Copyright © The Author(s)
Vol. 02, No. 2, May 2025, 89-98
e-ISSN: **3047-8839**

Effectiveness of Community-Based Health Education in Enhancing Dengue Prevention in Remote Areas

Nurul Hidayah[1]*, Khaeriah B[2], & Made Dewi Sariyani[3]
[1]Universitas Sari Mulia
*e-mail: nurulhidayah@unism.ac.id

Article Information
Received: April 08, 2025
Revised: May 23, 2025
Online: May 28, 2025

Keywords
Dengue Prevention, Health Education, Community-Based Approach, Remote Areas

ABSTRACT

Dengue fever (DHF) remains a significant public health challenge in remote areas due to limited access to health services and a lack of public awareness regarding disease prevention. This study aimed to assess the role of health education in improving knowledge and behavior related to dengue prevention through a community-based approach. The research used a pretest-posttest design without a control group and applied a quantitative method. A total of 28 participants from high-risk areas were selected using a purposive sampling technique. The health education was delivered through counseling sessions involving lectures, interactive discussions, and visual media such as posters and educational videos. The effectiveness of the health education was evaluated by comparing pretest and posttest scores. The results showed a statistically significant improvement in participants' understanding, with the average score increasing from 54.46 before the health education to 79.36 afterward. This study confirms that interactive and contextualized health education is effective in increasing community awareness and participation in dengue prevention efforts. The findings recommend implementing community-based health education programs tailored to community needs to bridge the information gap and promote sustainable preventive behavior. Further research is recommended to explore the long-term impact and optimization of health education strategies in resource-limited settings.

Keyword: *Dengue Prevention, Health Education, Community-Based Approach, Remote Areas*

INTRODUCTION

Dengue fever (DHF) is an infectious disease that is still a public health challenge in Indonesia, especially in remote areas that have limited access to health services and prevention information. The disease is caused by the dengue virus which is transmitted through the bite of Aedes aegypti

http://doi.org/10.69855/mgj.v2i2.129
https://gpijournal.com/index.php/miracle
PUBLISHED BY : GPress Indonesia

and Aedes albopictus mosquitoes. Based on data from the World Health Organization (WHO), around 2.5 billion people in the world are at risk of DHF, with the global infection rate reaching 390 million cases per year (WHO, 2020). In Indonesia, DHF is a significant problem, with a surge in cases that continues to increase every year, especially during the rainy season which favors the development of vectors of the disease (Kemenkes RI, 2019). The spread of DHF in remote areas is further exacerbated by the low level of public health education and lack of awareness of clean and healthy living behaviors (Budi, 2021).

Studies have shown that health education plays an important role in increasing public awareness of dengue prevention. A study conducted by Simbolon et al. (2023) showed that providing health education to university students can significantly improve their knowledge about dengue prevention, with a difference in pre-test and post-test scores after the educational intervention. (Simbolon et al., 2023). Another study by Kustini and Betty (2008) examined the effect of health education on dengue prevention behavior among housewives and found that there were significant changes in active dengue prevention behavior after counseling (Kustini & Betty, 2008). In addition, research conducted by Alexander et al. (2024) revealed that socialization of dengue prevention to children using interactive educational methods can instill healthy living habits from an early age, which has an impact on reducing the risk of spreading the disease (Alexander et al., 2024)

Although various efforts have been made to increase public awareness about dengue prevention, there are still gaps in the implementation of health education in remote areas. A study conducted by Sari et al. (2022) highlighted that community empowerment in dengue prevention is still suboptimal due to limited access to information and lack of community involvement in health programs (Sari et al., 2022). On the other hand, a study by Djalaluddin et al. (2025) found that education on clean and healthy lifestyles can increase community awareness on dengue prevention, but its implementation in remote areas is still limited due to the lack of adequate resources and health workers (Djalaluddin et al., 2025)

Based on these studies, there are still gaps in the implementation of health education in remote areas, especially in terms of the effectiveness of the extension methods used and the active involvement of the community in dengue prevention programs. Many studies have shown the effectiveness of health education in improving community knowledge, but not many have explored the most effective strategies to be implemented in remote areas with limited resources. Therefore, further research is needed to develop more adaptive and community-based health education approaches to improve the effectiveness of DHF prevention in these areas.

Based on the gap analysis, this study aims to assess the role of health education in preventing dengue in remote areas using a community-based approach. The main focus of this study is to evaluate the effectiveness of the educational methods used and understand the factors that influence the successful implementation of health education in resource-limited settings. With a more contextualized and community-based approach, this study is expected to provide new contributions

to dengue prevention efforts in remote areas and assist in the development of more effective public health policies.

METHODS

This study used a quantitative method with a pretest-posttest design without a control group to measure the effectiveness of health education on increasing knowledge and changing community behavior in preventing DHF (Creswell, 2018). The research subjects were people in remote area X who have a high risk level for DHF with a sample of 28 people selected using purposive sampling technique based on certain criteria. This research was conducted in several stages. The first stage was the identification of locations and subjects based on data on high dengue cases. The second stage was pre-test, in which the level of knowledge and behavior of DHF prevention were measured using a questionnaire.

The third stage was the health education intervention, which was conducted through counseling using lecture methods, interactive discussions, and visual media such as posters and educational videos. After that, a post-test was conducted to measure changes in knowledge and behavior after the intervention. The last stage was evaluation, where the effectiveness of the intervention was analyzed based on the difference in pre-test and post-test results.

The research procedure included the preparation stage (preparation of materials and validation of questionnaires), the data collection stage (pretest, counseling, and posttest), and the data analysis stage using the paired t-test statistical test with a significance level of 95% ($\alpha = 0.05$). This study has met the ethical principles of research by obtaining informed consent from each respondent and ensuring the confidentiality of the data collected.

RESULTS

The analysis was carried out in accordance with the data obtained from respondents including the age and class of respondents. An overview of the analysis of respondent characteristics is illustrated in table 1 below as follows :

Table 1. Respondent Characteristics

Respondent Characteristics	Frequency (n)	Percentage (%)
Age		
< 20 years old	6	21,4
20 – 35 years old	14	50
> 35 years old	8	28,5
Education		
SD	7	25
SMP	16	57,14
SMA	5	17,8

The results showed the characteristics of respondents, the results obtained showed that the respondents with the most age were 20-35 years as many as 14 people (50.0%), the most recent education was junior high school graduates as many as 16 people (57.14%).

Table 2. Mean Pretest-Posttest Score by Education on Dengue Fever Socialization in Remote Areas

Education	Pretest	Posttest
SD	49,25	74,50
SMP	53,50	78,17
SMA	57,17	82,17

The data in Table 2 and Figure 1 show the average pretest and posttest scores based on education level in the socialization on Dengue Fever in remote areas. The pretest results showed that participants with primary school education had an average score of 49.25, while participants with junior and senior high school education had average pretest scores of 53.50 and 57.17, respectively. After the socialization, there was a significant increase in posttest scores. Participants with an elementary school education level experienced an increase in average score to 74.50, while participants with junior and senior high school education levels achieved an average posttest score of 78.17 and 82.17, respectively.

This increase in posttest score indicates that the socialization was effective in improving participants' understanding of Dengue Fever. In addition, there is a tendency that participants with higher education levels have better pretest scores than participants with lower education levels, and show a more optimal increase in understanding after socialization.

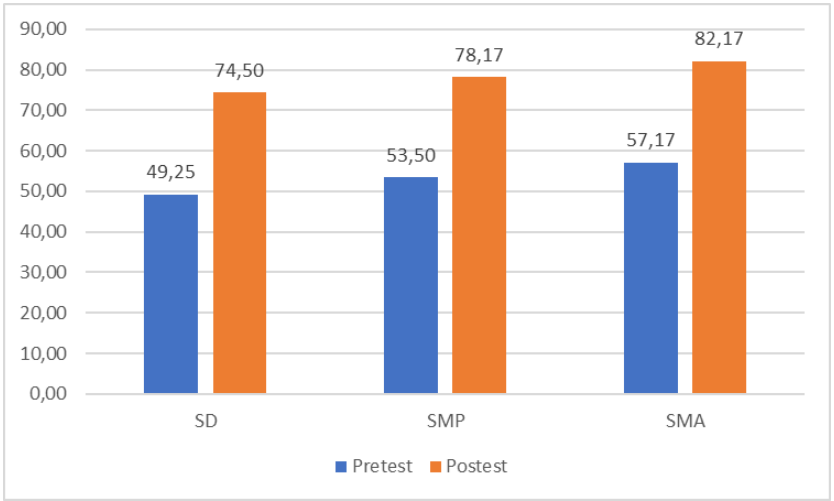

Figure 1. Graph of Average Pretest-Posttest Score Based on Dengue Fever Socialization Education in Remote Areas

Table 3. Distribution of Pretest-posttest Before and After Dengue Fever Socialization in Remote Areas

Variable	n	Average comprehension score	Standard Deviation	*p value*
Pretest	28	54,46	4,694	0,00
Postest	28	79,36	4,953	

Table 3 presents the distribution of pretest and posttest scores before and after socialization related to Dengue Fever (DHF) in remote areas, with the participation of 28 respondents. The pretest results showed that the average score of participants' understanding before socialization was 54.46 with a standard deviation of 4.694. After the intervention, the average score increased significantly to 79.36 with a standard deviation of 4.953. Health education is an integral part of health efforts that aim to change individual behavior to be more aware and able to implement a healthy lifestyle through communication, information and education approaches.

Health counseling contributes to increasing individual knowledge and confidence in implementing healthy behaviors. In addition, the results of this study are also in line with a study conducted by Reni Ranteallo et al. (2021), which shows that health education can have a positive impact on changes in community behavior. The significance of this increase in understanding is supported by a p-value of 0.00 ($p < 0.05$), which indicates a statistically significant difference between pretest and posttest scores.

The significant increase in comprehension scores after socialization showed that the counseling methods applied were effective in conveying information about DHF. The use of a combination of lecture methods, interactive discussions, and visual media such as posters and educational videos allowed participants to more easily understand the material provided. This is in line with learning theory which states that a multisensory approach can improve information absorption and long-term knowledge retention.

In addition, the effectiveness of this socialization can also be attributed to the active involvement of participants in the discussion sessions, which allowed them to ask direct questions and explore the material presented. This activity contributed to increasing participants' motivation and confidence to apply dengue prevention measures in their daily lives. Another contributing factor was the relevance of the materials provided, where the information presented was tailored to the local conditions and needs of the communities in these remote areas.

The results of this study confirm that the socialization has been effective in increasing community understanding and awareness of dengue prevention. Therefore, similar programs should continue to be developed and implemented more widely with approaches tailored to the characteristics of each community. In addition, it is important to conduct a long-term evaluation to measure the impact of this increased understanding on changes in community behavior in preventing DHF in a sustainable manner.

DISCUSSION

The low level of understanding observed among participants in this study may be influenced by several factors, including education level and limited access to accurate and reliable health information. Questionnaire results indicated that participants primarily obtained information from social media and family environments, which are not always reliable sources of comprehensive health education. This finding aligns with recent studies highlighting the proliferation of health misinformation on social media platforms, which can lead to inadequate health literacy and misinformed health behaviors. The limited participation in previous health education activities reported by respondents supports the conclusion that a lack of exposure to formal health education programs contributes to insufficient knowledge about dengue prevention.

This is consistent with findings from studies that emphasize the importance of structured community engagement in improving preventive health behaviors (Fitriyani et al., 2024). Additionally, many participants expressed low personal motivation to change behavior, which may be rooted in entrenched daily habits and the absence of external support or reinforcement—factors that are emphasized in the Health Belief Model (HBM). Recent research applying the HBM framework has demonstrated that perceived barriers and lack of cues to action can significantly inhibit the adoption of preventive health behaviors (Ismawardani & Destrity, 2023).

After the implementation of health education (post-test), there was a significant increase in respondents' understanding score, which rose to 79.36 compared to the initial score of 54.46 before counseling. This increase shows that the education provided was able to improve the community's understanding of dengue prevention and encourage awareness of the importance of healthy living behaviors. This success can be attributed to the effectiveness of the counseling method applied, where the material was delivered systematically, easy to understand, and using an approach that suits the characteristics of the participants. In addition, the active involvement of respondents in discussion sessions and the use of visual media in counseling also contributed to the increased absorption of information.

The results of this study are also in line with the findings of Sari et al. (2022), which emphasized that community empowerment in dengue prevention efforts is strongly influenced by effective education and active participation of individuals in understanding and implementing prevention measures. Therefore, continuous health counseling programs with interactive methods and based on community needs are highly recommended to increase the effectiveness of interventions in dengue prevention.

Research conducted by Kurniawan (2020) revealed that people who receive health education tend to have a higher level of knowledge about disease prevention and show more proactive behavior in maintaining environmental hygiene. This finding is in line with the results of the community service program which shows that increased knowledge contributes to more positive behavioral changes in dengue fever prevention efforts. In addition, this program also targets school children as the target group, given that health education has been proven effective in increasing understanding and practice of dengue prevention among students (Suhariati & Ruliati, 2023).

Education-based interventions, both for the general public and school children, play an important role in building awareness and sustainable preventive behaviors in reducing the risk of dengue spread.

Research conducted by Sari and Susanto (2021) showed that community interventions focusing on health education contributed significantly to reducing the incidence of dengue fever in the community. Programs that involve active community participation in prevention efforts are proven to be effective, supporting the findings in this study that health education can reduce the risk of disease transmission through increased knowledge. Furthermore, Tanjung et al. (2020) revealed that health education has a significant effect on increasing knowledge and changing people's attitudes in preventing dengue fever.

Their results showed that after attending counseling, the community experienced a significant increase in understanding and showed a more positive attitude in implementing preventive actions, such as maintaining environmental hygiene. This underscores the important role of health education in shaping community awareness and attitudes towards disease prevention. In line with these findings, Fitriani et al. (2021) found that a community-based extension program was effective in increasing public awareness of the dangers of dengue fever. Analysis of the pre-test and post-test showed a significant increase in the community's knowledge of the disease prevention measures. Therefore, systematically designed and targeted educational interventions can be an effective strategy in improving community health in a sustainable manner.

The application of an educational model that integrates hands-on demonstrations and the use of audiovisual media in health counseling proved effective in improving community knowledge and skills related to dengue fever prevention. The post-test results showed a significant increase in participants' understanding after attending the counseling activities, confirming that interactive methods have a greater impact in delivering health information. Research conducted by Maulana et al. (2023) also supports these findings, where community involvement in health education plays an important role in reducing the incidence of dengue fever. In addition to increasing individual awareness, active community participation in maintaining environmental hygiene is a major factor in the success of prevention programs.

Ngadino et al. (2024) identified several supporting factors that contribute to the effectiveness of education programs, including community involvement, support from village governments and puskesmas, and the use of simple technology such as the use of larvitraps for mosquito vector control. Increased knowledge gained through education not only impacts on community understanding, but also encourages positive behavioral changes in maintaining environmental hygiene. Thus, the implementation of community-based education strategies supported by simple technology can significantly contribute to reducing the incidence of dengue fever and increasing public awareness of the importance of preventive measures.

In this study, the community-based approach applied showed positive results, as also found in the study of Djalaluddin et al. (2025), which emphasized that clean and healthy lifestyle education can increase community awareness about dengue prevention, especially in resource-limited areas.

One of the factors that can support an increase in the level of community knowledge is the availability of effective health counseling. Health education is conducted through various methods, such as counseling, training, and providing technical assistance needed by the community. In addition, the availability of adequate health facilities for individuals, families and communities is also an important factor in supporting increased knowledge about health. Adequate facilities can facilitate community access to health information and services needed.

In addition, the attitude and behavior of community leaders and health workers play a very important role in improving community knowledge. Health education focused on religious leaders, community leaders, and health workers will be more effective because they are considered role models in the community. Positive attitudes and behaviors shown by community leaders and health workers can be a reference for the community to apply healthy behaviors in everyday life. With good examples from community leaders and health workers, the community is more motivated to change their attitudes and behaviors towards a healthy lifestyle.

CONCLUSIONS

This study confirms that health education plays a crucial role in increasing community understanding and awareness of dengue fever prevention, especially in remote areas with limited access to information and health services. The results of the study showed that educational interventions conducted through lectures, interactive discussions, and visual media such as posters and educational videos significantly improved participants' knowledge levels. This improvement was not only seen in the pre- and post-education scores, but also in changes in attitudes and behaviors in implementing dengue prevention measures.

The effectiveness of community-based approaches to health education has been shown to have a positive impact, especially when communities are actively involved in the learning process. Factors such as participation in discussions, involvement of community leaders, and relevance of materials to local conditions play an important role in increasing the success of education programs. These results suggest that interactive and contextualized extension methods are more effective than one-way information delivery methods.

Therefore, further efforts are needed to expand the scope of health education programs by adjusting delivery methods based on the needs and characteristics of local communities. Strengthening collaboration between the government, health workers and the community is also needed to ensure that education programs are sustainable and have a long-term impact. In addition, periodic evaluations should be conducted to ensure that this increased understanding actually translates into sustainable behavior change, so that the risk of spreading DHF can be suppressed more effectively in remote areas.

REFERENCES

Alexander, S., Roja, A., Rahman, A., Arrizky, M. Z., Karlina, L., Mulyani, N.,Bima,). (2024). ADM: Journal of Lecturer and Student Service Preventing Dengue Fever (DBD) Early Through

Socialization Activities. (3), 80. https://doi.org/10.61930/jurnaladm

Budi, A. (2021). Dengue Fever (DBD) Health Education at the Kedaton Health Center, Bandar Lampung. ANDASIH Journal of Community Service, 2(2), 49–53. https://doi.org/10.57084/andasih.v2i2.713

Creswell, J. W. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Los Angeles: SAGE Publications.

Djalaluddin, N. A., Ananda, R., & Heriyati, H. (2025). Dengue Fever Prevention Strategy through Clean and Healthy Lifestyle Education in the Lembang Health Center Work Area. Journal of Community Service Creativity (PKM), 8(2), 1140–1151. https://doi.org/10.33024/jkpm.v8i2.17831

Fitriyani, L., Dwijayanti, F., Ruswandi, U., Afriansyah, E., & Purwadi, H. (2024). Efektivitas edukasi Health Belief Model dalam perubahan pengetahuan dan perilaku pasien tuberkulosis. *Indonesian Journal on Medical Science*, *11*(2).

Ismawardani, A. N., & Destrity, N. A. (2023). Analisis isi pesan promosi kesehatan program vaksinasi Covid-19 pada Instagram Kementerian Kesehatan RI (@kemenkes_ri) berdasarkan Health Belief Model. *Jurnal Media dan Komunikasi*, *3*(2). https://doi.org/10.20473/medkom.v3i2.44174

Kurniawan, A. (2020). Increasing Public Knowledge and Attitudes About Dengue Fever Through Health Education. Journal of Public Health, 12(1), 34–42.

Kustini, H., & Betty, F. (2008). The Influence of Health Education About Dengue Fever on Active Behavior in Preventing Dengue Fever in Mothers of Minapadi Residents, Nusukan Village, Surakarta City.

Maulana, M., Fitriani, Y., & Lestari, A. (2023). The Influence of Community Involvement in Health Education on Community Knowledge and Attitudes. Journal of Community Health, 7(2), 112–118.

Ministry of Health of the Republic of Indonesia. (2019). Guidelines for Prevention and Control of Dengue Fever. Jakarta: Ministry of Health of the Republic of Indonesia.

Ngadino, N., Setiawan, S., & Hermiyanti, P. (2024). Mentoring and Training in Making Larvitrap and Psn Plus for Jumantik to Make Kemuning Village, Tegalombo District, Pacitan Free of Aedes Mosquito Larvae. Journal of Community Service, 3(2), 43–45.

Pomarida Simbolon, Anthonyus Anthonyus, Urim Gabriel Dinasti Laowo, Lea Sri Ita Br. P.A, & Irma Novita Sari Sihotang. (2023). Health Education for Dengue Fever Prevention in MIK Study Program Students of Stikes Santa Elisabeth Medan. Journal of Health Science Service, 3(3), 91–96. https://doi.org/10.55606/jpikes.v3i3.2907

Reni Ranteallo, R., Handayani Mangapi, Y., & Almar, J. (2021). The Effect of Health Counseling on Efforts to Prevent Dengue Fever (DF) in Dusun Tengah Lembang Sa'dan Andulan, Sa'dan District, North Toraja Regency in 2019. Scientific Journal of Promotive Health, 6(1), 25–36. https://doi.org/10.56437/jikp.v6i1.54

Sari, R. K., Djamaluddin, I., Djam'an, Q., & Sembodo, T. (2022). Community Empowerment in

Dengue Fever Prevention Efforts at Karangdoro Health Center. ABDIMAS-KU Journal: Journal of Medical Community Service, 1(1), 25. https://doi.org/10.30659/abdimasku.1.1.25-33

Sari, R., & Susanto, A. (2021). Community Intervention in Handling Dengue Fever in Indonesia. Journal of Public Health, 13(2), 20–27.

Suhariati, H. I., & Ruliati. (2023). The Effect of Health Education on the Prevention of Dengue Fever (DBD) in School-Age Children. Hesti Medan Research Journal Akper Kesdam I/Bb Medan, 4(2), 140–147.

Tanjung, F., Wahyu, M. D., & Setiawan, A. (2020). Health Education as an Effort to Prevent Dengue Fever. Journal of Public Health, 8(2), 76–88.

World Health Organization. (2020). Dengue and severe dengue. Retrieved from https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue