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Breeding Place, Dengue Hemorrhagic Fever (DHF) at Peureulak Barat Public Health Center, East Aceh Regency, 2025

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ABSTRACT

The existence of breeding sites plays a significant role in increasing the population of Aedes aegypti mosquitoes, the primary vector of Dengue Fever (DHF). To determine the relationship between the type of breeding site and the incidence of DHF in the Peureulak Barat Community Health Center, East Aceh Regency, in 2025. Method: This quantitative study used a case-control design. The sample consisted of 16 cases (with DHF) and 16 controls (without DHF). Data were collected through observation and interviews and analyzed using the Chi-Square test. Results: There was no association between water reservoirs and DHF incidence (p=0.066), there was a significant association between non-water reservoirs and DHF incidence (p=0.029), and there was no association between natural water reservoirs and DHF incidence (p=0.394). Conclusion: The type of breeding site most associated with DHF incidence is non-water reservoirs. The community needs to increase their 3M Plus (National Disposal and Sanitation) activities, especially for used containers that have the potential to hold water.
Keywords : Dengue Fever, Aedes aegypti, Breeding place

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is an infectious disease that remains a public health problem in Indonesia. This disease is caused by the dengue virus, which is transmitted through the bites of *Aedes aegypti* and *Aedes albopictus* mosquitoes.[1] Based on data from the Ministry of Health, DHF cases in Indonesia still show a relatively high trend every year, with an incidence rate of 41.1 per 100,000 population, and often increase during the rainy season.[2] In Aceh Province itself, the number of DHF cases from 2022 to 2024 tends to increase, and East Aceh Regency is also among the areas that often experience cases. The Peureulak Barat Community Health Center (Puskesmas), as one of the health service facilities, recorded 16 DHF cases in 2024.[3] Household environmental factors, particularly the presence of breeding places such as bathtubs, buckets, drums, used bottles, tires, and natural water puddles, greatly influence the development of mosquito vectors.[4] The occurrence of DHF is closely related to environmental factors that provide breeding sites for *Aedes aegypti* mosquito vectors, such as water storage containers. A breeding place is a location where mosquitoes reproduce and lay their eggs. Breeding places support an increase in DHF-spreading vectors; the more breeding places that hold water in and around the house, the more locations mosquitoes have to lay eggs and develop, thus increasing the risk of DHF occurrence.[5]

If these places are not properly managed, the potential for mosquito breeding will increase, thereby raising the risk of disease transmission.[6] Based on these issues, this study was conducted to analyze the relationship between the types of breeding places and the incidence of DHF in the working area of Peureulak Barat Community Health Center, East Aceh Regency.

RESEARCH METHODS

This research is a quantitative study with a case-control design, which is an epidemiological study that compares case and control groups. The study was conducted in the working area of the Peureulak Barat Community Health Center, with the sample consisting of 16 cases (DHF patients recorded at the health center) and 16 controls (community members with similar characteristics but without DHF), making a total sample of 32 respondents. The samples were selected using a purposive sampling method. Primary data were obtained through direct observation and interviews with respondents using a checklist, while secondary data were obtained from the health center's records of DHF case reports. Data analysis was performed

univariately to describe frequency distributions and bivariately using the Chi-Square test to determine the relationship between variables, with a significance level of 95% (α=0.05).

RESULTS AND DISCUSSION

The results of the study showed that the types of breeding places contributed differently to the incidence of Dengue Hemorrhagic Fever (DHF) in the working area of the Peureulak Barat Community Health Center, East Aceh Regency, in 2025.

1. Water Storage Containers (WSC)

   Water storage containers (WSC), such as bathtubs, buckets, and drums, showed that most of the case households were found to have larvae (75%), while in the control group only 37.5%. Although the Odds Ratio value (OR = 5.57) indicated an increased risk, statistical testing showed that there was no significant relationship between the presence of larvae in WSC and the incidence of DHF (p = 0.066).

Table 1
Relationship Between Water Storage Containers and the Incidence of DHF in the Working Area of the Peureulak Barat Community Health Center, East Aceh Regency, 2025

Water Reservoir	Case (n=16)		Control (n=16)		p value	OR (95% CI)
	n	%	n	%		
There are larvae (75%)	12	75	6	37,5	0,066	5,571
No larvae(25%)	`4	25	10	62,5		

2. Non-Water Storage Containers (Non-WSC)

   For the non-WSC variable, which includes used containers such as plastic bottles, used tires, cans, and flower vases, it was found that case households with the presence of larvae were 81.3%, which was much higher than the control group at 31.3%. Bivariate analysis showed a significant relationship with the incidence of DHF (p = 0.029) and an OR value of 7.22, which means that the presence of larvae in non-WSC containers increases the risk of DHF occurrence by up to seven times. This finding indicates that containers often neglected and found around the house can serve as effective breeding sites for mosquitoes and play a major role in the spread of disease vectors.

Table 2
Relationship Between Non-Water Storage Containers and the Incidence of DHF in the Working Area of the Peureulak Barat Community Health Center, East Aceh Regency, 2025

Not a Water Reservoir	Case (n=16)		Control (n=16)		*p value*	OR (95% CI)
	n	%	n	%		
There are larvae (81.3%)	13	81,25	5	31,25	0,029	7,222
No larvae(18.7%)	`3	18,75	11	68,75		

3. Natural Water Storage Places

   For the natural water storage variable, such as tree holes and coconut shells, larvae were found in 31.3% of case households and 12.5% of control households. The Chi-Square test results showed no significant relationship between natural water storage places and the incidence of DHF (p = 0.394), although the OR value of 3.18 still indicated a tendency toward increased risk. Thus, the results of this study emphasize that environmental factors in the form of non-water storage containers are the most dominant type of breeding place associated with the incidence of DHF in the study area.

Table 3
Relationship Between Natural Water Storage Places and the Incidence of DHF in the Working Area of the Peureulak Barat Community Health Center, East Aceh Regency, 2025

Natural Water Reservoirs	Case (n=16)		Control (n=16)		p value	OR (95% CI)
	n	%	n	%		
There are larvae (31.3%)	5	31,25	2	12,5	0,394	3,182
No larvae(68.7%)	`11	68,75	14	87,5		

The results of this study indicate that the presence of breeding places remains an important factor associated with the incidence of Dengue Hemorrhagic Fever (DHF) in the working area of the Peureulak Barat Community Health Center, East Aceh Regency. The analysis of the three types of breeding places shows that each type of container plays a different role, depending on its use and management practices within the community.

For the Water Storage Container (WSC) variable, the results show that houses with WSCs tended to have more larvae found in the case group than in the control group. However, statistical tests did not show a significant relationship (p = 0.066). This may be influenced by community behavior, as WSCs are frequently used in daily life and are therefore more often drained or cleaned. This condition is consistent with previous studies stating that well-managed WSCs can reduce the risk of *Aedes aegypti* breeding. Nevertheless, the OR value of 5.57 indicates that WSCs still have the potential to become risky breeding sites if the practices of draining and covering are not routinely performed.

For the Non-Water Storage Container (Non-WSC) variable, the results show a significant relationship with the incidence of DHF (p = 0.029; OR = 7.22). Non-WSC containers include used plastic bottles, tires, cans, flower vases, and other items capable of holding rainwater. These containers are often neglected by the community because they are considered unimportant, yet they frequently collect water and become ideal places for mosquito breeding. This finding is consistent with a previous study conducted in 2021, which reported that used items contribute greatly to the presence of mosquito larvae in household environments.[7] Therefore, DHF control efforts should place greater emphasis on environmental management, particularly the removal of discarded containers that can serve as mosquito breeding sites.

Meanwhile, for the Natural Water Storage variable, the results show no significant relationship with the incidence of DHF (p = 0.394; OR = 3.18). Although there is a tendency toward risk, the contribution of natural containers such as tree holes and coconut shells is relatively small. This may be due to the study area being a residential region with limited vegetation, resulting in fewer natural containers compared to artificial ones. This finding aligns with a study conducted in 2017, which stated that the influence of natural water storage places on DHF cases is lower than that of artificial containers, particularly in densely populated areas.[8]

Overall, the findings of this study confirm that non-water storage containers are the factor most strongly associated with DHF incidence. Therefore, the *Pemberantasan Sarang Nyamuk* (PSN) or "Mosquito Nest Eradication" strategy with the 3M Plus approach should focus more on controlling used containers and household waste, while maintaining the habits of draining and covering WSCs. Active community participation in maintaining environmental cleanliness is the key to reducing DHF incidence. In addition, support from the Community Health Center in the form of education, regular larvae monitoring, and empowerment of *jumantik* (larvae monitoring volunteers) should continue to be strengthened to make vector control efforts more effective.

CONCLUSIONS AND SUGGESTIONS

Conclusion

This study concludes that there is a significant relationship between non-water storage containers and the incidence of Dengue Hemorrhagic Fever (DHF) in the working area of the Peureulak Barat Community Health Center, East Aceh Regency, in 2025. Meanwhile, water storage containers and natural water storage places did not show a significant relationship. DHF prevention efforts should focus on increasing community awareness to carry out the 3M Plus Mosquito Nest Eradication (PSN) program routinely, particularly in managing non-water storage containers that have the potential to serve as mosquito breeding sites.

Suggestions

The community is expected to carry out the 3M Plus Mosquito Nest Eradication (PSN) program routinely, not only on water storage containers but also on used containers that have the potential to collect rainwater. The Community Health Center should enhance education and conduct regular larvae monitoring to support vector control efforts. Future research is recommended to include additional variables and a larger sample size to produce more representative results.

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