KESANS: International Journal of Health and Science
2808-7178 / 2808-7380
http://kesans.rifainstitute.com/index.php/kesans/index

Health Intervention for Dengue Prevention in Dili Municipality, Timor-Leste, 2024 Year

Aniceto da Conceição Pacheco, Levi Anatolia S. M. Exposto, Felisbela A. O. de Oliveira, Jimedio A. C. Quim, Eliseba Borges Ximenes, Marcos Carvalho
Faculty of Public Health and Medical Science, Universidade da Paz, Timor-Leste
anis.pacheco123@gmail.com

Article Information
Submitted: **02 June 2025**
Accepted: **10 June 2025**
Publish: **30 June 2025**

Keyword: Health Intervention; Prevention; Dengue;

Abstract
Introduction: *Dengue fever, a mosquito-borne viral disease, causes significant public health problems, especially in countries with limited human resources for disease control and prevention. In Timor-Leste, every year, a new outbreak of dengue fever occurs.* ***Objective:*** *The study aimed to find out the Health Intervention for Dengue Prevention.* ***Method:*** *This study utilized quantitative descriptive research with a cross-sectional approach, targeting 97 households in Dili Municipality. A purposive sampling technique was used, and data were collected using a questionnaire. Descriptive statistics and Pearson's Product-Moment correlation were used to analyze the data.* ***Result and Discussion:*** *The study found that health promotion is effective to preventing dengue with a success rate of 47.4% and a failure rate of 22.7%. A significant correlation was found between health promotion and dengue fever prevention. Fumigation was found to be the most effective method, with a 50.5% success rate and a 29.9% failure rate. Slaughter was also found to be effective, with a 45.4% success rate and 29.9% failure rate. Health promotion in preventing dengue fever in Timor-Leste is important.* ***Conclusion:*** *However, a lack of awareness and understanding hinders progress. Bottom-up strategies should involve all community members, not just those following best practices. The Ministry of Health is implementing fumigation campaigns, but environmental control, awareness raising, adoption, and empowerment are also needed.*

How to Cite **Aniceto da Conceição Pacheco, Levi Anatolia S. M. Exposto, Felisbela A. O. de Oliveira, Jimedio A. C. Quim, Eliseba Borges Ximenes, Marcos Carvalho/Health Intervention for Dengue Prevention in Dili Municipality, Timor-Leste, 2024 Year, Vol. 4, No. 9, 2025**
DOI https://doi.org/10.54543/kesans.v4i9.373
e-ISSN/p-ISSN **2808-7178 / 2808-7380**
Published by **CV Rifainstitut/KESANS: International Journal of Health and Science**

Introduction

The World Health Organization reports more than 7.6 million cases of dengue fever, including 3.4 million confirmed cases, 16,000 severe cases, and 3,000 deaths. Dengue fever is transmitted through mosquito bites, causing mild febrile illness or severe complications such as shock, bleeding, or organ damage. (WHO, 2024). Dengue has emerged as the most widespread and rapidly increasing vector-borne disease in the world. According to the WHO that of the 3.5 billion people around the world living in dengue endemic countries and at risk of contracting dengue fever, 1.3 billion live in dengue endemic areas in 10 countries of the SEA Region. This region accounts for more than half of the global dengue burden, with five highly endemic countries including India, Myanmar, Sri Lanka, and Thailand. Factors contributing to the expansion of dengue include high population growth, inadequate water supplies, poor waste management, global trade and tourism, global warming, changes in public health policies, and hyper-endemicity in urban areas. (SEARO, 2024).

Dengue fever, a mosquito-borne viral disease, causes significant public health problems, especially in countries with limited resources for disease control and prevention. To reduce the risk of mosquito bites, residents and visitors should use mosquito repellent, wear protective clothing, and stay in areas with screened doors and windows. Public health measures, including vaccination, vector management, community outreach, and provider education, are needed to improve outcomes. (Ware-Gilmore et al., 2025). Although traditional control methods such as fogging, larvicides, and public awareness campaigns are widely used, their long-term effectiveness is undermined by limited community participation. (Dom et al., 2025; Imelda K. Moise, Leo C. Zulu, 2018). Urban populations often face challenges such as socioeconomic disparities, low health literacy, and cultural attitudes that reduce personal responsibility for vector control. (Dom et al., 2025; Kache et al., 2022). The Ministry of Health of Timor-Leste reports annual cases of dengue-related morbidity and mortality. In 2019, the incidence was 19.17%, with a 14.28% mortality rate. In 2020, it increased to 28.48%, with a 28.57% mortality rate. In 2021, it was 28.50%, with a 35.71% mortality rate. In 2022, it decreased to 23.83%, with a 21.42% mortality rate. In Dili Municipality, the incidence increased to 46.07%, with a 40.0% mortality rate. In 2022, it decreased to 15.14%, with a 35.0% mortality rate. (Pacheco et al., 2024).

Minister of Health's Timor-Leste strategies to control in Dili focus on vector control, including fumigation and larvicide use around reported cases. Public health messages are also being provided to encourage communities to reduce breeding sites and larval habitats by encouraging people to dispose of trash and other items that can collect water, such as old tires, cans, and bottles. (Machado et al., 2024). To empower the population to maintain and enhance their health, the Timor-Leste Ministry of Health established Health Promotion. Every individual or group must be able to recognize and fulfill their goals, meet their requirements, and manipulate or manage their surroundings to attain a healthy state. The lack of cleanliness in homes, particularly concerning the discharge of wastewater around the house, is the present issue that the people of Timor-Leste are facing. However, another issue with dengue fever eradication is public understanding of the need to maintain a clean house. The fact that the community disregards the health professionals' campaign or education is considerably more complex.

Health promotion is the process of empowering individuals to control and improve their health. The emphasis is on human behavior through a variety of environmental and social interventions. Health promotion helps communities, governments, and societies address health problems. This is achieved by establishing constructive public policies, fostering supportive environments, and increasing the capacity of individual and community services (WHO, 2024). Health promotion can improve health literacy and skills to facilitate individual and community health. Health professionals are provided in communities and schools through speakers, posters, and pamphlets related to dengue prevention. Health promotion in public health has two meanings. First, health promotion is part of the disease prevention level. Second, health promotion is the marketing of health messages so that people can receive health messages from promoters. Health promotion is a community empowerment process that aims to maintain and improve community health and to change people's behavior. (da Silva et al., 2024).

Health promotion is critical in preventing dengue and other mosquito-borne diseases by raising awareness about how to eliminate mosquito breeding sites, use mosquito repellents, and seek medical attention promptly. This education reduces the incidence of dengue and saves lives. Investing in health promotion programs builds resilience in communities and health care systems, preparing them to respond to future infectious disease outbreaks. Efforts to control dengue fever can be accomplished by promoting health awareness among those at risk of contracting the disease. Numerous factors, such as the health promotion methods and media used, will affect health promotion. (Tarigan et al., 2020). The purpose of the study is to find out the Health Intervention for Dengue Prevention in Dili Municipality, Timor-Leste.

Methods

Quantitative research methods are methods used to answer research problems related to data in the form of numbers and statistical programs (Adiputra et al., 2021). The method used in this study is quantitative descriptive research with a Cross-Sectional approach. The target population in this survey was the head of household in Dili Municipality, with a sample of 97 households. The sample selection technique was carried out using a purposive sampling technique. The main instrument used for data collection was a questionnaire with the mWater application. The analysis used descriptive statistics to explain the distribution of respondent characteristics. The researcher used Pearson's Product-Moment correlation to assess the relationship between variables, and this analysis was supported by the SPSS version 22.0 application.

Results and Discussion

1. Result

Table 1
Descriptive analysis of the characteristics of respondents

	Frequency	Percent (%)
Gender		
Women	63	64.9
Men	34	35.1
Aged		
16-20	6	6.2
21-25	14	14.4
26-30	16	16.5
31-35	7	7.2
36-40	16	16.5
41-45	18	18.6
46-50	6	6.2
> 50	14	14.4
Employees status		
Government employees	26	26.8
Private employees	3	3.1
Others	68	70.1

Based on descriptive analysis, it shows that as many as 64% of women and 35.1% of survey participants, with the majority aged 41-45 years, have employee status, as many as 18.6% and from the government sector as many as 26.8% while in the private sector only 3.1%.

Table 2
Analysis Health Promotion, Fumigation, Slaughter (abate), and Dengue Prevention

Health Promotion	Dengue Prevention		Total	Pearson's R	*p value*
	Not success	successfully			
Effective	22 (22.7%)	46 (47.4%)	68 (70.1%)	0.307	0.002
Not effective	19 (19.6%)	10 (10.3%)	29 (29.9%)		
Fumigation (Fogging)					
Effective	29 (29.9%)	49 (50.5%)	78 (80.4%)	0.209	0.04
Not effective	12 (12.4%)	7 (7.2%)	19 (19.6)		
Slaughter (Abate)					
Effective	29 (29.9%)	44 (45.4%)	73 (75.3%)	0.09	0.382
Not effective	12 (12.4%)	12 (12.4%)	24 (24.7%)		
Total	41 (42.3%)	56 (57.7%)	97 (100%)		

Based on the results of the analysis show that health promotion is effective, with a success rate of dengue fever prevention of 47.4% and a failure rate of 22.7%. And as many as 10.3% of respondents answered that health promotion is not effective for dengue fever prevention. Statistical analysis shows that there is a significant correlation between health promotion and dengue fever prevention in Dili Municipality, Timor-Leste, as indicated by Pearson's R of 0.307 and a p-value of 0.002. Fumigation (Fogging) was 50.5% for the success of dengue prevention. The failure rate was 29.9%. Some respondents answered that no effective Fumigation in preventing dengue fever, which was 7.2%. A statistical analysis shows a significant correlation between Fumigation on dengue prevention in Dili Municipality, Timor-Leste, with Pearson's R being 0.209 and

the *p-value* is 0.04. Slaughter (Abate) was 45.4% for the success of preventing dengue fever, and 29.9% were unsuccessful. Some respondents answered that Slaughter was not effective in preventing dengue fever, which was 12.4%. A statistical analysis shows no significant correlation between the Slaughter with dengue prevention in Dili Municipality, Timor-Leste, with Pearson's R being 0.209 and *p-value* is 0.04.

2. Discussion

Health Promotion is very important for all people, especially in Timor-Leste. The study found that health promotion is effective, with a success rate of dengue fever prevention is 47.4%. The problem currently faced by the people of Timor-Leste is the lack of understanding and awareness of the society about dengue prevention. This is in line with (Sulistyawati et al., 2019), although various campaigns have been conducted involving the community in preventing dengue fever, the level of knowledge is still minimal, and compliance with the routines taught is still low in many community groups. To increase motivation levels, bottom-up strategies are needed to involve all community members in dengue control, not only those who already comply with best practices.

To improve the community's knowledge, health workers should provide routine health promotion every month can improve public understanding in preventing dengue fever. It's a line with National Health Sector Strategy Plan II 2020-2030 the goal of health promotion is to improve the capacity of individuals, families, and communities to live a healthy life and to create a healthy environment that is conducive to practicing healthy behaviors for improving the health status of the people of Timor-Leste, (NHSSP II 2020-2030, 2020).

Implementing effective health promotion methods is crucial for dengue fever prevention in Timor-Leste. It's related to National Health Sector Strategy Plan II 2020-2030 the Ministry of Health establish the guidelines of Health to implementing health promotion is effective used the instructional guide will help remind health professional to will provide concrete instructions for using the various products in Healthy Families, Happy Families: such as flipcharts, videos, recipe books, healthy toys, stories, and materials that give advice (such as a poster to hang on the wall/sticker/brochure). These materials can be useful to help us communicate with groups, as well as with individuals. (MdS, 2018)

Currently, health promotion does not produce a good outcome for communities because the incidence of dengue increases yearly in Timor-Leste. It's a line with (Tarigan et al., 2020) found that a relationship exists between extension strategies and motivation for a healthy lifestyle, influencing the community's knowledge. Health promotion failed to change people's behavior in preventing dengue fever, so the Ministry of Health changed its strategy by using Slaughter (abate). Abate is distributed to certain areas that are potentially infected with dengue fever. Slaughter (abate) is one method for eradicating mosquito larvae in water reservoirs used in daily life, especially for washing or bathing.

This study shows that mosquito larvae eradication in Dili City has not been effective; during the rainy season, the number of cases continues to increase. This study found that Slaughter (Abate) was 45.4% for the success of preventing dengue fever, and 29.9% were unsuccessful. Some respondents answered that Slaughter was not effective in preventing dengue fever, which was 12.4%. Dengue fever, which is seasonal in Timor-Leste, requires thorough monitoring of potential vector breeding sites, so that when vector densities increase, they can be monitored and proactive control measures can be

implemented rather than reactive measures. In addition to specific diagnosis and treatment, case tracking, follow-up, referral to hospital, use of personal mosquito bite prevention techniques, use of insecticides and larvicides for adults, capacity building, social, community, and awareness mobilization (WHO-TL, 2021).

Another strategy from the Ministry of Health to combat dengue is the fumigation program. Fumigation is one way to control mosquitoes in areas with many cases of dengue fever to reduce the development of mosquitoes that carry the disease. In addition, fumigation must be carried out according to established standards to kill mosquitoes flying around the house. Fumigation is one of the most effective mosquito-killing tactics, yet dirty and poorly managed environmental conditions might allow mosquitoes to grow around the house. This study found that Fumigation (Fogging) was 50.5% for the success of dengue prevention. The failure rate was 29.9%. 7.2% of respondents answered that fumigation is not effective in preventing dengue fever. Poor home sanitation can have a significant impact on public health issues. This reflects the study conducted by (Rakhmani & Zuhriyah, 2024) Three innovative programs are needed: increasing community and health worker knowledge, implementing "3M Plus" to suppress vector breeding in households, and promoting the program as a community empowerment approach. Successful management requires collaboration between communities and health workers through various creative programs, ensuring long-term dengue control and prevention.

Finding

Based on the research results, researchers found a concept that can be used to overcome the problem of dengue fever in Timor Leste. Given that the incidence of dengue fever increases every year during the rainy season, the Ministry of Health of Timor Leste is strengthening health strategies for the prevention of dengue fever in Timor Leste.

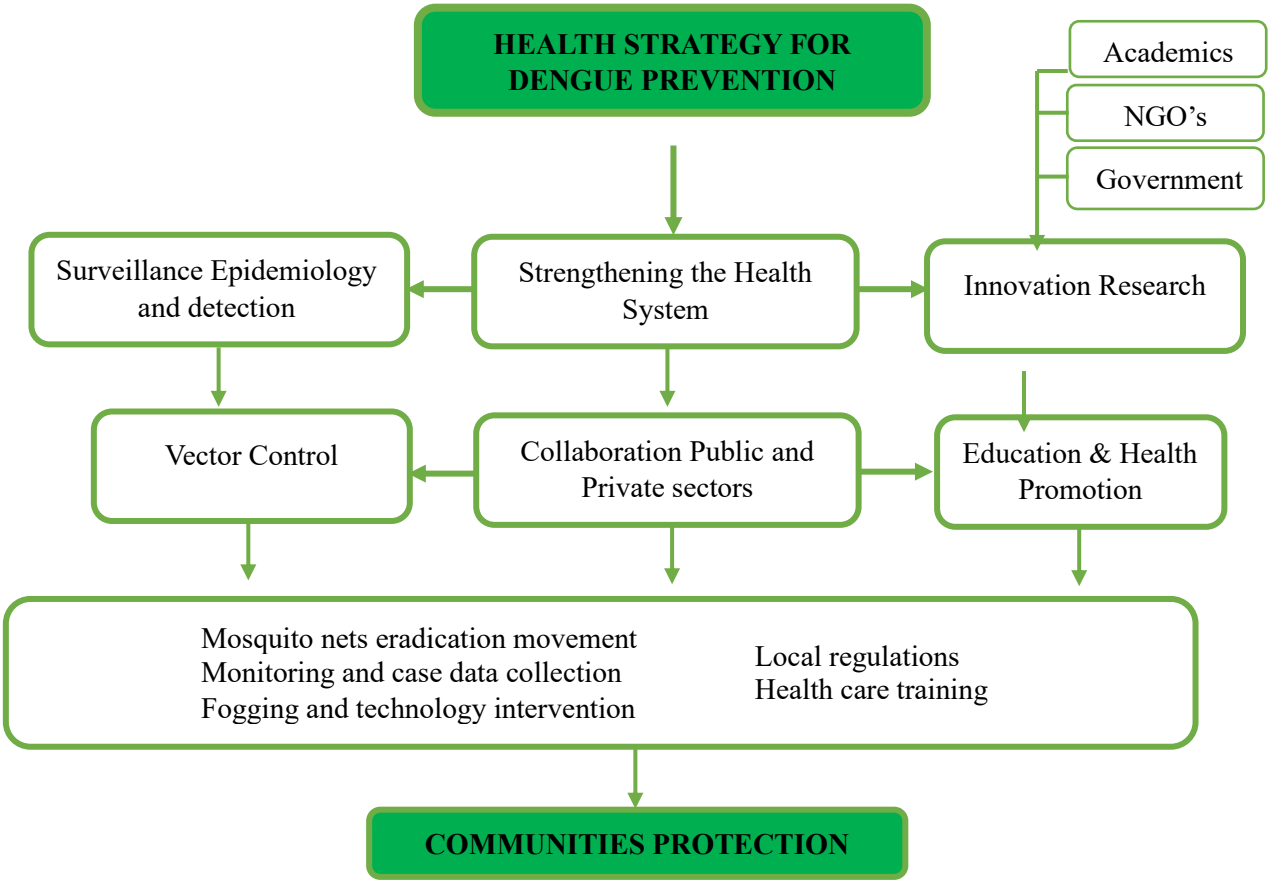

Fig. 1. Framework of Health strategy for dengue prevention

Conclusion

Health promotion is crucial in Timor-Leste, with a 47.4% success rate for dengue fever prevention. However, the lack of awareness and understanding about prevention hinders progress. To increase motivation, bottom-up strategies should involve all community members in dengue control, not just those already following best practices. The study reveals that mosquito larvae eradication in Dili City is ineffective due to increasing cases during the rainy season. Slaughter was found to be 45.4% effective in preventing dengue fever, with 29.9% unsuccessful. Timor-Leste's Ministry of Health is implementing a fumigation campaign to eradicate mosquitoes in high-dengue fever-infected regions. Community awareness raising, adoption, and community empowerment are also needed. This study suggests that the Ministry of Health needs to explore more health promotion in the community. Health promotion is not enough for dengue prevention, the government needs to change the health prevention strategy. Establish health workers in village offices to work with community leaders to develop health promotion strategies to combat dengue in Timor-Leste.

References

Adiputra, I. M. S., Trisnadewi, N. W., Oktaviani, N. P. W., & Munthe, S. A. (2021). *Metodologi Penelitian Kesehatan* (S. K. Ronal Watrianthos & Janner Simarmata Desain Sampul: Devy Dian Pratama (ed.)). Penerbit Yayasan Kita Menulis.

da Silva et al. (2024). Literature Review: Health Promotion Strategies Stunting Prevention in Timor-Leste. *KESANS: International Journal of Health and Science*, *3*(11).

Dom, N. C., Dapari, R., Kamal, H. A., Harun, Q. N., Salleh, S. A., & Aljaafre, A. F. (2025). Exploring community willingness and barriers to digital solutions and training for dengue prevention: a cross-sectional study in major urban areas of Malaysia. *BMC Public Health*, *25*(1). https://doi.org/10.1186/s12889-025-22677-5

Imelda K. Moise, Leo C. Zulu, D. O. F. and J. C. B. (2018). Persistent Barriers to Implementing Efficacious Mosquito Control Activities in the Continental United States: Insights from Vector Control Experts. *Current Topics in Neglected Tropical Diseases. Intech*, *i*(tourism), 13. https://doi.org/http://dx.doi.org/10.5772/57353

Kache, P. A., Santos-Vega, M., Stewart-Ibarra, A. M., Cook, E. M., Seto, K. C., & Diuk-Wasser, M. A. (2022). Bridging landscape ecology and urban science to respond to the rising threat of mosquito-borne diseases. *Nature Ecology and Evolution*, *6*(11), 1601–1616. https://doi.org/10.1038/s41559-022-01876-y

Machado, F. D. N., Draper, A. D. K., Bosco, F., Tilman, A. J. P., Soares, E., Soares, N. G., Sarmento, N., Niha, M. A. V, Soares, A. F., Taal, A., Francis, J. R., Yan, J., Miller, M., Flint, J., Petrie, S., Thompson, L., Kaldor, J., Kirk, M., & Sheel, M. (2024). Communicable Diseases Intelligence: A brief description of the epidemiology of dengue in Dili, Timor-Leste, 2018–2022. *Australian Government. Department of Health and Aged Care*, *48*, 2018–2022.

MdS. (2018). *Matadalan ba Implementasaun Promosaun Saúde*.

NHSSP II 2020-2030. (2020). *National Health Sector Strategy Plan II 2020-2030*.

Pacheco, C., Lino, M. N., & Tilman, C. B. (2024). Family characteristics, Basic Sanitation through Health promotion, moderating in prevention of Dengue in Dom Alexo, Dili, 2024. *Asian Journal of Healthy and Science*, *3*(10), 278–289.

Rakhmani, A. N., & Zuhriyah, L. (2024). Knowledge, Attitudes, and Practices Regarding Dengue Prevention Among Health Volunteers in an Urban Area – Malang, Indonesia. *Journal of Preventive Medicine and Public Health*, *57*(2), 176–184. https://doi.org/10.3961/jpmph.23.484

SEARO. (2024). *Dengue in Southeast Asia*. 1–23. https://www.who.int/southeastasia/health-topics/dengue-and-severe-dengue

Sulistyawati, S., Astuti, F. D., Umniyati, S. R., Satoto, T. B. T., Lazuardi, L., Nilsson, M., Rocklov, J., Andersson, C., & Holmner, Å. (2019). Dengue vector control through community empowerment: Lessons learned from a community-based study in Yogyakarta, Indonesia. *International Journal of Environmental Research and Public Health*, *16*(6). https://doi.org/10.3390/ijerph16061013

Tarigan, M. I., Badiran, M., & Napitupulu, L. H. (2020). Health Film Promotion, Media, And Motivation On Community Knowledge In Preventing Dengue Fever. *Iamsph*, *1*(1), 37--50.

Ware-Gilmore, F., Rodriguez, D. M., Ryff Mph, K., Torres, J. M., Velez, M. P., Torres-Toro, C. T., Santiago, G. A., Rivera, A., Madewell, Z. J., Maldonado, Y., Cardona-Gerena, I., Brown, G. C., Adams, L. E., Paz-Bailey, G., & Marzán-Rodriguez, M. (2025). Dengue Outbreak and Response - Puerto Rico, 2024. *MMWR. Morbidity and Mortality Weekly Report*, *74*(5), 54–60. https://doi.org/10.15585/mmwr.mm7405a1

WHO-TL. (2021). National strategic plan for Integrated Vector-borne diseases, Timor-Leste 2021-2030. *Pharmacognosy Magazine*, *75*(17), 399–405.

WHO. (2024). *Dengue - Global situation*. https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON518