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Original Research/Systematic Review

Influence of Nurses' and Teachers' Roles in Health Education on Dengue Prevention Behavior Changes in Schools

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ABSTRACT

Background: *Dengue Hemorrhagic Fever (DHF) remains a major public health problem in tropical regions, including Indonesia, due to high morbidity rates and environmental factors that support mosquito breeding. This study aimed to determine the influence of nurses and teachers in health education on changes in dengue prevention behavior in schools.*

Methods: *This research used a single-group pretest-posttest experimental design with 90 respondents selected purposively. Changes in knowledge and behavior were assessed before and after the intervention. The intervention involved health education on dengue prevention, focusing on the 3M Plus method: draining, covering, recycling, and using larvicide.*

Results: *The results showed a significant increase in the proportion of respondents with good preventive behavior, rising from 15.6% in the pretest to 91.1% in the posttest (p-value = 0.000). This indicates that health education significantly improves public knowledge and encourages positive behavioral changes in dengue prevention.*

Conclusion: *Health education significantly improves dengue prevention behavior, raising good practices from 15.6% to 91.1%. Sustained community involvement and policy support are crucial for lasting impact.*

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INTRODUCTION

The role of nurses and teachers in minimizing *Aedes aegypti* larvae and mosquitoes is reflected through their functions as educators, preventers, and care supporters. Nurses educate the community about the 3M Plus movement (draining, covering/burying, and reusing items) and other preventive methods, such as installing mosquito nets, raising larva-eating fish, and maintaining environmental cleanliness. Nurses also conduct comprehensive monitoring and help prevent complications of Dengue Hemorrhagic Fever (DHF) (Aji, 2023).

Geographically, Indonesia is located between the Asian and Australian continents, the Pacific and Indian Oceans, and crossed by the equator, giving it a tropical climate. This climate influences rainfall, temperature, humidity, lighting, and wind, all of which support the development of biota, including disease vectors. In tropical climates, the proliferation of disease vectors tends to increase, making Indonesia an endemic area for many infectious diseases. One of the most common diseases is DHF, caused by the bite of *Aedes aegypti* mosquitoes infected with the dengue virus. The disease was first discovered in Surabaya in 1968, infecting 58 people and causing 24 deaths. Since then, dengue has spread across regions, and by 1980, all provinces in Indonesia had been affected (Yuningsih, 2019).

Data from the Central Statistics Agency (BPS) of Bengkulu Province indicate fluctuating DHF cases in Rejang Lebong Regency. In 2023, the incidence rate was 102.00 per 100,000 population, a sharp increase compared to 36.20 in 2022. In 2021, the incidence rate reached 127.00, the highest in three years, while in 2019, it was 114.00. This fluctuation highlights the importance of consistent prevention and control measures.

The increasing cases of DHF and expansion of affected areas are linked to various factors, including transportation, population density, low public awareness of environmental hygiene, and the widespread presence of *Aedes aegypti*. Furthermore, the continuous circulation of four dengue virus serotypes contributes to disease transmission (Genis, 2016). Therefore, the objective of this study is to examine the influence of nurses' and teachers' roles in health education on behavioral changes in dengue prevention at schools.

MATERIALS AND METHOD

This study applied a pre-experimental approach using a One Group Pretest–Posttest Design, which aimed to measure behavioral changes in participants after receiving an intervention. A total of 90 respondents were purposively selected as the research sample. The intervention consisted of an integration of the 3M Plus program, including draining bathtubs, covering water reservoirs, burying unused items, and applying abate powder to water containers.

Prior to the intervention, an initial assessment (*pretest*) was conducted to determine the baseline condition of participants regarding dengue prevention practices. After the intervention, a final assessment (*posttest*) was performed to evaluate changes in knowledge and behavior. Data obtained from pretest and posttest were analyzed statistically. The effectiveness of the intervention was tested using a paired statistical test, and the results showed a p-value = 0.000, indicating a significant difference between pre-intervention and post-intervention conditions.

RESULTS

Table 1. Effect of dengue fever prevention efforts before and after health education

Prevention of dengue	Pretest		Posttest		P-Value
	n	%	n	%	
Good	14	15,6	82	91,1	
Poorly	76	84,4	8	8,9	0,000
Total	90	100	90	100	

Based on the data presented in the table, changes in dengue fever prevention behavior can be seen before and after the health education program. In the pre-test, only 15.6% of participants demonstrated good dengue fever prevention practices, while 84.4% demonstrated poor prevention practices. However, after the health education program (post-test), a significant change occurred, with the number of participants demonstrating good dengue fever

prevention practices increasing sharply to 91.1%, while those demonstrating poor prevention practices decreased to only 8.9%.

This change demonstrates the effectiveness of health education in increasing public knowledge and awareness of the importance of dengue fever prevention, particularly in implementing the 3M Plus program. The statistical test results showed a p-value of 0.000, indicating a significant difference between conditions before and after the counseling. Since the p-value is less than 0.05, it can be concluded that health education has a significant impact on improving dengue fever prevention efforts in the community.

According to Ali (2010), health education is an integrated activity within every health effort, aimed at changing individual behavior for healthy living through communication, information, and education. This aligns with research by Firawan (2013), which states that health education provided to respondents can provide additional information and increase respondents' confidence to behave better in maintaining their health, as also found in research by Reni Ranteallo et al., 2021. The results showed that respondents' knowledge increased after receiving health education provided by the researcher, proving that health education can influence a person's knowledge. Therefore, this indicates a congruence between existing facts and theory.

DISCUSSION

Based on the results presented in Table 1, before receiving health education (pre-test), 14 respondents (15.6%) demonstrated good dengue fever prevention efforts. Factors influencing this included respondents' education level and information obtained from various sources such as social media, the internet, and family (Yosvara & Atzmardina, 2020; Sulistyawati & Aminah, 2023). Meanwhile, 76 respondents (84.4%) demonstrated poor prevention efforts. This was due to a lack of knowledge about dengue prevention methods, as they had never received health education, as well as laziness, which hindered the adoption of healthy behaviors (Mawaddah et al., 2023; Kurniawati et al., 2022).

After health education (post-test), the results showed a significant improvement, with 82 respondents (91.1%) demonstrating good dengue prevention practices, compared to only 14 (15.6%) before the intervention. This improvement can be explained by the respondents' better understanding of the material presented during the education session, as well as increased awareness of healthy living (Engkeng et al., 2021; Hasugian, 2023). In addition, the easy-to-understand materials and the use of appropriate methods contributed to this change. However, 8 respondents (8.9%) still demonstrated poor prevention behaviors, caused by limited understanding during the sessions, insufficient knowledge, and deeply ingrained beliefs and habits that were difficult to change (Sutriyawan et al., 2022).

The poor living conditions of the respondents were also a limiting factor. In the pre-test, data analysis showed that not all respondents could answer questions about dengue prevention correctly. This is understandable, as they had not previously received sufficient information. However, some respondents were still able to provide adequate answers, as evidenced by the relatively average response rate. This indicates that even before the education program, respondents had already obtained basic knowledge from social media and other sources (Fauzi & Sari, 2023). These findings are in line with Aji (2024).

The purpose of this study was to determine the effectiveness of marigold plant powder aroma as a mosquito repellent. The findings are also in line with Kurniawan's (2010) study, which showed increased knowledge about Mosquito Nest Eradication (PSN) after counseling, although this increase in knowledge did not reduce the density of *Aedes aegypti*. This suggests that although knowledge increases, its practical application in reducing disease transmission remains limited (Dimjati Lusno et al., 2024).

This is consistent with Notoatmodjo's opinion that knowledge does not always directly translate into practice. For attitudes to turn into concrete actions, supporting factors are required, such as environmental support, available resources, and stronger motivation (Takaeb & Sabat, 2023). The results of this study differ from those obtained by Dwi Sutakresna and Made Marwati (2020)… However, the findings align with Tri Nurul Azizah et al. (2017), which also demonstrated positive preventive behaviors through the 3M Plus program (Maulida et al., 2023).

One important factor supporting increased community knowledge is the availability of effective health education, delivered through various methods such as counseling, training, and provision of technical assistance (Mawaddah et al., 2023). Moreover, the role of community leaders and health workers is critical in increasing public knowledge. Health education focused on religious leaders, community leaders, and health workers is more effective because they serve as role models. Positive behaviors demonstrated by them encourage the community to adopt healthy behaviors (Sulistyawati & Aminah, 2023).

The researchers' assumptions indicate that the majority of the community has shown good behavior in implementing dengue prevention through 3M Plus in their daily lives. This is consistent with the Stimulus-Organism-Response (SOR) theory, which states that behavioral changes are influenced by the quality of the stimulus interacting with the organism (Aji et al., 2025).

CONCLUSION

Health education plays an important role in improving understanding and preventive behaviors against dengue fever. The implementation of the 3M Plus program has proven effective in increasing preventive behaviors from 15.6% to 91.1%. Environmental support, sustainable policies, and collaboration among communities, health workers, and policymakers are essential to strengthen comprehensive dengue prevention strategies.

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