ABDI MASYARAKAT
Vol. 7 No 2 Desember 2025
***P-ISSN**: 2715-8799;**E-ISSN**: 2715-9108*
Link : *http://ejournal.mandalanursa.org/index.php/PB/issue/archive*

Socialization of the Use of Larvicides as a Strategy to Overcome the Increase in Dengue Fever Cases in Darmasaba Village, Abiansemal District, Badung Regency, Bali Province

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Article Info
Article history:
Accepted: 23 August 2025
Publish: 01 December 2025

Keywords:
Dengue Fever,
Larvicides,
Socialization
,Disease Prevention.

Abstract
This study aims to analyze the effectiveness of a larvicide socialization program as a strategy to address the increasing number of Dengue Hemorrhagic Fever (DHF) cases in Darmasaba Village, Abiansemal District, Badung Regency. This qualitative study, using a case study design, employed data collection methods through in-depth interviews, observation, and document analysis. Respondents were selected using purposive sampling, including health officials, village officials, and community members. The results show that the socialization, including the direct distribution of larvicides to residents' homes, was effective in increasing community understanding and active participation. A positive change in behavior was observed, with residents routinely cleaning water containers and using larvicides, which contributed to a decrease in DHF cases. Nevertheless, challenges such as misconceptions about fogging being the only solution and resource limitations were still found. This study recommends stronger collaboration between the government, health workers, and the community, as well as the use of digital media to ensure the sustainability of the program

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1. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) remains a significant public health problem in Indonesia, including in Bali Province. This disease is caused by the dengue virus, which is transmitted through the bites of Aedes aegypti and Aedes albopictus mosquitoes. Based on information of *World Health Organization*. According to the World Health Organization (WHO), dengue fever cases have increased rapidly worldwide in recent decades. The number reported to WHO rose from 505,430 cases in 2000 to 14.6 million cases in 2024. (WHO, 2025) Ministry of Health data shows that dengue fever cases in various regions of Indonesia continue to fluctuate, and even tend to increase during certain periods, especially during the rainy season. (Ministry of Health of the Republic of Indonesia, 2021) increase in cases not only impacts morbidity and mortality rates, but also causes significant economic losses, both for individuals and the health system as a whole.

Darmasaba Village, located in Abiansemal District, Badung Regency, is also not immune to the threat of dengue fever. According to reports from the local Public Health Center (Puskesmas), there has been an alarming increase in dengue fever cases in recent years. In 2024, there were 44 cases, and in 2025, from January to July, there were 26 cases. This situation highlights the need for effective and sustainable interventions to control the mosquito population. The use of larvicides, which are chemical or biological agents designed to kill mosquito larvae, is one strategy that has proven effective in breaking the mosquito life cycle. (Widyantoro et al., 2021) Larvicides can be applied to water reservoirs that serve as breeding grounds for mosquitoes, such as bathtubs, drums, and flower vases.

Various vector control methods have been implemented, such as fogging and larviciding. However, the widespread use of fogging has been shown to lead to vector resistance and negative environmental impacts. (Juhairiyah et al., 2025). Therefore, an approach that focuses more on the source of the problem, namely mosquito larvae, is a more sustainable option. One promising approach is the use of larvicides, particularly those based on Bacillus thuringiensis.(Zaki et al., 2020).

Research by Widyantoro et al. (2021) shows that community-based dengue control is highly effective. This approach aligns with the concepts of community co-creation and participatory research, which emphasize the active role of communities in designing and implementing health programs. (Dambach et al., 2024; Samsudin, Othman, et al., 2024) However, the challenge that often arises is the lack of correct knowledge, attitudes, and practices (KAP) among the community regarding prevention efforts.(Prayitno et al., 2025).

Dengue fever prevention and control efforts, particularly through community outreach and empowerment programs, are strongly relevant to the Sustainable Development Goals (SDGs). Specifically, this research contributes to the achievement of SDG 3, a healthy and prosperous life, which aims to end epidemics of infectious diseases such as dengue fever by 2030. By increasing public awareness and participation in the National Dengue Fever Prevention Program (PSN), this research directly supports sustainable health development and strengthens local health systems to address the threat of infectious diseases.

Darmasaba Village, Abiansemal District, Badung Regency, is one of the areas frequently experiencing spikes in dengue fever cases. Therefore, this study focuses on a larvicide outreach program aimed at increasing community participation in mosquito nets eradication (PSN). This paper will examine how the outreach program was implemented and its effectiveness in changing community behavior and its impact on dengue fever cases.

2. RESEARCH METHODS

This research used a qualitative approach with a case study design to gain an in-depth understanding of the effectiveness of public awareness campaigns on larvicide use in Darmasaba Village, Abiansemal District, Badung Regency. This design allowed researchers to explore in detail the perspectives and experiences of the community and health workers, relevant to the research objectives. (Yin, 2018) research location was selected based on data from the Community Health Center (Puskesmas) showing a significant increase in dengue fever cases. The study will last for one month (August 2025). Sampling will be conducted using a cross-sectional technique of *purposive sampling* to select relevant respondents, consisting of 2-3 health workers, 10-15 village officials, the PKK chairperson of each banjar in Darmasaba village, and the village heads of all banjars in Darmasaba village. This sample size is considered sufficient to achieve data saturation.(Cresswell & Cresswell, 2018)Primary data was collected through in-depth interviews and participant observation, while secondary data was obtained from related documents such as dengue fever case reports and outreach materials. The collected data will be analyzed using an interactive qualitative data analysis method that includes data reduction, data presentation, and drawing conclusions.(Qomaruddin & Sa'diyah, 2024). Data validity will be strengthened through source and method triangulation techniques, namely comparing information from various sources and data collection techniques.

3. RESEARCH RESULTS AND DISCUSSION

The outreach program on larvicide use in Darmasaba Village, Abiansemal District, Badung Regency, went very well and smoothly. The outreach activities were not only theoretical but also included concrete actions by a team of students.

3.1 Implementation of the Socialization Program

The larvicide outreach program in Darmasaba Village was implemented in several stages. Initially, collaboration was carried out between the community health center (Puskesmas), the

village government, and health cadres. The main outreach was conducted through community meetings, door-to-door visits, and the use of digital media such as chat groups or social media to disseminate information (Permatasari et al., 2023).

3.2 Increased Knowledge and Behavior Change

Interviews with informants revealed a significant increase in community knowledge. Prior to the outreach program, many residents only knew fogging as the only effective method. However, after the outreach program, they understood that larviciding is far more effective in breaking the mosquito life cycle (Prayitno et al., 2025).

Some residents reported that they had begun routinely checking water reservoirs and applying larvicide. This demonstrates a shift in behavior from passive to more proactive. Active community participation in the One House, One Larva Monitor (Jumantik) movement has also increased (Huvaid et al., 2024).

This increased awareness and behavioral change directly contribute to achieving the Sustainable Development Goals (SDGs), particularly SDG 3, a healthy and prosperous life, which emphasizes the importance of disease prevention and strengthening basic health services. By actively involving communities in prevention efforts, this program not only supports the control and reduction of infectious diseases but also strengthens community resilience to future health challenges. This effort also aligns with the SDGs' principle of creating a healthier, more inclusive, and sustainable life for all levels of society.

3.3 Challenges and Opportunities

Despite improvements, some challenges were also identified.

a. Sustainability: Some residents reported that their motivation to continue using larvicides decreased after the initial program was completed.
b. Distribution: Access to larvicides remains an issue for some households.
c. Collaboration: Stronger collaboration between government, private sector, and communities is needed to address governance issues (Manaf et al., 2021).

One potential opportunity is the use of digital technology for monitoring and education (Salim et al., 2024). Furthermore, strengthening the role of local community leaders as program champions is crucial (Samsudin, Karim, et al., 2024).

Figure 1 Implementation of DHF and PSN 3M Plus Socialization, survey of Darmasaba village residents' homes and provision of mosquito larvae medication.

4. CONCLUSION

A larvicide awareness program in Darmasaba Village has proven effective in increasing public knowledge and changing behaviors related to dengue fever prevention. The program has successfully raised awareness that controlling mosquito larvae is key. This behavioral change, driven by appropriate outreach and community engagement, is a crucial step toward more sustainable dengue fever control.

The active community participation sparked by this outreach program not only reduced dengue fever cases but also strengthened community health systems and increased resilience to infectious diseases, aligning with the global vision for better and more sustainable health. Thus, this local effort serves as a concrete example of how community-based initiatives can support the global development agenda.

However, program sustainability and logistical challenges remain. Further research is recommended to conduct quantitative studies to directly measure the impact of the program's reduction in dengue cases. Furthermore, research on the most effective collaboration model to ensure program sustainability is highly relevant.

5. ACKNOWLEDGEMENT

The authors express their deepest gratitude to Warmadewa University for all their support in completing this research. Furthermore, our deepest appreciation goes to the Darmasaba Community Service Program students for their time and willingness to provide the necessary data and information. We would also like to express our deepest appreciation to all those who have assisted, directly or indirectly, in ensuring the successful completion of this article.

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