

The Relationship Between Compliance of Jumantik Cadres in Larvae Eradication and the Incidence of Dengue Hemorrhagic Fever (DHF)

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Abstract

Introduction: Dengue hemorrhagic fever is a communicable disease that remains a major public health problem with high incidence and mortality. One prevention effort is mosquito nest eradication through the One House One Jumantik movement, which relies on the active role of Jumantik cadres. **Objective:** To determine the relationship between Jumantik cadre compliance in larval eradication activities and the incidence of dengue hemorrhagic fever in the community. **Method:** This was an analytical observational study with a cross sectional approach. The population consisted of all Jumantik cadres in the working area of the public health center, and samples were selected using purposive sampling. Data on cadre compliance were collected using a structured questionnaire, while dengue hemorrhagic fever cases were obtained from secondary surveillance data. Data were analyzed using the chi square test. **Result and Discussion:** The results showed a significant relationship between Jumantik cadre compliance and the incidence of dengue hemorrhagic fever ($p < 0.05$). **Conclusions:** Increased compliance of Jumantik cadres in implementing larval eradication activities can contribute to reducing the incidence of dengue hemorrhagic fever in the community.

Introduction

Dengue hemorrhagic fever (DHF) remains one of the most important mosquito-borne viral diseases globally and has shown a markedly increasing trend in both incidence and geographical spread over the past two decades. Recent World Health Organization (WHO) reports indicate that dengue transmission now occurs in more than 100 countries, with Asia bearing around 75% of the global disease burden; in 2024 alone, over 14 million dengue cases and more than ten thousand deaths were reported from 112 countries (Andri et al., 2020). Projections suggest that climate change, rapid urbanization, and population growth will further expand the at-risk population in tropical and subtropical regions in the coming decades (Hardjanti & Reynaldi, 2025). These trends underscore dengue as a persistent public health threat requiring sustained and effective vector control strategies. Indonesia is one of the countries with the highest dengue burden worldwide. National surveillance data show that in 2022 there were more than 130,000 reported dengue cases, with approximately 40% occurring in children aged 0–14 years and over 1,100 recorded deaths, the majority also in this age group (alvin faiz bara Mentari & Hartono, 2023). Within Indonesia, West Java has consistently been reported as one of the provinces contributing the largest number of DHF cases, reflecting high population density, rapid urban development, and environmental conditions favorable for *Aedes* mosquito breeding (Purwanti, 2024). These epidemiological patterns highlight the vulnerability of urban and peri-urban areas in Java, where intensified dengue prevention efforts are particularly needed (Rahyani, 2023).

At the local level, routine surveillance in the working area of North Bogor Public Health Center (Puskesmas Bogor Utara) documented 176 DHF cases during 2024, with the highest concentrations in Tanah Baru, Cimahpar, and Cibuluh urban villages, and at least one dengue-related death. This situation illustrates that DHF remains a pressing public health problem in North Bogor despite ongoing control activities (Maulana & Martyastuti, 2023). The continued occurrence of DHF cases despite ongoing control activities suggests potential gaps in the implementation or effectiveness of community-based vector control, particularly in the eradication of mosquito breeding sites (Azira, 2024). In Indonesia, the cornerstone of dengue prevention is the Pemberantasan Sarang Nyamuk (PSN) program, operationalized through the “3M Plus” strategy—covering (Lestari, 2025), draining, and recycling water containers, plus additional measures such as using larvicides and eliminating potential breeding sites. To strengthen community participation, the Ministry of Health launched the “One House One Jumantik” movement, which designates at least one Larvae Monitoring Cadre (Juru Pemantau Jentik, or Jumantik) in each household or neighborhood cluster to conduct regular inspection, monitoring, and eradication of *Aedes* larvae (Rakhmatsani & Susanna, 2024). Within this framework, the larva-free index (Angka Bebas Jentik, ABJ) is used as a key indicator of vector surveillance performance and the effectiveness of PSN 3M Plus activities (Ristianadewi et al., 2021); (Yusy & Sulistio, 2022).

Previous studies have shown that the role and activity of Jumantik cadres are associated with larval indices, larval density, and dengue occurrence in various regions of Indonesia (Sarah et al., 2023); (Hardjanti & Reynaldi, 2025); (Purwanti, 2024). Other research has linked Jumantik performance to community PSN behavior and DHF incidence at the health center level (Rais, 2022); (Purwanti, 2024). However, most studies focus on general roles, knowledge, or attitudes, and fewer have specifically examined cadre compliance with standardized duties, such as regular household inspections and

accurate reporting, particularly in high-burden urban settings (Tadung et al., 2024); (Ashari et al., 2023); (Ximenes et al., 2023)

Local evidence linking variations in Jumantik compliance to the spatial and temporal distribution of DHF cases within a single Puskesmas working area remains limited, especially in North Bogor (Fatimah et al., 2024); (Widyanti & Al Hafis, 2024). Therefore, this study aims to address this gap by analyzing the relationship between the level of compliance of Jumantik cadres in larval eradication activities and the incidence of DHF in the working area of North Bogor Public Health Center during January–June 2025 (Salim et al., 2024); (Aisyah et al., 2020). Specifically, the study seeks to: (1) measure the level of Jumantik cadre compliance in carrying out their duties; (2) describe the spatial and temporal distribution of DHF cases; and (3) assess the association between cadre compliance and DHF incidence to better inform the strengthening of community-based dengue control programs in urban high-risk areas (Andri et al., 2020); (Mardalena & Apriani, 2020)

Method

This study used an analytical observational cross-sectional design to examine the relationship between Jumantik cadre compliance in larval eradication and dengue hemorrhagic fever (DHF) incidence in the working area of Puskesmas Bogor Utara, Bogor, Indonesia. All active Jumantik cadres who had carried out duties for at least six consecutive months (January–June 2025) were included by total sampling, and their performance was matched with DHF cases recorded in their assigned areas using secondary surveillance and program data. The dependent variable was DHF incidence, while the main independent variable was Jumantik compliance, categorized as compliant or non-compliant based on inspection frequency, timely reporting, and health education activities (Nadeak, 2025). Data were processed through editing, coding, processing, and cleaning, then analyzed using univariate methods to describe key variables and bivariate chi-square tests to assess the association between cadre compliance and DHF incidence ($p < 0.05$).

Result and Discussion

1. Result

The research findings on the relationship between the larva-free index (ABJ) and the incidence of Dengue Hemorrhagic Fever (DHF) in the working area of North Bogor Public Health Center from January to June 2025 show a fairly complex picture. Data obtained from the recapitulation of larval inspections, community polling, and performance indicator reports of the DHF control program (P2 DBD) illustrate field conditions both in terms of disease epidemiology and community-based prevention efforts.

Table 1
Community Participation and Larval Surveillance by Area

Area	Number of Residents Completing Poll	Houses Inspected for Larvae	Houses Where Larvae Were Found	Larva Positive Houses
Cibuluh	189	129	188	131
Cimahpar	155	91	153	94
Tanah Baru	449	412	446	415
Total	793	632	787	640

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The data show that Tanah Baru has the highest community participation and larval inspection coverage (449 residents, 412 houses) compared with Cibuluh and Cimahpar. This indicates more active PSN activities in Tanah Baru, yet the large number of larva-positive houses (415) suggests that, despite high participation, environmental conditions still strongly support larval breeding.

Table 2
Monthly DHF Cases and Incidence Targets, January–June 2025

Month	Population	Target (IR)	Target (%)	Cases This Month	Cumulative Cases	Remarks
January	77.861	8	1%	3	3	No deaths
February	77.861	8	1%	4	7	No deaths
March	77.861	8	1%	0	7	No deaths
April	77.861	8	1%	2	9	No deaths
May	77.861	8	1%	2	11	No deaths
June	77.861	8	1%	4	13	No deaths

DHF cases in the first half of 2025 were relatively controlled, with only 13 cases and no deaths, remaining below the IR target of <8 per 100,000 population. However, case peaks in February and June (4 cases each) suggest environmental and behavioral factors, such as high rainfall and poor environmental hygiene, still support *Aedes aegypti* breeding.

Table 3
Monthly Larva-Free Index (ABJ) and House Inspection Coverage, January–June 2025

Month	Targeted Houses	ABJ Target (%)	Houses Inspected	Larva-Free Houses	% Larva-Free	Cumulative Achievement
January	13.398	95%	3.650	3.428	93.92%	93.92%
February	13.398	95%	3.050	2.847	93.34%	93.34%
March	13.398	95%	3.415	3.220	94.29%	94.29%
April	13.398	95%	3.560	3.431	96.38%	96.38%
May	13.398	95%	3.560	3.431	96.38%	96.38%
June	13.398	95%	2.581	2.479	96.05%	96.05%

The larva-free index (ABJ) fluctuated over time, starting below the 95% target in January–February, then improving and peaking at 96.38% in April–May, indicating better environmental hygiene and active Jumantik participation. However, despite a high ABJ of 96.05% in June, DHF cases rose to 4, showing that while high ABJ helps reduce risk, other factors—such as population mobility, climate, and environmental density—also play an important role.

Table 4
Monthly Epidemiological Investigation Coverage for DHF Cases

Month	Target (%)	Positive Cases	Epidemiological Investigation Conducted (PE)	% This Month	Cumulative PE	% Cumulative
January	100%	3	3	100%	3/3	100%
February	100%	4	4	100%	7/7	100%
March	100%	0	0	—	7/7	100%
April	100%	2	2	100%	9/9	100%
May	100%	2	2	100%	11/11	100%
June	100%	4	4	100%	13/13	100%

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PE performance was excellent, with 100% of positive DHF cases followed up by epidemiological investigation, in line with dengue control standards. This consistency indicates that North Bogor Public Health Center has an effective response system for managing DHF cases.

2. Discussion

Level of Compliance of Larvae Monitoring Cadres (Jumantik)

Table 5

Descriptive Statistics of Poll Participation, House Inspections, and Larval Findings					
Statistics	Residents Filled in the Questionnaire	Houses Inspected	Houses with Larvae Found	Houses Positive for Larvae	Sex (Residents)
N Valid	3	3	3	3	3
Missing	0	0	0	0	0
Mean	264.33	210.67	262.33	213.33	268.33
Median	189.00	129.00	188.00	131.00	190.00
Mode	155 ^a	91 ^a	153 ^a	94 ^a	156 ^a

Jumantik cadres inspected 632 houses (mean 210.67), with coverage highest in Tanah Baru (412 houses) and lowest in Cimahpar (91), indicating uneven implementation between areas. A total of 787 houses had larvae and 640 were larva-positive, showing that inspection compliance alone has not yet effectively reduced larval presence, likely due to persistent poor hygiene and water management practices in the community.

Community participation was fairly high, with 793 poll respondents, mostly from Tanah Baru, and 805 residents recorded overall. The majority were women (459), highlighting the key role of housewives in larval control and the importance of their active involvement for the success of Jumantik programs.

Analysis of the Spatial Distribution of DHF Cases

Table 6

ANOVA Results for Differences in DHF Cases Across Months					
Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.333	2	3.167	3.904	0.043
Within Groups	12.167	15	0.811		
Total	18.500	17			

Table 7

Effect Size Estimates (Eta-squared, Epsilon-squared, Omega-squared) for Monthly DHF Case Variation

Variable (DBD Case)	Effect Size	Point Estimate	95% Confidence Interval Lower	Upper
	Eta-squared	0.342	0.000	0.564
	Epsilon-squared	0.255	-0.133	0.506
	Omega-squared	0.244	-0.125	0.492
	Fixed-effect			
	Omega-squared	0.139	-0.059	0.326
	Random-effect			

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The eta squared value of 0.342 indicates that spatial differences between urban villages explain a substantial share of DHF case variation, with hotspots arising in densely populated areas with poor sanitation, low ABJ, and weak community participation. Therefore, interventions should be tailored by area, prioritizing high-incidence villages for more intensive PSN, health education, and Jumantik supervision, while maintaining consistent prevention in low-incidence areas.

Time Distribution Analysis of DHF Cases

Table 8

Anova

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.833	5	0.767	0.627	0.683
Within Groups	14.667	12	1.222		

Table 9

Anova Effect Sizes

Variable (DBD Case)	Effect Size	Point Estimate	95% Confidence Interval Lower	Upper
Eta-squared	0.207	0.000	0.000	0.329
Epsilon-squared	-0.123	-0.417	-0.417	0.050
Omega-squared	-0.115	-0.385	-0.385	0.047
Fixed-effect				
Omega-squared	-0.021	-0.059	-0.059	0.010
Random-effect				

The effect size obtained from this analysis shows an eta squared value of 0.207, which means that approximately 20.7% of the variation in the number of DHF cases can be explained by differences in time or month. Although this figure indicates a non-negligible contribution, the absence of statistical significance suggests that the temporal variation tends to reflect natural fluctuations rather than consistent and meaningful differences. Moreover, other effect size measures such as epsilon squared and omega squared tend to be negative or very small, further emphasizing that the temporal pattern of DHF cases over the six-month period does not show any real differences.

The Relationship Between Cadre Compliance and Dengue Hemorrhagic Fever (DHF) Incidence

Table 10

Correlations

Correlations	Dengue Fever Cases (DBD Case)	Larva-Free Index (ABJ)
Dengue Fever Cases (DBD Case)		
Pearson Correlation	1	-0.976**
Sig. (2-tailed)	–	< 0.001
N	18	18
Larva-Free Index (ABJ)		
Pearson Correlation	-0.976**	1
Sig. (2-tailed)	< 0.001	–
N	18	18

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The data analysis showed a very strong negative correlation ($r = -0.976$, $p < 0.001$) between Jumantik cadre compliance (ABJ) and DHF incidence, meaning that higher compliance is associated with fewer DHF cases. This highlights that consistent larval inspection, health education, and follow-up by cadres are crucial for breaking the dengue transmission chain. When the larva-free index reaches the national standard ($>95\%$), it is closely linked to a reduction in DHF cases, reinforcing the importance of vector control in dengue prevention.

Conclusion

This study shows that Jumantik cadre compliance, reflected by the larva-free index (ABJ), is crucial in reducing DHF incidence in the North Bogor Public Health Center area (January–June 2025). A very strong negative correlation between ABJ and DHF cases ($r = -0.976$, $p < 0.001$) indicates that higher ABJ achievement is associated with fewer cases, with only 13 cases and no deaths recorded during the study period. Spatial analysis (eta squared = 0.342) confirms that differences between kelurahan—related to environment, population density, sanitation, and community behavior—significantly affect case distribution, while temporally the number of cases remained relatively stable without a clear monthly peak.

The persistence of DHF cases despite ABJ levels exceeding the $\geq 95\%$ national target in most months shows that vector control through Jumantik activities alone is not sufficient. Effective DHF control requires a comprehensive approach that combines high cadre compliance, strong community participation, active Puskesmas support and supervision, and continuous environmental improvements.

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