

Original Article

Relationship between knowledge, education, and support of health workers on mosquito nest eradication behavior in Kedaton community health center: A cross-sectional study

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Abstract

Background: Dengue fever (DF) remains a major global health problem with a high prevalence in Indonesia. The behavior of mosquito breeding site eradication (known as PSN) is the primary strategy for dengue prevention; however, it is influenced by factors such as knowledge, education, and support from healthcare workers.

Objective: This study aimed to analyze the relationship between knowledge, education, and healthcare worker support and mosquito breeding site eradication (PSN) behavior in the working area of UPTD Kedaton Public Health Center in 2025.

Methods: A quantitative descriptive study with a cross-sectional approach was employed. The sample consisted of 50 heads of households in RT 01 RW 01, Kedaton Village, selected using a total sampling technique. Data were collected using a structured questionnaire and checklist to assess independent variables (knowledge, education, and healthcare worker support) and the dependent variable (PSN behavior). Data were analyzed using the Chi-Square test with a significance level of 0.05.

Results: The majority of respondents demonstrated negative PSN behavior (58%), had poor knowledge (54%), and possessed a low level of education (56%). The Chi-Square test revealed a significant association between knowledge ($p = 0.000$), education ($p = 0.001$), and healthcare worker support ($p = 0.000$) with PSN behavior. Respondents with good knowledge, higher education, and strong support from healthcare workers tended to exhibit positive PSN behavior.

Conclusion: Knowledge, education, and healthcare worker support play crucial roles in improving community PSN behavior. Continuous health education interventions and the strengthening of healthcare workers' roles are essential strategies to reduce dengue incidence in endemic communities.

Background

Dengue fever (DF) remains a significant global public health problem, with data from the World Health Organization (WHO) showing a 30-fold increase in incidence over the past five decades, reaching approximately 390 million infections and 25,000 deaths annually, with nearly three-quarters of cases occurring in the Asia-Pacific region (Wati et al., 2016 in Kurniawan & Agustian, 2021). Indonesia is among the countries with the highest dengue prevalence in Southeast Asia, accounting for more than 57% of cases and nearly 70% of dengue-related deaths (Ministry of Health of the Republic of Indonesia, 2022). The Ministry's data show that in 2018, there were 129,650 reported cases with a case fatality rate of 0.83%, increasing by 29,303 cases in 2019 (Kemenkes RI, 2020). In 2019, East Java recorded the highest morbidity rate (50.75%), followed by South Sumatra in 2020 (55.63%) and West Sumatra in 2021 (57.32%) (Kemenkes RI, 2021). At the provincial level, South Sumatra reported the

highest incidence in Lahat (62.2%) in 2019, OKI (43.5%) in 2020, and Empat Lawang (45.7%) in 2021, with OKU ranked seventh (South Sumatra Provincial Health Office Profile, 2021). These data underscore the importance of mosquito breeding site eradication (PSN) as a community-based preventive strategy.

The dynamics of dengue transmission in Indonesia are closely linked to climatic conditions, environmental factors, and vector density of *Aedes aegypti* (Gunawan et al., 2021). Climate variability has been shown to elevate dengue risk, as demonstrated by studies in Jakarta and Semarang indicating the influence of rainfall and humidity on disease patterns (Nuraini et al., 2021; Wibawa et al., 2024). Research in Bali further confirmed that meteorological and spatio-temporal factors significantly affect dengue case distribution (Laksmi et al., 2021). Similarly, a study in Medan found that breeding site distribution and *Aedes aegypti* density contributed to higher infection rates (Siregar et al., 2020). Thus, sustained

vector control through PSN serves as the cornerstone of dengue prevention.

Effective vector control through PSN requires optimal community participation, as most mosquito breeding habitats are found within households (Wijaya et al., 2022). Unhygienic water storage practices have been shown to increase dengue infection risk (Wijaya et al., 2022). Preventive behavior is also influenced by sociodemographic factors, as studies in Yogyakarta demonstrated that education and maternal knowledge significantly affect dengue prevention practices (Fitriana et al., 2022). Similarly, research in Purworejo highlighted that maternal attitudes are closely associated with PSN behavior (Widiyaning et al., 2018). Environmental factors at the community level also play a role, as shown in studies conducted in Payung Sekaki District, Pekanbaru (Hardianti, 2021).

Beyond environmental influences, community knowledge remains a key determinant of successful dengue prevention. A study in Aceh demonstrated that community-based vector management effectively reduced dengue incidence (Zulkarnain et al., 2024). However, studies from various regions in Indonesia indicate persistent gaps between public knowledge and PSN practices (Prayitno et al., 2025). Research in Surabaya revealed that community participation and environmental conditions interact significantly in shaping prevention efforts (Setiawan et al., 2023). Similarly, in Yogyakarta, residents along riverbanks continue to face behavioral challenges despite health education interventions (Makrufardi et al., 2021). Recent evidence also indicates that public awareness of Wolbachia-based vector control innovations remains low (Andini et al., 2025).

Health education interventions have been proven effective in improving household knowledge and PSN practices (Santoso et al., 2024). A quasi-experimental study in Central Kalimantan confirmed that health promotion programs can drive behavioral change in dengue prevention (Amelia et al., 2023). Likewise, research in Semarang reported that household-level health education significantly enhanced PSN practices (Santoso et al., 2024). However, national-level studies highlight persistent gaps in implementing integrated community-based dengue control programs

(Rakhmani et al., 2024). Thus, evidence-based health education is an essential component of an effective PSN program.

The role of healthcare workers is integral in facilitating behavioral change within communities. Studies in East Nusa Tenggara revealed that knowledge, attitude, and active involvement of healthcare professionals strongly influence dengue prevention success (Dawe et al., 2020). International studies confirm that professional health behaviors significantly affect the adoption of evidence-based practices in communities (Patey et al., 2023). Similarly, research in Aceh showed that community-based interventions are more effective when facilitated by healthcare providers (Zulkarnain et al., 2024). This role is increasingly critical given the persistently high dengue mortality rate in Indonesia (Ali et al., 2025).

In addition to knowledge and professional support, government policy is a crucial determinant of dengue control success. The Regulation of the Minister of Health No. 50 of 2017 establishes environmental health standards and vector control guidelines as the foundation for PSN programs (Kemenkes RI, 2017). Regional statistical data also provide valuable insights for designing locally adapted prevention strategies, as reported by the Pekanbaru City Statistics Office (2022). Clinical and laboratory findings further emphasize the urgency of prevention, as early diagnosis remains a challenge (Melly & Anggraini, 2022). Therefore, PSN-based control should be supported by both community engagement and systemic policy measures.

Furthermore, studies show that the success of PSN depends on the integration of knowledge, attitude, health worker support, and community involvement (Wahab et al., 2024). Research across regions consistently highlights the gap between knowledge and practice as a key barrier (Prayitno et al., 2025). Household behavioral factors—such as waste management and environmental cleanliness—have also been identified as significant determinants of PSN success (Hidayah et al., 2021). Thus, multi-sectoral community empowerment programs are essential to enhance PSN effectiveness (Zulkarnain et al., 2024).

Based on the literature review above, this study aims to analyze the relationship between knowledge, education, and healthcare worker support and mosquito breeding site eradication (PSN) behavior in the working area of the Kedaton Public Health Center.

Methods

Study Design

This study employed a quantitative descriptive design with a cross-sectional approach. This design was selected to determine the relationship between the independent variables—knowledge, education, and healthcare worker support—and the dependent variable, namely mosquito breeding site eradication (PSN) behavior, measured at the same point in time. The study was conducted in January 2025 in RT 01 RW 01, Kedaton Village, which is under the working area of UPTD Kedaton Public Health Center. The research site was chosen because it represents a dengue-endemic area where PSN activities remain suboptimal and require improvement.

Sampling

The study population consisted of all heads of households residing in RT 01 RW 01, Kedaton Village. Based on population projections from the Central Bureau of Statistics (BPS) of Ogan Komering Ulu Regency (2021), there were 50 households in the area. A total sampling technique was applied, in which all heads of households meeting the inclusion criteria were included as research respondents. Thus, the total sample size was 50 respondents.

Instruments

Data were collected using a structured questionnaire and an observation checklist. The questionnaire was used to measure the independent variables—knowledge, education, and healthcare worker support—while the checklist was used to assess PSN behavior. The questionnaire was developed based on relevant theoretical indicators and adapted to the sociocultural context of the Kedaton community. Content validity was ensured through expert review, and reliability testing was conducted via a pilot study prior to the main data collection.

Data Collection

Data were collected directly through structured interviews with each head of household using the questionnaire. The research team visited each respondent's home according to the predetermined list. Data collection was conducted within a single period in January 2025 to ensure consistency. The checklist was used for direct observation of PSN practices within each household, including habits such as cleaning water containers, covering water storage tanks, and recycling used items that could serve as mosquito breeding sites.

Data Analysis

Data obtained from the questionnaire and checklist were first subjected to editing and coding to ensure completeness and accuracy. The data were then entered and analyzed using SPSS software. Univariate analysis was performed to describe the frequency distribution of each research variable. Bivariate analysis was conducted using the Chi-Square test with a significance level of $\alpha = 0.05$. The results were presented in frequency tables, percentages, and p-values to identify the relationships between knowledge, education, and healthcare worker support and PSN behavior.

Ethical Considerations

This study adhered to ethical research principles, including informed consent, confidentiality, beneficence, and justice. Respondents were informed about the study's purpose, benefits, and procedures and were asked to provide written consent prior to participation. Confidentiality was maintained by excluding personal identifiers from the instruments and reports. The study received official permission from the UPTD Kedaton Public Health Center and local authorities before implementation.

Results

This section presents the findings of the study regarding the relationship between knowledge, education, and healthcare worker support and mosquito breeding site eradication (PSN) behavior in the working area of UPTD Kedaton Public Health Center. The results are organized into univariate analyses, which describe the

frequency distribution of each variable, and bivariate analyses, which test the relationships between variables using the Chi-Square test at a significance level of 0.05. Data are presented in

both tabular and narrative form to provide a comprehensive overview of respondent characteristics and their association with PSN behavior.

Table 1. Frequency Distribution of Respondents Based on Mosquito Breeding Site Eradication (PSN) Behavior, Knowledge, Education, and Healthcare Worker Support

Variables	Frequency (n)	Percentage (%)
Mosquito Breeding Site Eradication (PSN) Behavior		
Positive	21	42,00
Negative	29	58,00
Knowledge		
Good	23	46,00
Poor	27	54,00
Education		
High	22	44,00
Low	28	56,00
Healthcare Worker Support		
Supportive	27	54,00
Unsupportive	23	46,00

Based on Table 1, it was found that the majority of respondents demonstrated negative mosquito breeding site eradication (PSN) behavior, totaling 29 respondents (58.0%), while only 21 respondents (42.0%) exhibited positive behavior. This finding indicates that PSN practices among residents of RT 01 RW 01, Kedaton Village, remain relatively low. In terms of knowledge, most respondents had poor knowledge, accounting for 27 respondents (54.0%), whereas 23 respondents (46.0%) possessed good knowledge. These results suggest a persistent knowledge gap regarding dengue prevention.

For the education variable, the largest proportion of respondents had low educational

attainment, totaling 28 respondents (56.0%), while 22 respondents (44.0%) had higher education levels. This supports the notion that education level is associated with the ability to comprehend and apply health information. Meanwhile, for the healthcare worker support variable, most respondents reported receiving support from healthcare workers (27 respondents; 54.0%), whereas 23 respondents (46.0%) stated that they did not receive such support. Thus, although healthcare worker support was relatively adequate, the low levels of knowledge and education among the community appear to remain dominant factors influencing poor PSN behavior.

Table 2. Relationship Between Knowledge, Education, and Healthcare Worker Support and Mosquito Breeding Site Eradication (PSN) Behavior

Variables	Mosquito Breeding Site Eradication Behavior				Total		Pvalue
	Positive		Negative		n	%	
	n	%	n	%			
Knowledge							
Good	18	85,7	5	17,2	23	46	0,000
Poor	3	14,3	24	82,8	27	54,3	
Education							
High	15	71,4	7	24,1	22	44	0,001
Low	6	28,6	22	75,9	28	56	
Healthcare Worker Support							
Supportive	18	85,7	10	34,5	28	56	0,000
Unsupportive	3	14,3	19	65,5	22	44	

Table 2 shows that there was a significant relationship between knowledge and mosquito breeding site eradication (PSN) behavior ($p = 0.000$). Respondents with good knowledge were more likely to exhibit positive PSN behavior (85.7%), whereas those with poor knowledge predominantly demonstrated negative behavior (82.8%). Education was also found to be significantly associated with PSN behavior ($p = 0.001$), with respondents having higher education levels showing a greater tendency toward positive behavior (71.4%) compared to those with lower education levels. Furthermore, healthcare worker support had a strong association with PSN behavior ($p = 0.000$), as respondents who received support were predominantly engaged in positive PSN practices (85.7%). These findings emphasize that knowledge, education, and healthcare worker support play critical roles in improving community participation in PSN activities and enhancing dengue prevention behavior.

Discussion

The findings of this study indicate a significant relationship between knowledge and mosquito breeding site eradication (PSN) behavior, where respondents with good knowledge were more likely to exhibit positive preventive behavior ($p = 0.000$). This result aligns with previous research emphasizing that knowledge level is one of the key determinants of dengue prevention behavior (Fitriana et al., 2022). A study in Yogyakarta confirmed that sociodemographic factors, including knowledge, directly influence preventive actions (Makrufardi et al., 2021). Other studies in Indonesia revealed persistent gaps in knowledge, attitudes, and practices in dengue control programs (Prayitno et al., 2025). Knowledge has also been found to play a critical role in public acceptance of innovative strategies such as Wolbachia-based vector control (Andini et al., 2025). Therefore, enhancing public knowledge through continuous health education remains a pivotal step in reducing dengue incidence (Santoso et al., 2024).

Formal education was also significantly associated with PSN behavior, as respondents

with higher education levels were more likely to engage in positive preventive practices ($p = 0.001$). This finding is consistent with a study in Purworejo, which demonstrated that education level influences dengue prevention practices at the household level (Widiyaning et al., 2018). Higher education facilitates better understanding and application of health information (Fitriana et al., 2022). Moreover, education fosters a more positive attitude toward community-based health programs (Setiawan et al., 2023). Research in Surabaya confirmed that community participation in dengue prevention is more effective when individuals possess sufficient educational backgrounds (Setiawan et al., 2023). Consequently, low educational attainment can serve as a barrier to behavioral change toward PSN (Hidayah et al., 2021).

Healthcare worker support was also significantly correlated with PSN behavior, where respondents who received support were more likely to demonstrate positive practices ($p = 0.000$). A study in East Nusa Tenggara highlighted the crucial role of healthcare workers in mobilizing communities for dengue prevention (Dawe et al., 2020). This support includes education, mentoring, and facilitation of community empowerment activities (Patey et al., 2023). Similarly, research in Aceh showed that the success of community-based vector management programs depends on active engagement of healthcare professionals (Zulkarnain et al., 2024). Their involvement extends beyond information delivery to motivating and sustaining behavioral change (Amelia et al., 2023). Therefore, the role of healthcare workers as facilitators in PSN programs must be continuously strengthened (Prayitno et al., 2025).

Beyond individual factors, environmental conditions play a vital role in dengue prevention. A study in Payung Sekaki Subdistrict, Pekanbaru, revealed that uncontrolled environmental conditions increase mosquito breeding risks (Hardianti, 2021). Research in Medan demonstrated that *Aedes aegypti* breeding site distribution is strongly influenced by household hygiene behaviors (Siregar et al., 2020). Climatic factors

also significantly contribute to dengue outbreaks, as confirmed by studies in Jakarta and Semarang (Gunawan et al., 2021; Nuraini et al., 2021). A study in Bali further established a close correlation between meteorological variables and the spatio-temporal patterns of dengue incidence (Laksmi et al., 2021). Thus, PSN behavior is not solely an individual responsibility but is closely linked to environmental and climatic conditions (Wibawa et al., 2024).

Household behavior is another critical determinant in dengue prevention. A study in West Java found that improper water storage practices increase the risk of dengue infection (Wijaya et al., 2022). Similarly, research in Sendangmulyo Village showed that household waste management behavior significantly affects dengue prevention (Hidayah et al., 2021). These findings are consistent with the present study, which revealed that PSN behavior among respondents remains predominantly negative. Poor household practices exacerbate mosquito breeding risks (Widiyaning et al., 2018). Therefore, behavioral interventions at the household level should be reinforced through targeted educational programs (Santoso et al., 2024; Amelia et al., 2025 & Niksan et al., 2025).

Health education serves as a fundamental strategy for improving knowledge and PSN practices. A study in Central Kalimantan demonstrated that health promotion through educational interventions significantly enhances dengue prevention behaviors (Amelia et al., 2023). Similarly, household-based health education programs in Semarang were proven to improve preventive practices (Santoso et al., 2024). Community-based education also effectively increases public participation in PSN programs (Setiawan et al., 2023). Supporting evidence from Aceh confirmed the effectiveness of community-based interventions in reducing dengue cases (Zulkarnain et al., 2024). Therefore, continuous health education initiatives involving healthcare workers as facilitators are essential (Dawe et al., 2020).

This study also highlights the importance of multisectoral collaboration in dengue control. Regulation of the Minister of Health

(Permenkes) No. 50 of 2017 establishes national standards for vector control to be applied across Indonesia (Kementerian Kesehatan RI, 2017). Local statistical data can serve as a basis for designing context-specific interventions (Daerah Statistik Kota Pekanbaru, 2022). National health profiles further confirm that dengue remains a public health priority (Pusat Data dan Informasi Kementerian Kesehatan RI, 2022). With strong policy support, PSN initiatives can be more systematic and effective in reducing dengue incidence (Prayitno et al., 2025). This underscores the need for synergy between policy, education, and community empowerment (Rakhmani et al., 2024).

Overall, this study demonstrates that knowledge, education, and healthcare worker support are significantly associated with community PSN behavior. Environmental factors, household practices, and policy support further reinforce dengue prevention efforts (Hardianti, 2021; Wibawa et al., 2024). Hence, an integrated approach that encompasses individual, community, and system-level interventions is essential for sustainable dengue prevention (Heryanto & Meliyanti, 2021, Zulkarnain et al., 2024). The findings provide an important foundation for developing more effective community-based intervention programs in the future (Prayitno et al., 2025).

Conclusion and Recommendation

This study concludes that knowledge, education, and healthcare worker support are significantly associated with mosquito breeding site eradication (PSN) behavior among residents in the working area of UPTD Kedaton Public Health Center in 2025. Respondents with good knowledge, higher education levels, and adequate healthcare worker support tended to exhibit more positive PSN behavior. However, the majority still demonstrated negative PSN practices, indicating the need to strengthen community awareness and knowledge. Environmental, climatic, and household factors were also found to influence dengue prevention success. Therefore, dengue control requires a comprehensive strategy encompassing individual capacity-building, healthcare worker engagement, and supportive public health

policies. Strengthening community education, improving environmental sanitation, and promoting intersectoral collaboration are essential measures to achieve sustainable dengue prevention outcomes.

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Declaration of conflict of interest

The authors declare no competing interests.

Declaration on the Use of AI

No AI tools were used in the preparation of this manuscript.

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