

Evaluation of Community Empowerment Initiatives in Dengue Hemorrhagic Fever Control and Prevention in Pekanbaru City

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aimed to evaluate the use of community empowerment strategies in dengue fever prevention and control in Pekanbaru City, with a focus on program inputs, outputs, and processes in relation to regional planning. Utilizing qualitative methods, the study relied heavily on informants to shape its findings. The "one house one jumantik" initiative encountered significant challenges due to limited funding and funds being redirected for Covid-19 management. Additionally, the facilities and infrastructure in Limapuluh District were found to be inadequate. Despite improvements in dengue fever incidence rates, the ABJ (Larva Free Rate) in Limapuluh and Sail Districts failed to meet the Indonesian Ministry of Health's target of $\geq 95\%$.

Keywords: Dengue; Jumantik; Medan; Covid19; Village Governance.

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1. Introduction

The incidence rate of Dengue Hemorrhagic Fever (DHF) in four Indonesian provinces did not meet the target of less than 49 cases per 100,000 individuals in 2017. Bali Province exhibited the highest incidence rate at 105.95 per 100,000 individuals, whereas Riau Province ranked 17th out of 34 provinces, with an incidence rate of 28.96 per 100,000 individuals (Ministry of Health, 2018). In Pekanbaru City, the number of reported DHF cases was 358 in 2018, which escalated to 488 in 2019 and further to 494 in 2020. Nonetheless, governmental efforts to curb the spread of DHF in 2021 culminated in a reduction of cases to 313.

The environment is a pivotal factor influencing the breeding and survival of *Aedes aegypti* mosquitoes, the primary vector for DHF (Dinata and Dhewantara, 2011). Community participation and involvement in activities aimed at eradicating mosquito breeding sites—such as cleaning, draining, covering water storage containers, recycling used items (3M), and utilizing larvicidal pesticides—are crucial in thwarting DHF transmission (Wahyono et al., 2010; Widiyanto, 2007).

In addition to environmental factors, economic factors significantly contribute to the spread of DHF. For example, communities in water-scarce areas may resort to purchasing and storing water, which can become potential mosquito breeding sites. The region is intrinsically linked to this issue. The difficulty in accessing water sources compels communities to store water for extended periods, increasing the likelihood of mosquito larvae proliferation.

Addressing dengue fever necessitates intersectoral collaboration, particularly between health and regional sectors. The Ministry of Health of Indonesia's Dengue Prevention and Control Strategy (2017) encompasses vector control through community empowerment, engaging communities in mosquito breeding site eradication, and implementing the 3M Plus approach (cleaning, draining, and recycling) via the "1 House 1 Jumantik" initiative.

Miryanti et al. (2016) identified individual factors, such as knowledge of Dengue Fever (DF) and its prevention among community health volunteers, psychological factors like motivation, and organizational factors including supportive infrastructure and facilities for activities. Effective DF control mandates collaboration between the government and the community through empowerment activities such as public education about DF, joint program development, community organization, and sustainable program implementation.

Research by Chadijah et al. (2011) demonstrated that empowering jumantik (mosquito larvae controllers) through PSN activities significantly increased mosquito-free areas and reduced house index. Despite the government's implementation of the One House One Jumantik campaign since 2016, the reduction in Dengue Fever incidence rates in Pekanbaru has not been substantial enough to meet governmental targets.

This situation has prompted researchers to scrutinize the efficacy of community empowerment strategies in controlling Dengue Fever in Pekanbaru, aiming to enhance the success of these initiatives in the future. Pekanbaru City is proactively engaged in dengue fever prevention and control. The implementation of these measures, coupled with community empowerment strategies, is regularly assessed to mitigate the disease's spread in Pekanbaru. Continuous monitoring ensures the effectiveness of these interventions in reducing dengue fever incidence rates.

2. Method

The lifecycle of *Aedes aegypti* mosquitoes encompasses three distinct habitats: water, land, and air. The pre-adult stages, comprising eggs, larvae, and pupae, inhabit water environments. In contrast, adult *Aedes aegypti* mosquitoes are found in terrestrial and aerial habitats, seeking water solely for oviposition. Each oviposition event by a female mosquito results in the deposition of approximately 100 eggs. These eggs can endure desiccation for up to six months but will hatch more rapidly under flooded or humid conditions (Kemenkes RI, 2017). The emerging larvae float on the water's surface, breathing through a siphon.

This study was conducted in the Limapuluh and Sail Kota Pekanbaru districts from December 2021 to March 2023. Employing a qualitative case study methodology, this research entailed an intensive, detailed, and in-depth examination of a program, event, or activity at various levels (individual, group, institution, or organization) to achieve a profound understanding of the subject.

The data utilized in this study comprised primary data obtained through interviews, observations, and documentation related to the implementation of the one-house-one-larvae-inspector initiative for dengue hemorrhagic fever prevention and control in Pekanbaru City. Additionally, secondary data was collected from existing field data, including policies and larval-free rates. The data collection techniques employed in this study are outlined below:

- In-depth Interviews: Using a structured interview guide, in-depth interviews were conducted with informants to elicit comprehensive responses.
- Observation: The researcher acted as an observer, systematically recording and summarizing information derived from documents, behaviors, or informants' speeches during the research. Environmental observations were also conducted where the research took place.
- Documentation: Necessary documents were collected in various forms, including recordings, writings, photographs, policy regulations, and images of larval inspector activities.

The study's informants were categorized into key, primary, and supporting informants, with the following characteristics:

Table 1. Characteristics of Informants

No	Informant	Total Informant	Informant Code
1	Key Informant		
	<ul style="list-style-type: none"> • Holder of the dengue fever prevention and control program at the Pekanbaru City Health Office • The program holder for the prevention and control of dengue fever at the Puskesmas Health Center 	1 Person	K1 Informant
		3 Persons	K2-K4 Informant
2	Primary Informant		
	Jumantik Coordinator cadres	6 Persons	U1-U6 Informant
3	Supporting Informants		
	Jumantik in house/community	8 Persons	P1-P8 Informant

During data collection, information was acquired in various formats. Interviews provided insights from researchers and informants, observations offered notes on the real conditions of the research environment, and documentation included information from program managers, related agencies, and publications. During the data analysis process, the collected information was reduced by summarizing, identifying key patterns, and extracting significant information (Sugiyono, 2013).

Following data reduction, the next step in qualitative data analysis is data display. The purpose of displaying data is to offer an overview and interpret the relationships between the collected data (Samsu, 2017). Typically, qualitative data is presented using narrative texts, although it can also be displayed through tables, graphs, pie charts, and other visual formats, as suggested by Sugiyono (2013).

In qualitative research, conclusions represent new insights or clearer understandings of previously ambiguous objects. According to Harahap (2020), conclusions drawn during the data reduction phase are preliminary and subject to refinement. The final conclusion is reached after the data has been thoroughly reduced and displayed, resulting in more precise and accurate information.

3. Result and Discussion

3.1 Results and Discussion

The "one house one jumantik" program is a national-scale initiative involving multiple stakeholders and requiring a systematic implementation process. According to the Ministry of Health (2016), the activity process begins with preparation, including house visits, mosquito larvae monitoring, recording the results, and health education.

3.2 Preparation

The preparation phase involves mapping the locations that need monitoring for mosquito breeding before conducting house visits. Meetings are held with RT officials, local residents, community and religious leaders, and potential groups to introduce the "one house one mosquito larvae monitor" program. These meetings aim to select a coordinator and environmental monitors for mosquito larvae through negotiations between RT officials and other involved parties.

3.3 House Visits

Based on the mapping results obtained during the preparation process, coordinators conduct house visits every two weeks. During these visits, the mosquito larvae monitor coordinator engages with residents by initiating conversations about their well-being and discussing dengue fever outbreaks in the surrounding area. The coordinator explains the dangers of dengue fever, its transmission, and prevention methods. Homeowners are invited to inspect mosquito larvae and their breeding sites with the coordinator. A house mosquito larvae monitor is selected to independently monitor the larvae and is taught how to fill out the house mosquito larvae monitoring card.

3.4 Mosquito Larvae Monitoring

Mosquito larvae monitoring is conducted in houses, public buildings, and public spaces using the following guidelines: monitoring is carried out in bathtubs, toilets, water containers, drums, and other water storage areas such as flower vases, bird feeders, used cans, plastic bottles, old tires, dispenser stands, clogged drains, and holes in bamboo or tree trunks. If larvae inspection is conducted in deep or dark wells or water storage, a flashlight is needed during the inspection. If no mosquito larvae are found, water storage inspection must continue for more than a minute since larvae usually surface to breathe within that duration. Through regular monitoring, potential mosquito breeding sites are identified, and prompt action is taken to eliminate them, thereby reducing the risk of mosquito-borne diseases such as dengue fever. The community is encouraged to participate in monitoring activities to prevent mosquito breeding sites and protect themselves from mosquito-borne diseases.

3.5 Mosquito Larvae Observations

Every house visited by the jumantik coordinator must be recorded for the presence of larvae in the water containers or other breeding sites. The coordinator's monthly records are submitted to the jumantik supervisor. If within a period of 4 to 5 weeks of observation there is only one "+" sign, the house or container is noted or reported as "+". The jumantik coordinator's monthly records are submitted to the jumantik supervisor. The format of the larvae report by the jumantik coordinator is standardized and is submitted to the neighborhood health center, which further reports it to the Health Department. The output of the report made by the jumantik supervisor is the ABJ value. The ABJ data form includes the RW name, Village/Sub-district, District, Month, and Year of the ABJ data creation. The ABJ data is created per RT in that RW.

Despite the program's guidelines, the district of Limapuluh has no household mosquito monitors due to low community participation. This was reported by the district authority, who noted the low turnout at the program's socialization event. Some residents stated that they were not aware of the program, while others reported that the coordinator had never visited their home to provide information on the PSN 3M Plus program. In

contrast, Sail district has implemented the mosquito monitoring program effectively in the Suka Mulia neighborhood, with volunteers conducting home visits every two weeks. However, limited human resources mean not all households can be examined, so the focus is on those affected by dengue fever.

In Sail district, jumantik cadres visit houses twice a week, rotating the houses and inspecting 20 houses during each field duty. They also conduct socialization on how to inspect mosquito larvae using a flashlight, how to prevent dengue fever with the 3M Plus program, and provide information on mosquito nesting sites. Socialization is not only done from house to house but also in schools, neighborhoods, and gathering places. Another activity as part of the 3M Plus program is community service, initiated by the neighborhood and block heads once a month. The frequency of community service increases during dengue fever outbreaks and the rainy season to prevent stagnant water from becoming mosquito breeding grounds.

Jumantik coordinators in Sail district also check the mosquito larvae cards given to each household during house visits. At the program's start, each household received a mosquito larvae card and was educated on how to fill it out. The monitoring results recorded by the jumantik in each house are then transferred to the jumantik monitoring report sheet held by the jumantik coordinator. The same format is used in Limapuluh and Sail districts according to the Ministry of Health guidelines. The monitoring results by the jumantik coordinator are then reported to the neighborhood health center and forwarded to the district health center until they reach the Department of Health.

The program's output is reflected in the larva-free index (ABJ) and the incidence rate (IR) of Dengue Fever (DF). In Sail district, the ABJ value was 65% in 2017, 90% in 2018, 85% in 2019, and 85% in 2022. In Limapuluh district, there were 38 cases of DF in 2020 with a population of 38,613, resulting in an IR of 95 per 100,000 people. In 2021, Limapuluh achieved the target with 21 DF cases out of a population of 45,578, resulting in an IR of 46 per 100,000 people. Sail district consistently implemented the program, achieving the IR target with 9 DF cases in 2020 out of a population of 20,384 (IR of 44 per 100,000 people) and 11 cases in 2021 out of 25,290 people (IR of 44 per 100,000 people). Interviews with informants revealed that the program faced challenges in terms of human resources, funding, facilities, and infrastructure. The implementation process encountered obstacles, and the outputs did not always meet the targets set by the Ministry of Health. The findings suggest a need for more robust community engagement and better resource allocation to improve the program's effectiveness.

4. Conclusion

The "one house one jumantik" program faced several challenges, notably insufficient funding and the redirection of funds to address the Covid-19 pandemic. This financial strain significantly impeded the program's execution. Additionally, the facilities and infrastructure provided to jumantik cadres were only distributed during the initial socialization of the program. Newly recruited PSN kit cadres had to rely on existing equipment, and some even resorted to using personal flashlights.

The roles of stakeholders, including home jumantik and jumantik coordinators, were not fully aligned with the guidelines set by the Ministry of Health. Particularly in Limapuluh District, the home jumantik program was not implemented. The recording and reporting process was suboptimal, as home jumantik still required assistance from coordinators, making the process less efficient. Moreover, the PSN 3M Plus socialization efforts by coordinators were limited to verbal communication without the aid of educational materials and visual aids.

Despite these challenges, the program showed some positive outcomes. The ABJ (Larva Free Rate) in Limapuluh and Sail Districts, although still below the Ministry of Health's target of $\geq 95\%$, showed improvement. The incidence rate of dengue fever also improved, meeting the target incidence rate in both districts in 2022.

Geographically, both Limapuluh and Sail Districts are prone to flooding due to their flat topography. This, combined with inadequate drainage and sanitation systems, increases the risk of high dengue fever rates and low ABJ, as stagnant water accumulates and provides breeding grounds for mosquitoes.

In conclusion, while the "one house one jumantik" program has made strides in reducing dengue fever incidence rates, there are critical areas that need enhancement. Improving funding, infrastructure, and community engagement, along with better adherence to the Ministry of Health's guidelines, will be essential in achieving the program's goals more effectively. Continuous evaluation and adaptation of the program based on these insights will be crucial in the sustained fight against dengue fever in Pekanbaru City.

REFERENCES

- Central Bureau of Statistics [BPS]. (2022). *Sail Sub-district in Figures 2021*.
- Chadijah, S., Rosmini, & Halimuddin. (2011). Increasing community involvement in the implementation of dengue mosquito breeding ground eradication (PSN-DBD) in two Kelurahan in Palu City, Central Sulawesi. *Media Litbang Kesehatan*, 21(4), 183-190.
- Dinata, A., & Dhewantara, P. W. (2012). Characteristics of physical, biological, and social environment in the dengue endemic area of Banjar City in 2011. *Journal of Health Ecology*, 11(4), 315-326.
- Kemendes RI. (2007). *Demam Berdarah*. Jakarta: Kementerian Kesehatan Republik Indonesia.
- Ministry of Health of the Republic of Indonesia. (2016). *Technical Guidelines for Implementing the 3M-Plus PSN with the One House One Jumantik Movement*. Jakarta: Ministry of Health of RI.
- Miryanti, K., Budi, I. S., & Ainy, A. (2016). The participation of Jumantik cadres in increasing the index of larval free (ILF) in Talang Betutu Health Center. *Journal of Public Health Sciences*, 7(3), 168-173.
- Samsu. (2021). *Metode Penelitian: Teori & Aplikasi Penelitian Kualitatif, Kuantitatif, Mixed Methods, serta Research and Development (Cetakan ke-2)*. Pusaka Jambi.
- Sugiyono. (2013). *Metodologi Penelitian Kuantitatif, Kualitatif Dan R&D*. Bandung: ALFABETA.
- Wahyono, T. Y., et al. (2010). Factors related to the incidence of dengue fever and efforts to control it in Cimanggis Sub-District, Depok. West Java. *Journal of Epidemiology Window Bulletin*, 2(1), 31-43.