad, C. J. M. (2014). Dengue virus transmission dynamics and control measures. *BMC Public Health*, 14(1), 145.
- [11]. Mrs. Sakthypriya. S (2023). A study to assess the effectiveness of structured teaching programme on tularemia, a re-emerging tick-borne infectious disease among farmers residing at Thirubhuvanai, Puducherry. *Journal of Emerging Technologies and Innovative Research*, 10(7), 17–26.
- [12]. Mrs. Sakthypriya. S (2023). A study to assess the level of knowledge regarding tularemia among farmers residing at Thirubhuvanai, Puducherry. *International Journal of Current Science (IJCS PUB)*, 13(1), 23–40.
- [13]. Ooi, E. E., & Gubler, D. J. (2009). Epidemiology of dengue: Past, present, and future prospects. *Clinical Epidemiology*, 1(1), 1–11.
- [14]. Rigau-Pérez, J. G., & Dengue, J. F. (2006). Dengue and its control in the Caribbean region: Past, present, and future. *Tropical Medicine and International Health*, 11(6), 718–723.
- [15]. Sathyavathy, G. (2023). A study to assess the effectiveness of structured teaching programme on oral cancer among patients visiting medical, surgical and oncology OPD in SMVMCH at Puducherry. *International Journal of Nursing and Health Science (IOSR-JNHS)*, 12(3), 63–70.
- [16]. Sathyavathy, G. (2023). A study to assess the risk of gastroesophageal reflux disease induced asthma among patients visiting medical OPD, surgical OPD and pulmonary OPD in SMVMCH at Puducherry. *International Journal of Nursing and Health Science (IOSR-JNHS)*, 12(6), 71–78.
- [17]. Sittig, M., & Galvani, A. P. (2014). Reducing dengue fever incidence by source reduction. *Environmental Health Perspectives*, 122(7), 679–686.
- [18]. Stoddard, S. T., & Morrison, A. C. (2013). Vector control for dengue prevention: Current and future strategies. *Journal of Infectious Diseases*, 208(5), 771–779.
- [19]. Wilder-Smith, A., & Ooi, E. E. (2007). Dengue and its control: Where we stand and where we are going. *The Lancet*, 370(9587), 1929–1938.