Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 17s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Relationship Between Health Professionals And Teachers In The Socialization Of Marigold Plants And Ovitrap Fermentation To Minimize Mosquitoes And Prevent Dengue Fever

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Cite this paper as: Rustam Aji Rochmat, Dewi Lusiani, Sherly Ratih Frichesyarius Santy Aji, Reza Fahlevi, Jupriyono, Roro Ajhie Ayuningtyas, Ahmad Dahlan, (2025) Relationship Between Health Professionals And Teachers In The Socialization Of Marigold Plants And Ovitrap Fermentation To Minimize Mosquitoes And Prevent Dengue Fever. *Journal of Neonatal Surgery*, 14 (17s), 669-674.

ABSTRACT

The number of mosquitoes increases during the transition season. Dengue hemorrhagic fever (DHF) remains a significant public health problem in tropical regions, including Indonesia, due to the rapid spread of the Aedes aegypti and Aedes albopictus mosquitoes. Effective prevention strategies require community involvement and awareness. Relationship Between Health Professionals And Teachers In The Socialization Of Marigold Plants And Ovitrap Fermentation To Minimize Mosquitoes And Prevent Dengue Fever. The research design used a pre-experiment with a one-group pretest-posttest method, involving 90 students selected by purposive sampling. The intervention included educational sessions and demonstrations of mosquito control practices. Data was collected through a questionnaire and analyzed using the Paired Sample T-Test. The results showed a significant increase in students' knowledge scores from 57.18 (pretest) to 82.84 (posttest), as well as practice scores from 55.64 to 79.74 ($p < 0.05$). These findings indicate that the integration of biologically based mosquito control methods in educational programs can increase the effectiveness of dengue prevention. Collaboration between health professionals and teachers plays an important role in ensuring the effective dissemination and application of knowledge. Future research needs to explore long-term behavior changes as well as the potential for implementing similar programs in various educational institutions.

Keywords: *Health Professionals, Teachers: Marigold Plants, Ovitrap Fermentation, Minimizing Mosquitoes, Preventing DHF*

1. INTRODUCTION

The transition season for the development of mosquitoes is increasing. Dengue hemorrhagic fever (DHF) remains a significant public health problem in tropical regions, including Indonesia, due to the rapid spread of the Aedes aegypti and Aedes albopictus mosquitoes. Effective prevention strategies require community involvement and awareness. This research examines the relationship between the influence of health professional staff and teachers at hight school 10 in Rejang Lebong on the socialization of marigold plants and Ovitrap Fermentation on minimizing mosquitoes and preventing dengue fever.

Dengue hemorrhagic fever (DHF) is a disease caused by a virus that is transmitted through the bite of mosquitoes from the Aedes genus, especially Aedes albopictus and Aedes aegypti. The spread of this disease generally occurs through the bites of these two mosquito species, which have different habitat preferences; Aedes aegypti is more often found near residential areas and tends to bite humans, while Aedes albopictus is usually found in park areas and prefers to suck the blood of animals.

DHF is often related to interactions between humans and the environment, which are not always beneficial, as seen in the case of the spread of this disease (Fatmawati & Windarto, 2018). This disease begins with symptoms similar to influenza, including high fever, headache, pain behind the eyes, joint pain, and a rash on the skin. If not treated properly, dengue fever can develop into a more serious and potentially fatal condition due to complications such as bleeding or shock. According to data from the Indonesian Ministry of Health, the number of dengue fever cases shows annual fluctuations, with an increase in cases often occurring during the rainy season, when the Aedes aegypti mosquito population increases significantly.

Indonesia, with its tropical climate, provides an environment that is very conducive to the development of mosquitoes, so dengue fever often occurs, especially during the rainy season, and can become dangerous if not treated immediately. Some infected individuals may show no symptoms, while others experience only mild symptoms such as fever.

However, there are also more serious cases, where severe symptoms can be life threatening. This disease generally goes through three phases, starting from the initial symptoms to the recovery stage. In mild cases, symptoms can include high fever, rash, and muscle and joint pain. On the other hand, in more severe cases, known as Dengue Hemorrhagic Fever, severe bleeding can occur, a drastic drop in blood pressure, and even the risk of death (Ariyani et al., 2023). Several factors that play a significant role in the occurrence of dengue fever cases include environmental conditions, age, level of knowledge and community attitudes.

Environmental factors that contribute to dengue fever cases consist of several aspects, namely: physical environmental conditions, which include the frequency of cleaning containers, availability of container lids, and residential density; environmental biological conditions, which include the density of mosquito vectors and the presence of larvae in containers; and social environmental conditions, which include population density, support from health workers, experience following health education, as well as factors such as employment, education, history of dengue fever, and the habit of hanging clothes (Saputra et al., 2023).

Vector control is a very important aspect in efforts to prevent dengue fever. There are several techniques that can be applied to control mosquito populations, including: 1) chemical methods; 2) biological method; and 3) environmental methods. The government has implemented various initiatives, such as fumigation, eradication and Mosquito Nest Eradication (PSN). Mosquitoes often make nests indoors, including in cupboards and other indoor areas, and tend to hide in cool, shady places outside. Places containing water in or around homes, schools and other locations become places for female mosquitoes to lay eggs. Within ten days, the eggs will hatch into adult mosquitoes (Rubandiyah & Nugroho, 2018).

One method of vector control that has been studied is the use of plants, such as marigold (Tagetes erecta) and periwinkle (Catharanthus roseus). Tapak dara flower extract is known to have potential as a natural insecticide that is effective against the Aedes aegypti mosquito (Aji, 2020). Apart from that, the use of a modified ovitrap method can be applied to catch mosquito larvae using used bottles and gauze (Kurniawati et al, 2020).

Adolescents are a group that is very sensitive to change and renewal, considering that individuals in this group are at a stage of significant growth and development. At this age, children are in a condition that is sensitive to various stimuli, so they are easy to guide, direct and instill good habits, including healthy living habits. This is important, especially considering that mosquitoes can breed in the home environment and in the school environment (Notoadmodjo, 2012).

Knowledge about dengue fever can be increased through effective outreach programs. This socialization concept involves delivering material about dengue fever, the vector that transmits it, as well as information regarding the implementation of the Dengue Nest Mosquito Nest Eradication (PSN) using the 3M plus approach (Sugiyono & Darnoto, 2017). DHF cases often occur in school environments, especially through School Health Business (UKS) activities; However, not all schools have activated UKS activities. Based on interviews with the school principal, the community service program has been implemented regularly every month. However, there are still challenges, such as students' habit of throwing rubbish carelessly, especially bottles and drinking glasses, as well as a lack of attention to the cleanliness of students' desk drawers which they have not thought about cleaning (Kasenda et al., 2020).

The role of health workers and teachers is crucial in disseminating information and educating the public about preventing dengue fever. Health workers contribute to educational campaigns through various media, seminars and community activities, with the aim of conveying information about the causes, symptoms and preventive measures for dengue fever (Suparman, 2008). On the other hand, teachers have a strategic role in teaching students about the importance of maintaining a clean environment and implementing dengue prevention measures from an early age. Collaboration between health workers and teachers can strengthen outreach and education efforts, so that information about dengue prevention can be spread more widely and effectively, as well as increasing public awareness of the importance of maintaining environmental health.

Even though various efforts have been made, there is still a gap between knowledge and practice of dengue prevention in the community. Several studies show that the active role of health workers and community leaders has a positive impact on dengue prevention measures, such as Mosquito Nest Eradication (PSN) and 3M Plus. However, , the involvement of teachers in socializing the use of marigold, periwinkle and fermented ovitrap plants as methods of preventing dengue fever has not been widely studied. In addition, the effectiveness of collaboration between health workers and teachers in increasing

community awareness and preventive action against dengue fever has not yet been explored in depth. Based on this analysis, this research aims to examine the Relationship Between Health Professionals And Teachers In The Socialization Of Marigold Plants And Ovitrap Fermentation To Minimize Mosquitoes And Prevent Dengue Fever.

It is hoped that this research can provide a new contribution to dengue prevention strategies through a collaborative approach between health professionals and teachers, as well as enriching the literature regarding the implementation of natural methods in controlling dengue vectors at the community level.

2. METHODS

This research uses a quantitative method with a pre-experimental design type one-group pretest-posttest design to measure the influence of socialization carried out by health professional staff and teachers on increasing the knowledge, attitudes and practices of hight school 10 in Rejang Lebong students in efforts to prevent dengue fever through the use of marigold plants and fermented ovitrap. The sample for this research was 60 hight school 10 in Rejang Lebong students who were selected using purposive sampling with the criteria of being willing to take part in the entire series of socialization activities and filling out questionnaires.

Data was collected through questionnaires to measure students' knowledge, attitudes and practices before and after socialization, as well as participant observation to record students' direct practices related to dengue prevention. Data analysis was carried out using the Paired Sample T-Test to see differences in students' levels of knowledge, attitudes and practices before and after socialization. This research uses a quantitative approach in accordance with the research guidelines described by Creswell (2014), which emphasizes the collection of numerical data and statistical analysis to evaluate the effect of interventions on certain variables (Creswell, 2014).

3. RESULTS

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

Table 1. Characteristics of Respondents

Respondent Characteristics	Frequency (n)	Percentage (%)
Gender		
Man	40	44.4
Women	50	55.6
Education		
X	35	38.9
XI	25	33.3
XII	20	27.8

Based on the characteristics of the respondents presented, it can be seen that of the total of 90 students who participated as respondents, the majority consisted of women, namely 50 people (55.6%), while there were 40 men (44.4%). These findings indicate that the involvement of female students in this research is higher than that of male students. In terms of class division, the largest number of respondents came from class X, with 35 people (38.9%), followed by class XI with 30 people (33.3%), and class This distribution indicates that this study involved more class X students, which is likely due to the fact that they have more time and involvement in socialization activities, compared to class

Table 2. Distribution of Student Knowledge Before and After Socialization

Variable	n	Average Knowledge Score	Standard Deviation	p value
Pretest	90	57.18	6.30	0.00
Posttest	90	82.84	5.81	

Based on the research results which show the average score of students' knowledge before (pretest) and after (posttest) the socialization regarding marigold plants, as well as the use of ovitrap fermentation in an effort to minimize mosquitoes and

prevent Dengue Hemorrhagic Fever, it can be concluded that this socialization is very effective. The average student knowledge score before socialization was recorded at 57.18 with a standard deviation of 6.30, while after socialization, the average score increased to 82.84 with a standard deviation of 5.81. This significant increase shows that students gained a better understanding after participating in the socialization. The significance test shows a p-value of 0.00 ($p < 0.05$), which confirms that the difference between the average pretest and posttest scores is statistically significant. These findings indicate that the outreach carried out by health professional staff and teachers at hight school 10 in Rejang Lebong was successful in increasing students' knowledge about dengue vector control plants and mosquito prevention methods.

Table 3. Distribution of students' dengue management practices before and after socialization

Variable	n	Average Knowledge Score	Standard Deviation	p value
Pretest	90	55.64	6.19	0.00
Posttest	90	79.74	6.99	

This table organizes the data effectively, displaying the number of respondents (n), average knowledge score, standard deviation, and p-value for the pretest and posttest.

Based on the research results which show the average student practice scores before (pretest) and after (posttest) the socialization regarding marigold plants and ovitrap fermentation in an effort to minimize mosquitoes and prevent dengue hemorrhagic fever, it can be concluded that this socialization is very effective. The average student knowledge score before socialization was 55.64 with a standard deviation of 6.19, while after socialization, the average score increased to 79.74 with a standard deviation of 6.99. The significant increase shows that students gained a better understanding after participating in the socialization. The significance test shows the p-value = 0.00 ($p < 0.05$), which confirms that the difference between the average pretest and posttest scores is statistically significant.

4. DISCUSSION

The research results showed that the outreach carried out by health professional staff and teachers at hight school 10 in Rejang Lebong significantly increased students' understanding of dengue prevention. This is evident from the increase in the average student knowledge score from 57.18 (pretest) to 82.84 (posttest) and the increase in practice score from 55.64 to 79.74 with a p value <0.05. These results are in line with previous research which shows that health education plays a major role in changing individual behavior in adopting healthy living practices (Sugiyono & Darnoto, 2017). The age factor of teenagers who are still in the growth and development stage also supports the effectiveness of this socialization, because they are more responsive to new information and tend to apply it in everyday life.

This research proves that outreach carried out by health workers and teachers significantly increases students' knowledge and practice in preventing dengue fever. The results of the pretest and posttest analysis showed a significant increase in students' understanding of natural methods of preventing dengue fever, including the use of marigold plants and ovitrap fermentation. This increase is in line with research conducted by Basir et al. (2024), who found that training Mosquito larvae monitor (Jumantik) cadres with ovitrap could increase students' understanding of dengue prevention. However, the research also notes that increasing knowledge is not always significant if it is not accompanied by direct practice and ongoing mentoring School children are a group that is very vulnerable to dengue fever infection. According to Mohammad Subuh, MPPM from the Directorate General of Disease Control and Environmental Health, Ministry of Health of the Republic of Indonesia, children who are at school between 8 and 10 am have the highest risk of contracting dengue fever. Therefore, it is important to instill an understanding of Mosquito Nest Eradication (PSN) from an early age so that strong behavior and thought patterns are formed for the future. Apart from that, school children are more easily involved in PSN activities than adults, so they need to be trained to become little Mosquito larvae monitor Jumantik or larva monitors (Widyastututik, 2020).

Understanding PSN for school students is very important to instill the behavior of eradicating mosquito nests from an early age, which will later form the basis of their thinking and actions in the future. Students at school can contribute significantly to efforts to control dengue fever in Indonesia, both by acting as larva monitors Mosquito larvae monitor (Jumantik) and as implementers of mosquito nest eradication activities (PSN) in the school environment and in their respective homes (Widyastutik et al, 2020).

Collaboration between health workers and teachers is very important in increasing the effectiveness of socialization. Teachers have a role in building healthy habits in students, while health workers provide scientific validation regarding dengue prevention methods. This is supported by a study conducted by Rustam Aji et al. (2024), which shows that education about the periwinkle plant significantly increases students' understanding of the larvicidal effects of this plant on mosquitoes. However, the challenge in implementing this approach is the need for further training for teachers so that they can convey evidence- based information more effectively. In addition, active participation of health workers in school activities must be

strengthened so that the long-term impact is more optimal.

Marigold and periwinkle plants have potential as natural mosquito repellent agents because they contain bioactive compounds that are insecticidal. The study by Aji et al. (2024) found that marigold flower extract contains lutein and flavonoids which can disrupt the life cycle of mosquitoes, while periwinkle contains alkaloids which play a role in inhibiting the development of mosquito larvae. The use of this plant as a method of controlling mosquito vectors provides a more environmentally friendly alternative to the use of chemical insecticides. However, further studies are needed to determine the optimal dosage as well as the most effective application method.

Ovitrap fermentation is an innovative method of mosquito control that works by attracting female mosquitoes to lay eggs in a modified container. Research conducted by Nuriyah & Justitia (2021) found that ovitrap installed inside the house showed a higher capture rate of Aedes aegypti mosquitoes compared to conventional methods. However, the effectiveness of the ovitrap is highly dependent on community participation in its creation and maintenance. Therefore, education regarding how to make and use ovitrap must continue to be strengthened so that its implementation can be more widespread and effective.

The results of this research provide important insights for the development of dengue prevention policies, especially in the context of education and public health. Several recommendations that can be adopted based on these findings include the integration of dengue prevention education in the school curriculum to increase student awareness, the formation of student health cadres as agents of change in the school environment, empowering teachers as facilitators of health education with additional training on natural methods of controlling mosquitoes, as well as school collaboration with the health service for regular monitoring and evaluation regarding the effectiveness of the methods applied. By implementing these steps, it is hoped that the dengue prevention program can run more effectively and sustainably, and have a direct impact on reducing the incidence of dengue fever in the community.

5. CONCLUSIONS

The results of this study show that the outreach carried out by health professional staff and hight school 10 in Rejang Lebong teachers significantly increased students' understanding and practice in preventing dengue fever. This is evidenced by an increase in students' knowledge scores from 57.18 before socialization to 82.84 after socialization, as well as an increase in practice scores from 55.64 to 79.74, with a p value <0.05 which shows statistical significance.

The socialization method that prioritizes the use of marigold plants and ovitrap fermentation has proven effective in increasing students' awareness of efforts to control mosquito vectors that cause dengue fever. Collaboration between health workers and teachers plays an important role in ensuring the success of socialization, with teachers as educational facilitators and health professional workers as providers of scientific evidence- based information.

In line with the research results of Aji, et all (2024) The influence of the effectiveness of marigold flower pistil powder on mosquito repellent. The research location was in a room containing a mosquito net box containing 120 mosquitoes, almost all of which (90%) were found. 108 mosquitoes were avoided and the remaining 12 (10%) mosquitoes landed out of a total of 120 mosquitoes. in a mosquito net box contains 2 grams of marigold pistil powder in less than 10 minutes. The results of the Chi-square analysis obtained a value of $P = 0.04 < \alpha\ 0.05$, statistically there was a significant positive effect between marigold flower pistil powder on the ability to avoid mosquitoes, with an odds ratio = 4.10 times. So that people get used to it, put marigold flower pistil powder indoors to repel mosquitoes

Although the results of this study demonstrate the success of the intervention, further steps are needed to ensure the sustainability of the outreach program. Recommendations that can be implemented include the integration of dengue prevention education in the school curriculum, the formation of student health cadres, and increasing cooperation between schools and health services in monitoring and evaluation programs. With this ongoing effort, it is hoped that the incidence of dengue fever can be reduced effectively in schools and communities.

6. ACKNOWLEDGMENT

Thank you to the director of the Bengkulu Ministry of Health Polytechnic, Head of the Rejang Lebong DPKSM Office, and the Head, teachers, students of hight school 10 in Rejang Lebong , and the research team.

7. CONFLICTS OF INTEREST

No. conflicts of interest.

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