Analysis of the Influence of Community Cultural Factors on the Movement of Dengue Haemorrhagic Fever Mosquitoes in Malang Regency

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ABSTRACT

Background: Dengue Haemorrhagic Fever (DHF) remains a serious threat in tropical regions, including Indonesia, with a significant increase in cases.

Purpose: The spread of this disease is influenced by community cultural factors and behaviours related to environmental sanitation. Cultural differences between rural and urban communities affect dengue prevention efforts. Through the measurement of the House Index (HI) and Container Index (CI), the relationship between community behaviour and mosquito density can be determined.

Methods: This study analysed the influence of community cultural factors on the movement and breeding behaviour of *Aedes aegypti* mosquitoes in Malang Regency. Using a quantitative analytical observational design (cross-sectional), the research was conducted in three subdistricts with the highest DHF cases: Dau, Kepanjen, and Singosari.

Results: The results showed that family support for DHF prevention was generally positive but not significantly related to mosquito density ($p = 0.796$). Conversely, community leader support showed a significant effect ($p = 0.044$), as residents were more obedient to local leaders' guidance. Community leaders play a crucial role in dengue control, while family involvement needs to be strengthened through education and active participation.

Conclusion: Nurses are advised to empower families and collaborate with community leaders in implementing the 3M Plus movement and culturally based education to reduce mosquito density and Dengue Haemorrhagic Fever cases.

Keywords: community culture, dengue mosquito movement, influence

BACKGROUND

The public health crisis known as dengue haemorrhagic fever (DHF) is an ongoing concern in tropical and subtropical areas around the globe. Bite vectors of the dengue virus, Aedes aegypti and Aedes albopictus, are responsible for the disease's transmission. The World Health Organization (WHO) reports that between 50 and 100 million new cases of DHF are reported every year, a thirtyfold rise over the previous fifty years. According to the World Health Organization's Global Strategy for Dengue Prevention and Control, over half of the world's population resides in dengue-endemic regions, with the majority (around 75%) being in the Asia-Pacific region, which includes Indonesia.

Based on WHO data from April 2025, there were 621 fatalities and 88,593 confirmed cases in Indonesia, according to statistics from the World Health Organization (2024). According to the East Java Provincial Health Office (2023), 1,009 DHF cases were documented in Malang Regency in 2023, making it the province with the greatest number of cases in East Java.

The mountainous terrain, high temperatures and humidity, fast urbanization, and growing population density of Malang Regency are all factors that contribute to the growth of Aedes aegypti mosquitoes. The number of DHF cases has varied over the last three years, with the Malang Regency Health Office reporting 383. In 2023, the number of cases rapidly to 1,009, and in 2024, there was a little decline to 905 instances. With 91 cases in Dau, 81 in Kepanjen, and 77 in Singosari, the top dengue transmission subdistricts in Malang Regency are clearly a cause for concern.

The spread of DHF is influenced not only by physical environmental factors such as temperature, humidity, and sanitation but also by community cultural factors. Culture plays a vital role in shaping daily behaviour, including habits of environmental cleanliness, water storage practices, and participation in mosquito eradication programs such as *3M Plus* (Covering, Draining, and Burying) and *G1R1J* (One House, One Larvae Observer Movement). Communities lacking awareness or hygienic habits tend to create mosquito breeding sites.

Cultural differences between rural and urban communities influence disease prevention behaviours. Rural communities often uphold family and religious values but may be less consistent in maintaining environmental cleanliness, while urban communities are more rational and open but tend to neglect collective activities such as *gotong royong* (communal mosquito control). These behavioural variations demonstrate that local cultural values significantly affect vector-borne disease dynamics. Entomological surveys measuring mosquito density and movement through the House Index (HI) and Container Index (CI) often correlate with cultural practices and household environmental management (Ministry of Health RI, 2017).

Given the high incidence of DHF in Malang Regency and the complex sociocultural dynamics, it is essential to analyse how cultural factors influence mosquito movement. The findings are expected to provide comprehensive insights for the Malang Regency Health Office to develop more culturally adaptive mosquito control strategies.

OBJECTIVE

To analyse the influence of community cultural factors on the movement and breeding behaviour of *Aedes aegypti* mosquitoes, the primary vector of Dengue Haemorrhagic Fever, in Malang Regency.

METHODS

This research used a quantitative analytical observational approach with a cross-sectional the research combines the teory of Hendrik L. Blum and the theory of Lawrwncw Green, where in all data collection or retrival processes, questionnaries and interviews were used simultaneously to collect data.the population and sample in this study were 151 responden. The study was conducted in three subdistricts of Malang Regency with high DHF cases: Dau (91 cases), Kepanjen (81 cases), and Singosari (77 cases), totaling 249 cases. and the demographic data of the area were obtained from secondary data of BPS (Central Statistics Agency) Malang in 2022 and other secondary data, such as the administrative map of Malang Regency in 2022, which were obtained from the Department of Public Works and Water Management of Malang Regency. Data were analysed using SPSS with linear regression tests.

Linier regression tests were conducted to determine the influence of culture on mosquito density in these 3 areas. This primary data research was conducted for 4 months from October 2025 to Januari 2026, and the research was conducted in 3 locations in Malang Regency, namely Dau District, Kepanjen District, and Singosari District, because these three districts had the highest levels of dengue fever in Malang Regency in 2012.

RESULTS

Reinforcing Factors of the Community Toward Dengue Fever in 3 Region with a High Dengue Fever Incidence Rate in Malang Regency

The reinforcing factors in this study consist of family support and community leader support. Family support in this study refers to the encouragement or motivation provided by family members, which focuses on an individual's activities aimed at eradicating dengue fever in their environment. This factor serves to observe how the community strives to reduce dengue fever incidence in the future. Meanwhile, community leader support refers to the encouragement or motivation that comes from outside the family, such as village leaders, traditional leaders, or other community figures, who also emphasize individuals' participation in efforts to eradicate dengue fever in their surrounding areas. In this reinforcing factor, family support is divided into three categories: less supportive, supportive, and highly supportive. The explanation of these categories of family support is described as follows:

Table 1. Linear Regression Test Results: Family Support Toward DHF Prevention in Three Subdistricts of Malang Regency

Variable	Dau	P-Value	Singosari	P-Value	Kepanjen	P-Value
Less Supportive	15 (30%)	0.093	7 (14%)	0.866	9 (18%)	0.796
Supportive	25 (50%)		23 (46%)		31 (62%)	
Highly Supportive	10 (20%)		20 (40%)		10 (20%)	

Table 1 shows that in Dau District, 25 respondents (50%) supported dengue prevention activities, 10 respondents (20%) were highly supportive, and 15 respondents (30%) were less supportive. These results indicate that community support in Dau District, Malang Regency, for dengue prevention activities in terms of family support is generally not yet optimal. However, it should be noted that some members of the community in Dau District do show support for dengue prevention efforts. This finding suggests that respondents in Dau District need to further enhance their efforts in dengue prevention, both within their own households and in their surrounding environment.

In Singosari District, 23 respondents (46%) were supportive of dengue prevention activities, 20 respondents (40%) were highly supportive, and only 7 respondents (14%) were less supportive. These results indicate that community support in Singosari District, Malang Regency, for dengue prevention activities in terms of family support is generally supportive. This demonstrates that respondents in Singosari District are enthusiastic about participating in dengue prevention activities, both within their homes and in their neighbourhoods. However, these efforts still need to be further strengthened to break the chain of dengue transmission in the area. Finally, in Kepanjen District, 31 respondents (62%) supported dengue prevention activities, 10 respondents (20%) were highly supportive, and 9 respondents (18%) were less supportive. These results indicate that community support in Kepanjen District, Malang Regency, for dengue prevention activities in terms of family support is generally positive. This suggests that respondents are enthusiastic about dengue prevention efforts both in their households and in their surrounding communities. Nevertheless, further efforts are still needed to break the chain of dengue cases in the region. Based on the linear regression test results, the significance value was found to be greater than $\alpha = 0.05$, indicating that the family support factor has no significant effect on mosquito density the vector responsible for dengue transmission in areas with a high incidence of dengue fever in Malang Regency.

This Reinforcing Factor also includes the variable of community leader support, which is divided into two categories: not implemented and implemented. The description of this community leader support is presented as follows:

Table 2. Results of the linear regression test on the community leader support factor of respondents toward dengue fever (DF) in the three districts of Malang Regency with a high incidence of dengue fever.

Variable	Dau	P-Value	Singosari	P-Value	Kepanjen	P-Value
Not Implementing	38 (76%)	0.046*	18 (36%)	0.040*	10 (20%)	0.044*
Implementing	12 (24%)		32 (64%)		40 (80%)	

Table 2 illustrates that in Dau District, 12 respondents (24%) implemented dengue fever prevention activities, while 38 respondents (76%) did not implement such activities. These results indicate that the community in Dau District, Malang Regency, generally received less support from community leaders in implementing dengue prevention activities. However, it should be noted that there were still some community members who participated in these activities. This finding suggests that respondents in Dau District need to further improve their efforts in dengue prevention, both within their households and in their surrounding environment. In Singosari District, 32 respondents (64%) implemented dengue prevention activities, while only 18 respondents (36%) did not. These results show that the community in Singosari District, Malang Regency, generally implemented dengue prevention activities with support from community leaders. However, there were still some residents who did not engage in these efforts. This indicates that respondents in Singosari District still need to strengthen their dengue prevention actions, both at home and in the community. In Kepanjen District, 40 respondents (80%) implemented dengue prevention activities, while only 10 respondents (20%) did not. These results suggest that the community in Kepanjen District, Malang Regency, generally carried out dengue prevention activities with support from community leaders. Nevertheless, it should be emphasized that there were still a few residents who did not participate in dengue prevention efforts. This implies that respondents in Kepanjen District also need to continue enhancing their dengue prevention activities, both within their homes and in their surrounding environment. Based on the results of the linear regression analysis, it was

found that the significance value was less than α = 0.05, indicating that the community leader support factor had a significant influence on mosquito density the primary vector of dengue fever in areas with high dengue incidence rates in Malang Regency.

DISCUSSION

Reinforcing Factors (Family Support and Community Leader Support) on Dengue Fever Incidence in Kepanjen, Dau, and Singosari Districts
Reinforcing Factor: Family Support

The reinforcing factor, particularly family support, was examined to explore the relationship between family support, Aedes aegypti mosquito density, and community leader support. Similar to the predisposing and enabling factors, data for this reinforcing factor were collected through questionnaires distributed to respondents from three districts in Malang Regency: Dau, Singosari, and Kepanjen. The researcher involved 50 respondents from Dau District, 50 respondents from Singosari District, and 50 respondents from Kepanjen District. In total, 95 households were observed across the three districts, as some households had two to three respondents. A person's internal or familial environment is the source of their family support. The way family members treat each other, including their attitudes, behaviors, and acceptance, is defined by mutual support, encouragement, and readiness to provide a hand. Majid, A. M. et al. (2025), the most basic social unit is the family, which consists of a breadwinner and his or her dependents who share a dwelling. Community knowledge and attitudes are important predictors of dengue preventive behaviors, and effective dengue control strategies must involve the integration of socio-cultural aspects, intersectoral collaboration, and inclusive public engagement.

Community beliefs and understanding regarding Aedes mosquitoes remain diverse, including the perception that mosquitoes breed only in dirty water, that dengue fever is seasonal, or that preventive measures are sufficient only when cases occur. These beliefs contribute to low consistency in preventive behaviors, such as mosquito breeding site elimination, management of water storage containers, and the use of personal protective measures. Pujiyanti, A., Paramastri, I., & Triratnawati, A. (2020). Women tend to exhibit better dengue prevention behaviors than men. Respondents who have lived longer in Malang and those with larger household sizes also tend to demonstrate better preventive behaviors. BMC Public Health. (2018).

Family support often influences an individual's emotional understanding of knowledge or information. In this study, even though family support can motivate someone to change their habits and families generally express support for dengue prevention activities, the study found that these changes tend to be temporary. After participating in prevention activities, individuals often return to their previous habits the following day. Thus, positive behaviours are performed only briefly, becoming what can be described as seasonal behaviours. This indicates that while family support has the potential to change a person's old habits into better ones, it may also remain as mere verbal or emotional encouragement without actual behavioural change.

Reinforcing Factor: Community Leader Support

Community leader support originates from influential figures within a person's neighbourhood. It refers to the actions and attitudes influenced by local community leaders such as neighbourhood heads (RT/RW) or village officials. This type of support is a form of interpersonal relationship that provides emotional comfort, assistance, and useful information received verbally or through guidance from community leaders, which can shape behavioural outcomes. Community leader support can be categorized into four types: Emotional support, which includes expressions of empathy, care, and concern. Appreciation support, which involves respect, recognition, and encouragement to progress. Instrumental support, which

includes direct assistance according to community needs. Informational support, which provides advice, guidance, suggestions, and feedback (Smet B, 1994). According to the Law of the Republic of Indonesia No. 8 of 1987, a community leader is defined as "a person who, due to their social status, is honoured by the community and/or the government." The status of a community leader is obtained through an individual's knowledge, wisdom, moral character, and success in social life. Because of their wisdom, knowledge, and respected personality, community leaders are often looked up to as role models within their respective fields. Their activity, capability, and character make them figures who are respected and obeyed (Porawouw, 2016). In conclusion, community leader support can influence the increase or decrease in Aedes aegypti larvae density in an area because people tend to follow and comply with the policies or directives given by these leaders. Communities are often more responsive or even fearful of local authority figures if they fail to adhere to established regulations. Therefore, community leaders can serve as a key factor in reducing or eradicating dengue fever cases by enforcing and promoting public health policies that aim to control and prevent the spread of the disease in their areas.

CONCLUSION

The reinforcing factors examined in this study included family support and community leader support in three districts with high dengue fever (DF) incidence in Malang Regency. The results showed that family support did not have a significant effect on mosquito density because the support provided was inconsistent and tended to be seasonal in nature. In contrast, community leader support had a significant effect on mosquito density, as community members were more likely to comply with the directions and policies of local leaders. Therefore, community leaders play an essential role as a primary reinforcing factor in reducing mosquito density and the incidence of Dengue Fever in Malang Regency. Nurses need to empower families and collaborate with community leaders in dengue prevention efforts through continuous health education, PSN 3M Plus activities (draining, closing, and recycling water containers plus additional preventive actions), and culture-based community approaches. Regular monitoring is necessary to ensure that these efforts are sustainable and effective in reducing the density of Aedes aegypti mosquitoes and dengue fever cases in the community.

CONFLICTS OF INTEREST

The researcher declares that there is no conflict of interest in this study.

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