Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

Prevention and Control Strategies of Dengue Hemorrhagic Fever in Indonesia

Sunarsih[1], Tri Rizkiyanti Alwi[2], Andi Zuhra Ibrahim[3], Itha Puspita Sari[4], Masiti[5], Sy. Rugaiyah[6], Sri Handayani[7]
[1,2,3,4,5,6] Mahasiswa Prodi Magister Kesehatan Masyarakat, Universitas Muhammadiyah Palu
[7] Departemen Kesehatan Lingkungan, Fakultas Kesehatan Masyarakat, Universitas Hasanuddin, Indonesia

Received: April 19, 2025
Revised: April 28, 2025
Accepted: May 15, 2025
Published: May 24, 2025

Corresponding Author:
Author Name*: Sri Handayani
Email*:
srihandayani@unhas.ac.id

***Abstract*:** *Dengue Hemorrhagic Fever (DHF) is a significant public health issue in Indonesia, with incidence rates fluctuating every year. This study aims to identify and analyze the prevention and control strategies for DHF in Indonesia over the last five years (2019–2024) using a literature review method. The analyzed articles were selected based on inclusion criteria such as publications in Indonesian or English, published between 2019 and 2024, and directly discussing prevention or control strategies for DHF. The results show that strategies implemented in Indonesia include community-based approaches such as the 3M Plus movement, the use of innovative technologies like Wolbachia-infected mosquitoes, enhancement of surveillance systems, public education, and strengthening cross-sector coordination. Despite various efforts, challenges such as vector resistance, climate change, and lack of inter-agency synergy still hinder program effectiveness. Therefore, more integrated, evidence-based policies oriented toward community participation are needed to achieve optimal and sustainable DHF control.*

***Keywords* :** *Dengue Hemorrhagic Fever, Prevention Strategies, Vector Control, Wolbachia*

How to cite: Sunarsih, Alwi, T. R., Ibrahim, A. Z., Sari, I. P., Masiti, Rugaiyah, S. & Handayani S. (2025). Prevention and control strategies of Dengue Hemorrhagic Fever in Indonesia. Journal of Health and Hygiene, 2(1), 24–31. https://doi.org/10.62872/pysqyt79

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is one of the most serious public health issues in Indonesia. This disease is caused by the dengue virus, which is transmitted through the bite of the *Aedes aegypti* mosquito, and has become endemic in almost all regions of the country. According to data from the Ministry of Health of the Republic of Indonesia (2023), in 2022 there were 143,266 DHF cases with 1,237 deaths, indicating a significant increase compared to the previous year, which recorded 73,518 cases and 705 deaths. These figures reflect the high disease burden and highlight the need for evaluation and optimization of prevention and control strategies.

Globally, the World Health Organization (WHO, 2021) reported that approximately 390 million dengue infections occur each year, with around 96 million exhibiting clinical symptoms. Indonesia ranks among the top five countries with the highest number of cases worldwide, alongside Brazil, India, Vietnam, and the Philippines. The tropical climate, rapid urbanization, environmental changes, and low public awareness of vector control are key factors that exacerbate the spread of this disease.

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

Efforts to prevent and control DHF in Indonesia have so far been carried out through various strategies, such as the 3M Plus Mosquito Nest Eradication Movement (*Pemberantasan Sarang Nyamuk* or PSN), targeted fogging, empowerment of larva monitoring cadres (*Juru Pemantau Jentik* or Jumantik), community education, and cross-sectoral involvement. However, the effectiveness of these strategies largely depends on the consistency of implementation, the level of public awareness, and adequate policy support from local governments. In practice, many regions have not optimally implemented community-based approaches, even though community involvement is a key factor in breaking the transmission cycle of DHF.

On the other hand, technological advancements are also being utilized in DHF control, such as the use of *Wolbachia* bacteria to suppress the population of dengue virus-carrying mosquitoes and the implementation of digital DHF case reporting applications. However, the implementation of these innovations remains limited to certain areas and has not yet reached a national scale. Therefore, it is important to systematically assess how these strategies have been implemented in various regions and how much they contribute to reducing the incidence of DHF.

Various strategies have been adopted by the Indonesian government, including the 3M Plus movement (draining, covering, and recycling water storage containers + other preventive actions such as using larvicides), focused fogging, strengthening epidemiological surveillance, and the application of environment-based technology such as the release of *Wolbachia*-infected *Aedes aegypti* mosquitoes. Nevertheless, the effectiveness of these strategies strongly depends on community participation, program sustainability, and cross-sectoral coordination. Some studies show that despite increased education programs and community interventions, DHF cases remain fluctuating and often spike during the rainy season (Nuraini et al., 2020; Sutaryo et al., 2022).

In addition to conventional approaches, new challenges in DHF control have emerged in the digital and globalization era, including vector resistance to insecticides, climate change, and high population mobility. Therefore, a reassessment of the various DHF prevention and control strategies that have been and are being implemented in Indonesia is necessary. Through this literature review, the authors aim to analyze these approaches comprehensively, while also identifying gaps and opportunities for innovation in future DHF control efforts.

This study aims to analyze the strategies for the prevention and control of Dengue Hemorrhagic Fever (DHF) implemented in Indonesia, from the aspects of policy, field implementation, to the level of community participation. Specifically, this study aims to identify the forms of interventions that have been carried out, assess the effectiveness of each strategy such as the 3M Plus Mosquito Nest Eradication Movement, focused fogging, empowerment of Jumantik cadres, and technological innovations such as the use of *Wolbachia* and digital applications. Additionally, this study also aims to explore the supporting and inhibiting factors in the implementation of these strategies in order to provide relevant recommendations for enhancing more effective and sustainable DHF control efforts.

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

METODOLOGI

This study utilizes a literature review approach grounded in a qualitative descriptive method, with the primary goal of systematically identifying and critically analyzing dengue prevention and control strategies that have been applied in Indonesia over the past five years. This methodological choice is particularly appropriate because it enables a thorough exploration of existing evidence, capturing the evolving trends, assessing the effectiveness of various interventions, and uncovering the challenges faced in implementation, all without the resource-intensive process of conducting primary field research. By synthesizing findings from previously published studies and official documents, the study aims to provide a well-rounded and in-depth understanding of the current landscape of dengue control efforts in Indonesia.

The data for this study were sourced from a diverse range of scientific publications and authoritative policy documents released between 2019 and 2023. To ensure comprehensive coverage and reliability, the literature search was conducted across multiple reputable electronic databases, including internationally recognized platforms such as PubMed, ScienceDirect, and Google Scholar, as well as national academic portals like GARUDA and SINTA that specifically index Indonesian scholarly work. This extensive search strategy was designed to capture a wide spectrum of relevant research, encompassing both scientific investigations and practical policy-oriented studies.

To maintain the quality and relevance of the materials reviewed, specific inclusion criteria were established. These criteria required that the literature be (1) published within the 2019–2023 timeframe, ensuring the data reflects recent developments; (2) focused explicitly on dengue prevention and/or control strategies within the Indonesian context to maintain geographical relevance; (3) available in either the Indonesian or English language to facilitate accessibility and comprehension; and (4) composed of peer-reviewed scientific articles, official government reports, or institutional publications that have undergone rigorous review processes to assure credibility and accuracy. Conversely, the study excluded (1) opinion pieces, editorials, or non-empirical commentaries to avoid subjective bias; (2) documents that lacked contextual relevance to Indonesia to ensure the findings are applicable locally; and (3) articles that failed to present empirical data or substantial discussions related to dengue prevention or control strategies, thus preserving the analytical focus on evidence-based interventions.

The literature search was conducted using keywords such as: *"strategi pengendalian DBD di Indonesia," "dengue prevention Indonesia," "vector control dengue,"* and *"intervensi DBD 2019–2023."* After an initial screening based on titles and abstracts, the articles that met the criteria were analyzed in depth. A total of 20 primary documents were selected and analyzed in this study.

The data analysis technique used was thematic analysis, in which each article was reviewed to identify recurring key themes, such as community-based interventions, vector control technologies (including *Wolbachia*), health education and promotion, as well as policies from local and national governments. The findings from various sources were then narratively synthesized to present a comprehensive overview of dengue prevention and control strategies in Indonesia over the past five years.

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

Table 1. Inclusion and Exclusion Criteria for Literature Review

Criteria	Inclusion	Exclusion
Publication Year	2019–2023	Before 2019
Geographical Area	Studies focusing on Indonesia	Studies conducted outside Indonesia
Language	English or Indonesian	Other languages
Document Type	Peer-reviewed articles, government reports, or institutional publications	Opinion pieces, editorials, or abstracts only
Content	Studies discussing dengue prevention and control strategies	Studies unrelated to dengue prevention/control
Data	Studies presenting clear data or comprehensive analysis	Studies lacking clear data or methodology details

The inclusion and exclusion criteria applied in this study were carefully formulated to ensure that the literature reviewed was both relevant and of high scholarly quality. To be included, articles needed to meet several key conditions: they had to be published within the most recent five-year period, specifically from 2019 to 2024, to guarantee that the findings and insights reflect the latest developments and current practices in dengue prevention and control. Additionally, the articles had to be written in either Indonesian or English, ensuring accessibility for the research team and relevance to the Indonesian context. Importantly, only full-text articles were considered, which allowed for comprehensive analysis of the study methodologies, results, and discussions. The central thematic requirement was that the literature explicitly address dengue prevention and control strategies implemented in Indonesia, thereby maintaining a clear focus on the geographic and topical scope of the research. Conversely, the exclusion criteria filtered out any articles that did not satisfy these standards. Studies published prior to 2019 were excluded to avoid outdated information that may no longer reflect current realities or recent advancements. Articles that did not specifically relate to the Indonesian context were omitted to maintain the geographical relevance and applicability of the findings. Furthermore, articles without full-text availability were excluded, as the lack of complete information would hinder thorough evaluation and could compromise the integrity of the review. By applying these stringent inclusion and exclusion standards, the study ensures that the data and conclusions drawn are both accurate and meaningful, thus strengthening the overall validity and reliability of the research outcomes. This careful selection process also helps to avoid biases and inconsistencies that could arise from incorporating irrelevant or low-quality sources.

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

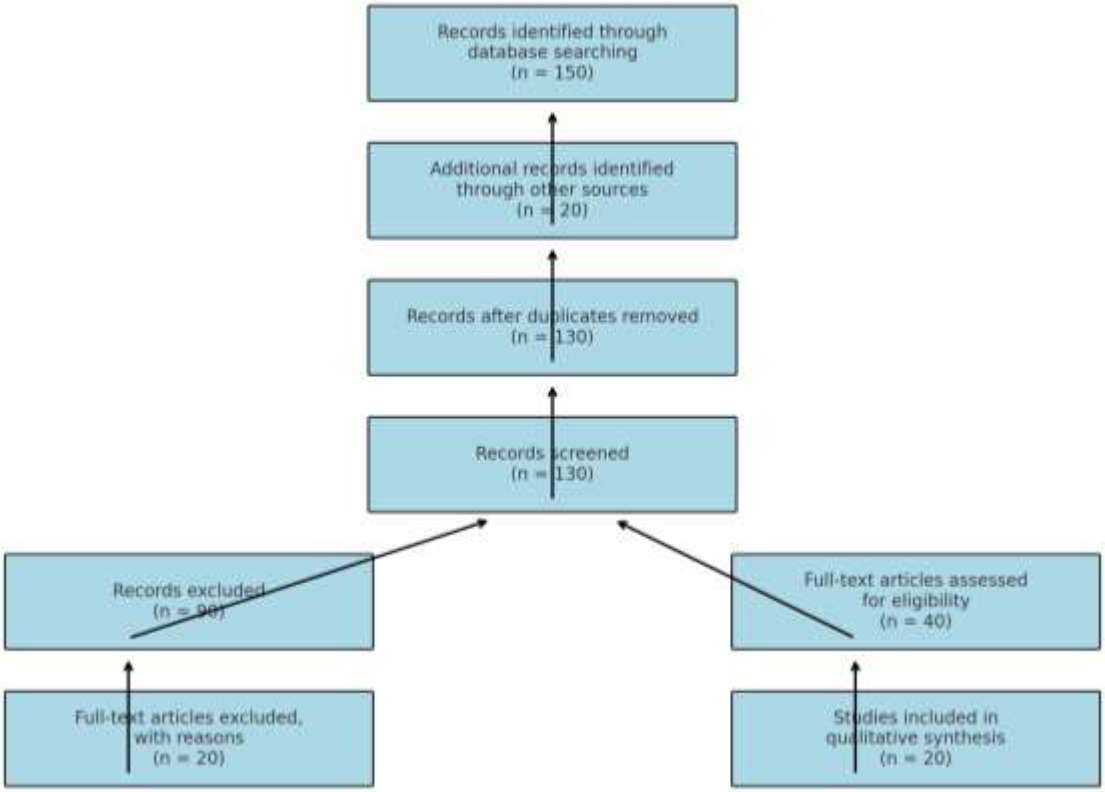

Fig 1. PRISMA Flow Diagram

The PRISMA diagram illustrates the systematic process of screening and selecting the literature used in this review. Initially, a total of 150 articles were identified through searches of major databases, with an additional 20 articles found from other sources, resulting in 170 articles overall. After removing duplicates, 130 articles remained and were screened based on their titles and abstracts. From this screening process, 90 articles were eliminated for being irrelevant to the topic or for not meeting the initial criteria. The remaining 40 articles were then assessed in full-text format to evaluate the relevance of their content. Of these, 20 articles were excluded for not aligning with the study's focus or lacking sufficient data on dengue prevention and control strategies in Indonesia. Finally, 20 articles were selected for further analysis in the qualitative synthesis. This diagram reflects a systematic, transparent, and standardized approach in the literature selection process, as recommended in the PRISMA guidelines for literature review studies.

RESULTS AND DISCUSSION

From the 170 identified articles, a total of 130 articles were obtained after duplication removal. After screening abstracts and titles, 40 articles were selected for full-text assessment. Of

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

these, 20 articles met the inclusion criteria and were further analyzed. The most frequently encountered prevention strategies include 3M Plus, the use of natural larvicides, public education campaigns, and technological innovations such as the release of Wolbachia mosquitoes. Local governments were also reported to have enhanced epidemiological surveillance efforts and digital-based reporting systems. Cross-sector collaboration, including the participation of schools and community organizations, is also a key element in controlling cases in several endemic areas.

This literature review reveals various prevention and control strategies for Dengue Hemorrhagic Fever (DHF) in Indonesia that have been implemented and evaluated for their effectiveness during the 2019–2023 period. From the 20 main literatures analyzed, it was found that DHF control efforts in Indonesia adopt a multidimensional approach that includes community-based interventions, innovative technology, government policies and regulations, as well as strengthening surveillance systems and cross-sector collaboration.

Community-Based Strategies and Health Education

Community-based approaches remain a cornerstone in DHF control. The 3M Plus movement program draining, covering, and burying water containers that have the potential to become mosquito breeding grounds has become a nationally promoted routine program. A study by Sari et al. (2021) reported that educational interventions and the involvement of health cadres in villages in Central Java successfully reduced the Mosquito Density Index (MDI) by up to 38% in the first six months. This approach is supported by health education activities and Clean and Healthy Lifestyle (PHBS) campaigns involving schools, women's groups, and community leaders, as described in the research by Putri et al. (2022). However, the effectiveness of this program is still limited by challenges in maintaining long-term behavioral change and consistency in the community. Several studies state that good knowledge is not always followed by consistent practices, due to low risk awareness, economic factors, and socio-cultural changes. This highlights the importance of more innovative and adaptive risk communication strategies using psychosocial approaches tailored to local conditions.

Vector Control Technology and Innovation

The use of modern technology has become an important component in DHF control strategies. One innovation that has received considerable attention is the release of Aedes aegypti mosquitoes infected with Wolbachia bacteria. Handayani et al. (2023) reported significant success from the Wolbachia intervention in the Yogyakarta region, which reduced DHF incidence by up to 70% over three years of implementation. This intervention works by inhibiting the mosquito's ability to transmit the dengue virus, and shows that community and local government support is a key factor in its success.

In addition, fogging with insecticides is still widely used as a rapid control method during outbreaks. However, the literature indicates a phenomenon of mosquito resistance to certain insecticides, which poses a serious challenge. Rahmawati et al. (2020) found that resistance to pyrethroid insecticides has increased in several urban areas in Indonesia, significantly reducing fogging effectiveness. Therefore, the development of new insecticides and alternative methods such as natural-based larvicides and mosquito traps (ovitraps) are important recommendations.

Government Policies and Regulations

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

Reviews of national and local policy documents show that the Indonesian government has issued various regulations to strengthen DHF control. The Ministry of Health (2022) emphasizes the importance of Minister of Health Regulation No. 45 of 2020 on Vector-Borne Disease Control. This regulation governs the implementation of integrated vector control, including the strengthening of human resource capacity, real-time case monitoring, and community empowerment. Additionally, the reinforcement of Posbindu and Puskesmas programs also serve as strategic means to implement prevention interventions. However, the implementation of this policy still faces challenges such as disparities in resources between regions, especially in remote areas and regions with limited healthcare access. Variations in compliance and support among local governments also affect the success of the programs. Therefore, cross-sector coordination and sustainable financing are key focuses in future policy development strategies.

Surveillance Systems and Cross-Sector Collaboration

Strengthening epidemiological surveillance systems is one of the crucial aspects of DHF control. Nugroho et al. (2021) emphasized the importance of integrating DHF case data with information technology to facilitate monitoring, reporting, and rapid response. Digital-based surveillance systems that integrate data from health facilities, community reports, and vector monitoring results enable more accurate and dynamic identification of high-risk areas. Cross-sector collaboration, including government, academia, communities, and the private sector, has also proven to increase the effectiveness of DHF control. These collaborative programs include the development of technological innovations, integrated health education, as well as environmental hygiene and sanitation programs. A study by Wahyuni et al. (2022) revealed that such integrated interventions had a significantly positive impact in reducing DHF cases in several districts in West Java.

Challenges and Barriers

Although various strategies have been implemented, the literature also identifies several major challenges that still hinder DHF prevention and control efforts. These include: limited human resources and funding, especially in rural areas and regions with limited health infrastructure; climate change causing unpredictable rainfall and temperature patterns, which prolong the transmission season and accelerate the mosquito life cycle; rapid urbanization and the growth of densely populated settlements, which create new habitats for mosquito vectors; and the lack of sustained public awareness and participation, despite various campaigns. All of these factors indicate that DHF control requires a more adaptive, multisectoral, and sustainable approach to comprehensively and long-term address the issue.

CONCLUSIONS

Based on the results of the literature review over the past five years, it can be concluded that the prevention and control strategies for Dengue Hemorrhagic Fever (DHF) in Indonesia have undergone significant developments, both in terms of conventional and innovative approaches. Community-based strategies such as the 3M Plus movement and community empowerment remain the main foundation in vector control. However, the emergence of new technologies such as the release of Wolbachia-infected mosquitoes and the utilization of digital surveillance information systems marks a transformation towards a more adaptive

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

and evidence-based public health approach. Nevertheless, challenges such as insecticide resistance, climate change, low health literacy, and limited cross-sectoral coordination continue to be serious obstacles in sustainably reducing DHF incidence rates. Therefore, the integration of policies, multisectoral commitment, and the enhancement of community and healthcare worker capacity are needed to achieve effective and sustainable DHF control in the future.

ACKNOWLEDGMENTS

The author sincerely thanks all individuals who have supported and contributed to the completion of this study. Special appreciation is given to mentors and colleagues for their valuable guidance, feedback, and encouragement throughout the research process. The author also acknowledges the researchers and authors of the publications reviewed, whose work provided essential insights and data for this literature review. Their contributions have been indispensable in making this study possible.

REFERENCES

Adlia, A., Tobing, A. V., & Suwantika, A. A. (2020). A Situation Analysis on the Use of Standardized-Herbal Medicines as Supportive Therapies for Dengue Hemorrhagic Fever (DHF) patients in Indonesia. *Systematic Reviews in Pharmacy*, *11*(10), 844-848.

Adnyana, I. M. D. M., & Surya, A. (2023). Strategy to control and eradicate dengue hemorrhagic fever vectors in Bali. *Int J Public Heal Sci*, *12*(1), 196-202.

Arfan, I., Rizky, A., & Hernawan, A. D. (2022). Factors associated with dengue fever prevention practices in endemic area. *Int J Publ Health Sci*, *11*(4), 1184-1189.

Arista, I. G. P., Sawitri, A. A. S., & Yatra, I. M. S. (2021). Hospital based dengue hemorrhagic fever surveillance management in Buleleng District, Bali during Covid-19 pandemic. *Journal of Health Epidemiology and Communicable Diseases*, *7*(2), 52-59.

Auliya, I. N., Sulistio, I., & Pratiwi, W. K. (2024). Study on the implementation of the dengue hemorrhagic fever vector control program in the working area of the Pare Health Center Kediri Regency. *Public Health Research Development*, *1*(1), 29-38.

Fahri, S., & Suhermanto, S. (2024). Enhancing Student Knowledge in Dengue Hemorrhagic Fever Control Through Educational Modeling. *Health Education and Health Promotion*, *12*(1), 37-42.

Harapan, H., Michie, A., Mudatsir, M., Sasmono, R. T., & Imrie, A. (2019). Epidemiology of dengue hemorrhagic fever in Indonesia: analysis of five decades data from the National Disease Surveillance. *BMC research notes*, *12*, 1-6.

Hendra, A., Alfah, D., & Pedani, A. L. (2022). Health Promotion with peer education: knowledge and Behavior Prevention of Dengue Hemorrhagic Fever (DHF) among adolescents in Indonesia. *Malaysian J Med Health Sci*, *18*, 25-30.

Ismayanti, G., Anwar, C., Syakurah, R. A., Ghiffari, A., & Amin, R. (2022). Evaluation of the Dengue Hemorrhagic Fever Eradication Program in Palembang. *Bioscientia Medicina: Journal of Biomedicine and Translational Research*, *6*(13), 2527-2533.

Janati, Y. N., & Fauziah, M. (2022). OVERVIEW OF EVALUATION OF THE IMPLEMENTATION OF DENGUE HEMORRHAGIC FEVER PREVENTION AND CONTROL PROGRAM IN THE WORK AREA PUSKESMAS TANAH BARU, DEPOK CITY, IN 2021. *Muhammadiyah International Public Health and Medicine Proceeding*, *2*(1), 350-365.

Khairulbahri, M. (2022). Understanding the Dynamics of Dengue Haemorrhagic Fever (DHF) in Indonesia and its Sustainable Solution: a Qualitative Perspective. *Science & Technology Asia*, 217-226.

Journal of Public Health Indonesian
Volume.2 Issue.1, (May, 2025) Pages 24-31
E-ISSN: 3048-1139
DOI : https://doi.org/10.62872/pysqyt79
https://nawalaeducation.com/index.php/JHH

Kosasih, C. E., Lukman, M., Solehati, T., & Mediani, H. S. (2021). Effect of dengue hemorrhagic fever health education on knowledge and attitudes, in elementary school children in West Java, Indonesia. *Linguistics and Culture Review*, 191-200.

Kurniawan, W. (2023). Analysis of the prevention of dengue fever in the community. *Jurnal Aisyah: Jurnal Ilmu Kesehatan*, *8*(3).

Kusnoputranto, H., Sintorini, M. M., Utomo, S. W., Aliyyah, N., Sinaga, E. R. K., & Pratiwi, O. A. (2019, August). Transmission of dengue hemorrhagic fever and climate variability in Jakarta. In *IOP Conference Series: Earth and Environmental Science* (Vol. 314, No. 1, p. 012071). IOP Publishing.

Lusno, M. F. D., Haksama, S., Yudhastuti, R., Zubaidah, S., Al Mamun, A., Tarawally, A., ... & Nugroho, H. S. W. (2024). The need for active and integrated involvement of the community and health professionals in the prevention and control of dengue hemorrhagic fever in Indonesia. *The Pan African Medical Journal*, *47*, 185.

Oktafiani, D., Putrie, I. R., & Samiun, F. M. (2024). Analysis of dengue virus vector control causing dengue hemorrhagic fever (DHF) in high and low case. *Jurnal EduHealth*, *15*(01), 603-611.

Oktaviana, E. (2024). The Level of Knowledge Regarding Dengue Hemorrhagic Fever. *Genius Journal*, *5*(1), 12-18.

Pakaya, R., Daniel, D., Widayani, P., & Utarini, A. (2023). Spatial model of Dengue Hemorrhagic Fever (DHF) risk: scoping review. *BMC Public Health*, *23*(1), 2448.

Putri, R. A., Herniwanti, H., Abidin, A. R., & Rahayu, E. P. (2024). The Implementation of the Dengue Hemorrhagic Fever (DHF) Eradication Program. *Jurnal Ilmu Kesehatan Masyarakat*, *15*(1), 132-148.

Witcahyo, E., Gani, A., Setiawan, M. Y., & Oktanova, M. A. (2023). Policy and Financing Strategy in The Management of Dengue Hemorrhagic Fever Control at Banyuwangi District. *Editorial Board Bali Medical Journal*, 16.