

Research Article

Community Intervention Through Education, Larvae Inspection, and PSN 3M Plus For Dengue Hemorrhagic Fever Prevention In in the Gembong Primary Health Center Area, Tangerang Regency

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Abstract: Dengue Hemorrhagic Fever (DHF) became the priority health problem in the Gembong Primary Health Center area after recorded cases increased from 6 in 2023 to 41 in 2024 and 69 positive/suspected reports by September 2025, with Cangkudu Village contributing the largest number. This study evaluated a community intervention combining dengue education, household larval inspection, and 3M Plus mosquito-breeding-site elimination. A descriptive community intervention was conducted on 18–23 October 2025. Community diagnosis used surveillance data, a mini-survey of 50 residents, Urgency-Seriousness-Growth scoring, the Blum framework, Delphi consensus, Fishbone analysis, and 5 Why. On 23 October 2025, interventions comprised education and leaflets with pretest-posttest assessment, larval inspection in 25 households, and a community clean-up with 3M Plus simulation. The mini-survey found good knowledge in 32% of respondents, positive preventive attitudes in 38%, and good preventive behavior in 30%. Education involved 22 residents; score distributions yielded a mean pretest of 85.0 and posttest of 95.9. Twenty participants (90.9%) scored ≥ 90 at posttest and 15 (68.2%) improved by ≥ 10 points. Larval inspection identified 9 positive households (36%) and 16 negative households (64%), giving a Larvae-Free Index of 64%, below the 95% target. All 22 attendees completed the clean-up and 3M Plus simulation. The intervention improved knowledge indicators descriptively and achieved full participation among attendees, but the low larvae-free index indicates persistent environmental risk. Repeated education, household larval monitoring, stronger community health-volunteer involvement, and routine 3M Plus activities are needed to sustain behavioral change and improve entomological indicators.

Keywords: 3M Plus; Community Empowerment; Dengue Hemorrhagic Fever; Health Education; Larval Inspection.

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1. Introduction

Dengue Hemorrhagic Fever (DHF) remains a major public health challenge in tropical regions because its transmission is influenced by interactions among Aedes vectors, environmental conditions, population mobility, and household behavior. At the community level, control efforts cannot rely solely on temporary measures but require a combination of larval habitat reduction, education, household monitoring, and sustained community participation. A systematic review of household-level interventions has shown that the effectiveness of Aedes control is strongly influenced by the suitability of interventions to the local context, community commitment, and sustained program support (Montenegro-Quinonez et al., 2023). Other studies have also emphasized the benefits of community participation in improving knowledge, attitudes, practices, and vector control indicators (Arfan et al., 2024; Widyantoro et al., 2021).

The working area of Gembong Community Health Center, Balaraja District, Tangerang Regency, comprises the villages of Gembong, Cangkudu, Sukamurni, and Tobat. In 2025, the total population was recorded at 53,787, with Cangkudu having the largest population at 17,020 residents. Surveillance records showed an increasing burden of DHF over the past three years, with 6 cases reported in 2023, 41 cases in 2024, and 69 reports recorded up to September 2025. In 2025, these 69 reports consisted of 26 confirmed positive cases and 43 suspected cases. The distribution by village showed that Cangkudu had the highest number, with 31 reports comprising 22 suspected and 9 confirmed cases, followed by Tobat with 19, Gembong with 12, and Sukamurni with 7. This pattern directed the intervention focus toward Cangkudu Village as the area with the highest disease burden.

The increase in cases cannot be explained solely by the presence of vectors. Community diagnosis needs to assess healthcare service, behavioral, and environmental factors simultaneously. According to Blum's framework, health status is influenced by environmental factors, behavior, healthcare services, and heredity. In the context of DHF in Cangkudu, behavioral and environmental components are particularly relevant because transmission occurs around residential areas, while many *Aedes* breeding sites originate from containers created or maintained through human activities. A community-based approach is therefore important to bridge the gap between knowledge and concrete preventive actions within households and their surrounding environments.

An initial mini-survey involving 50 residents of Cangkudu identified gaps in knowledge and preventive practices. Only 32% of respondents were categorized as having good knowledge, 38% as having good attitudes, and 30% as demonstrating good preventive behavior. A substantial proportion of respondents were unfamiliar with the PSN 3M Plus mosquito breeding-site eradication strategy, mosquito biting times, warning signs of DHF, modes of transmission, and mosquito breeding sites. In terms of behavior, most respondents did not routinely cover water containers, use larvicides in containers that were difficult to drain, cover discarded items capable of collecting water, or inspect hidden water-holding sites such as flower vases, dispensers, or plant pots. These findings indicate a gap between general awareness of cleanliness and the specific practices required to interrupt the *Aedes* breeding cycle.

The literature indicates that community-based DHF control interventions can improve knowledge and preventive practices when information is accompanied by opportunities to participate directly in preventive activities. Community-based health education has been reported to improve knowledge and DHF prevention behavior, both in pretest-posttest interventions conducted in Indonesia and in community programs implemented in low-income urban areas (Lachyan et al., 2023; Putra et al., 2021). On the other hand, knowledge, attitude, and practice studies have shown that adequate knowledge does not always translate into consistent preventive behavior. Attitudes, motivation, family experience, and household characteristics may also influence participation in mosquito breeding-site eradication activities (Kurniawati et al., 2022; Putri et al., 2023; Sillia et al., 2022; Tuba et al., 2023). A recent meta-analysis likewise demonstrated that gaps between positive attitudes and actual preventive practices remain common within communities (Crowley et al., 2025).

Larval surveillance is an important component because entomological indicators provide direct information regarding the presence of household breeding sites. A study in Kupang showed that high larval density and a low Larvae-Free Index (Angka Bebas Jentik or ABJ) may coexist with inconsistent mosquito breeding-site eradication practices (Leri et al., 2021), while an evaluation in Jombang emphasized the need to strengthen programs so that ABJ can be sustainably improved (Yusy et al., 2022). At the community level, health volunteers' understanding of larval index systems needs to be strengthened through training and continuous monitoring (Nontapet et al., 2022). Findings from Padang also showed that knowledge, attitudes, availability of facilities, and the role of larval monitoring coordinators were associated with vector control behavior through the One House One Larva Monitor Movement (Gerakan Satu Rumah Satu Jumentik) (Huvaaid et al., 2024). Thus, education, larval inspection, and environmental action constitute complementary components of DHF control.

Based on problem mapping using the Urgency-Seriousness-Growth (USG) scoring method, DHF obtained the highest score compared with hypertension, diabetes mellitus, tuberculosis, and leptospirosis. Further assessment using Blum's Paradigm, Delphi discussion, Fishbone analysis, and the 5 Whys analysis identified lifestyle and behavioral factors as the priority areas most feasible for intervention using the available resources. Therefore, three intervention components were designed to be implemented on the same day: DHF health

education accompanied by leaflets and pretest-posttest evaluation, household screening and door-to-door larval inspection, and community clean-up activities combined with a simulation of the PSN 3M Plus strategy.

This study aims to evaluate the implementation and initial outcomes of this series of community interventions. Specifically, the evaluation focuses on changes in knowledge indicators following the educational intervention, the coverage and results of household larval inspections, community participation in collective clean-up activities and PSN 3M Plus simulations, and gaps between planned targets and actual achievements that can be used to design follow-up strategies for DHF control in the working area of Gembong Community Health Center.

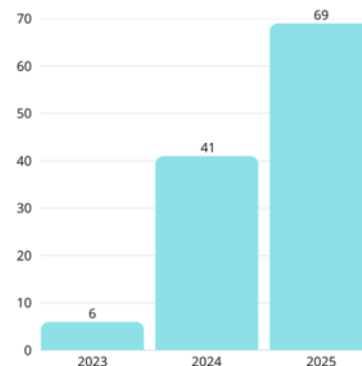


Figure 1. Trend in Recorded DHF Cases in the Working Area of Gembong Community Health Center, 2023–2025 (2025 data through September).

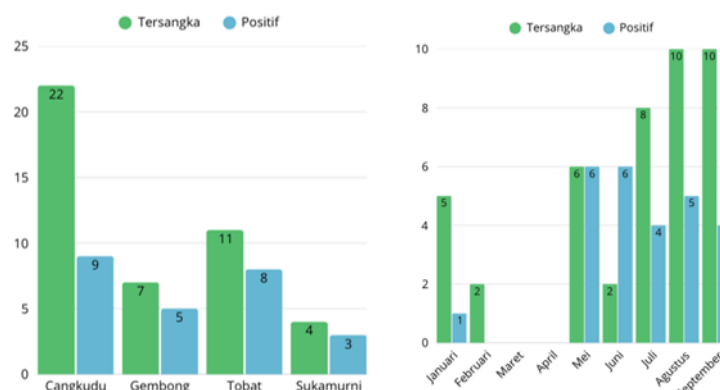


Figure 2. Distribution of Confirmed and Suspected DHF Cases by Village in the Working Area of Gembong Community Health Center in 2025.

2. Methods

This study employed a descriptive community intervention approach consisting of community diagnosis, planning, implementation, and evaluation stages. The activities were conducted within the service area of Gembong Community Health Center (Puskesmas Gembong), Balaraja District, Tangerang Regency, Banten Province, with the intervention focused on Cangkudu Village from October 18 to 23, 2025. The situation analysis utilized geographic and demographic data, health program data, and disease surveillance data obtained from Gembong Community Health Center. The health problems considered included dengue hemorrhagic fever (DHF), hypertension, diabetes mellitus, tuberculosis, and leptospirosis. Health problem priorities were determined using the Urgency, Seriousness, and Growth (USG) scoring method, after which the determinant factors were mapped using Blum's Paradigm. Priority causal factors were determined through consensus discussions with community health center staff and community health volunteers, while root causes were identified using Fishbone Analysis and the 5 Whys method.

A mini-survey was conducted among 50 residents of Cangkudu Village to describe their knowledge, attitudes, and preventive behaviors related to DHF. The knowledge domain consisted of 10 questions and was categorized as good when respondents answered more than seven questions correctly. Attitudes and behaviors were assessed using items included in the

activity instrument and categorized according to the cut-off points applied during the initial data collection. The mini-survey findings were used as the basis for selecting intervention targets, particularly regarding knowledge of the causes and transmission of DHF, recognition of symptoms and warning signs, and the implementation of the 3M Plus Mosquito Breeding Site Eradication (PSN 3M Plus) practices.

Three interventions were implemented on October 23, 2025. The first intervention consisted of DHF education conducted at the Cangkudu Village Hall from 08:00 to 09:00 Western Indonesian Time (WIB). The educational materials covered the definition of DHF, risk factors, modes of transmission, signs and symptoms, warning signs, and prevention through the PSN 3M Plus strategy. Education was delivered through presentations, interactive discussions, and leaflets. Participants completed a pretest before the educational session and a posttest afterward. The second intervention consisted of larval inspections conducted from 10:00 to 11:00 WIB in 25 households. Inspections were performed on water storage containers and other receptacles with the potential to collect water. A household was classified as larva-positive when mosquito larvae were detected and larva-negative when no larvae were found. The Larva-Free Index (Angka Bebas Jentik [ABJJ]) was calculated as the number of households without larvae divided by the total number of households inspected, multiplied by 100%. The third intervention consisted of a community clean-up activity and a simulation of the PSN 3M Plus strategy from 11:00 to 12:00 WIB. Activities included environmental cleaning, draining and covering water containers, and properly managing discarded items that could serve as mosquito breeding sites.

Data from the mini-survey, pretest and posttest, larval inspections, and observations of community participation were analyzed descriptively using Microsoft Excel. Mean pretest and posttest scores were recalculated based on the available score distributions. Hypothesis testing was not performed because the final tabulation did not contain paired individual scores. Data verification revealed discrepancies between the aggregate passing-rate table and the score distribution; therefore, the educational intervention outcomes were reported using directly calculable indicators, namely the proportion of participants achieving a posttest score of ≥ 90 and the proportion of participants whose scores increased by ≥ 10 points. The implementation of the three interventions was evaluated using a systems approach encompassing inputs, processes, outputs, environment, feedback, and impact, as well as the Plan-Do-Check-Act (PDCA) cycle to identify implementation gaps and areas requiring further improvement.

Table 1. Health Problem Prioritization Based on USG Scoring.

Health Problem	Urgency	Seriousness	Growth	Total	Priority
Dengue hemorrhagic fever (DHF)	5	4	4	13	1
Hypertension	2	3	5	10	2
Diabetes mellitus	1	5	3	9	3
Tuberculosis	4	2	2	8	4
Leptospirosis	3	1	1	5	5

Data source: Community diagnosis scoring, Gembong Community Health Center, 2025.

3. Results and Discussion

Overview of the Problem and Initial Mini-Survey

Dengue hemorrhagic fever (DHF) received a USG score of 13 and ranked as the highest-priority health problem. The selection of Cangkudu Village as the intervention site was supported by the distribution of cases in 2025, which showed that 31 of 69 reported cases (44.9%) originated from the village. Determinant analysis identified lifestyle and behavioral factors as the primary intervention targets because gaps remained in community knowledge regarding the causes, transmission, symptoms, warning signs, and implementation of PSN 3M Plus, as well as household practices that could sustain mosquito breeding sites.

Among the 50 respondents in the mini-survey, only 16 participants (32%) had good knowledge, 19 (38%) demonstrated good attitudes, and 15 (30%) exhibited good preventive behaviors. Several items revealed substantial gaps: 85% of respondents were unfamiliar with PSN 3M Plus, 80% did not know the warning signs or mode of dengue transmission, 70% were unaware that mosquitoes commonly bite in the morning and late afternoon, and 80% did not know the typical mosquito breeding sites. In the behavioral domain, 70% reported

never tightly covering water containers, 85% never applied abate to water containers that were difficult to drain, 85% never covered discarded items capable of collecting water, and 90% never inspected hidden areas for mosquito larvae.

Table 2. Mini-Survey Results on Knowledge, Attitudes, and Dengue Prevention Behaviors (n = 50).

Domain	Good category, n (%)	Poor category, n (%)	Interpretation
Knowledge	16 (32%)	34 (68%)	Majority poor
Attitude	19 (38%)	31 (62%)	Majority poor
Behavior	15 (30%)	35 (70%)	Majority poor

Results of the Educational Intervention

The educational session was attended by 22 residents, representing 55% of the initial target of 40 participants. All participants were women. The age distribution comprised 2 participants aged 30–40 years, 16 aged 41–50 years, and 4 aged over 50 years. The activity was conducted according to the planned sequence, consisting of an opening session, pretest, presentation of educational materials, question-and-answer session, posttest, and leaflet distribution.

The pretest score distribution consisted of a score of 20 for 1 participant, 70 for 4 participants, 80 for 2 participants, 90 for 9 participants, and 100 for 6 participants. The mean pretest score calculated from this distribution was 85.0. Following the educational intervention, the posttest distribution shifted to 80 for 2 participants, 90 for 5 participants, and 100 for 15 participants, with a mean score of 95.9. Thus, the descriptive mean increased by 10.9 points. A total of 20 participants (90.9%) achieved a posttest score of ≥ 90 , while 15 participants (68.2%) experienced an increase of at least 10 points. However, the aggregate data did not allow precise identification of how many participants met both criteria simultaneously.

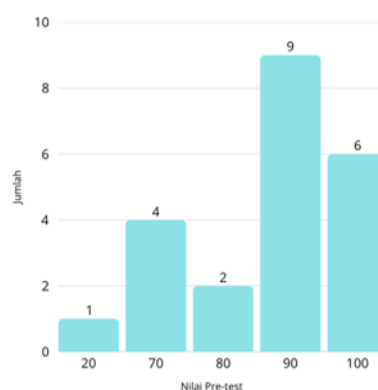


Figure 3. Distribution of Pretest Scores among Participants in the Dengue Educational Intervention (n = 22).

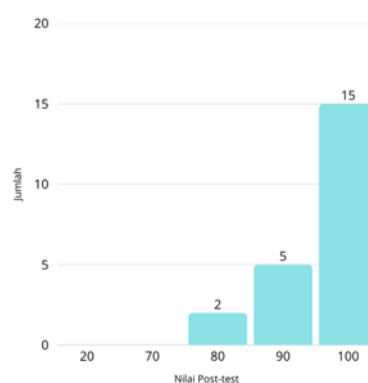


Figure 4. Distribution of Posttest Scores among Participants in the Dengue Educational Intervention (n = 22).

Results of Larval Inspection

All 25 households targeted for larval inspection were successfully examined, corresponding to 100% coverage. Mosquito larvae were found in 9 households (36%), whereas 16 households (64%) were larva-free. Using the formula of the number of larva-free households divided by the number of households inspected, the Larva-Free Index (ABJ) was 64%. This value was 31 percentage points below the target of 95%. Larvae were mainly found in water storage containers, bathtubs, and waste containers capable of retaining water.

These findings provided objective information that differed from residents' perceptions of household cleanliness. Although some residents reported frequently practicing clean and healthy living behaviors, more than one-third of the inspected households still contained mosquito breeding sites. Direct education during household inspections was used to demonstrate high-risk locations to families and encourage independent larval monitoring.

Table 3. Household Larval Inspection Results (n = 25).

Household status	Number	Percentage
Larvae-positive	9	36%
Larvae-negative	16	64%
Total	25	100%

Results of Community Clean-Up Activities and PSN 3M Plus Simulation

The community clean-up activity and PSN 3M Plus simulation were attended by 22 residents, equivalent to 55% of the initial target of 40 residents. All participants who attended completed the activity. Practical activities included cleaning the surrounding environment, draining and covering water containers, and managing discarded items that could potentially collect water. Full participation among attendees indicated good acceptance of the hands-on approach.

Process evaluation showed that support from the community health center and community health volunteers was available throughout all interventions. The primary gaps in the educational intervention were attendance below the target, the absence of microphones and speakers, and uneven achievement of knowledge indicators. For the larval inspection, the household coverage target was achieved, although the Larva-Free Index target was not. During the community clean-up activity, the process indicator of full participation among attendees was achieved; however, medium- and long-term impacts could not yet be assessed because evaluation was conducted only on the day of implementation.

Table 4. Summary of Achievements of the Three Community Interventions.

Intervention	Target	Process achievement	Main results	Gaps
Education + leaflet	40 residents	22 attended (55%)	Mean pretest 85.0; posttest 95.9; 20/22 achieved posttest ≥ 90 ; 15/22 increased by ≥ 10 points	Participant coverage below target; combined criteria could not be determined from aggregate data
Larval inspection	25 households	25 inspected (100%)	9 positive (36%); 16 negative (64%); ABJ 64%	ABJ below the 95% target
Community clean-up + PSN 3M Plus	40 residents	22 attended; 22/22 completed the activity	100% participation among attendees	Participant coverage 55%; medium- and long-term impacts not yet assessed

Discussion

The community diagnosis identified dengue as the priority health problem not merely because of the number of cases, but because of the combined urgency, seriousness, and potential growth of the problem. The increase in recorded cases from 6 in 2023 to 41 in 2024 and 69 reports by September 2025 indicates a dynamic that requires immediate attention. The

concentration of reported cases in Cangkudu also supported the selection of the village as the intervention site. In the context of vector-borne diseases, control measures are more effective when epidemiological data are considered alongside behavioral and environmental information because disease occurrence cannot always be attributed to a single determinant.

The mini-survey demonstrated that the main problem concerned the relationship among knowledge, attitudes, and practices. Good knowledge was identified in only approximately one-third of respondents, while the proportion demonstrating good preventive behavior was even lower. This pattern is consistent with research showing an association between knowledge and attitudes and dengue preventive practices (Sillia et al., 2022), as well as an association between knowledge and motivation and the implementation of PSN 3M Plus (Kurniawati et al., 2022). Family experience with dengue may also influence mosquito-breeding-site eradication practices (Tuba et al., 2023), while variations in knowledge, attitudes, and practices among household groups indicate that health promotion strategies should be adapted to community characteristics (Putri et al., 2023). A systematic review conducted in Surabaya further confirmed the association between knowledge and attitudes and PSN 3M Plus practices (Lusno & Farid, 2023). These findings are also consistent with a meta-analysis indicating that positive attitudes are not always followed by adequate preventive practices (Crowley et al., 2025).

Health education resulted in a shift in the score distribution toward higher values. The descriptive mean increased from 85.0 to 95.9, and the proportion of participants achieving a posttest score of ≥ 90 reached 90.9%. These findings are consistent with Putra et al. (2021), who reported improved preventive behaviors following health education, and Lachyan et al. (2023), who identified improvements in awareness and prevention indicators following a community-based intervention. In practical terms, these changes may have been facilitated by structured information delivery, opportunities for participants to ask questions, the use of leaflets as reminders, and discussion of problems closely related to residents' everyday experiences.

Nevertheless, the success of the educational intervention should be interpreted cautiously. First, the evaluation was conducted immediately after the educational session and therefore primarily reflected short-term retention rather than sustained knowledge improvement. Second, only 22 of the 40 targeted participants attended, resulting in 55% coverage; consequently, the findings cannot be generalized to the entire target population. Third, aggregate data showed that 15 participants experienced an increase of at least 10 points and 20 participants achieved a posttest score of ≥ 90 . Without paired individual scores, it was impossible to determine how many participants met both indicators simultaneously. This limitation is important because program evaluation requires not only high final scores but also consistent definitions of success and individual-level documentation that allows valid pre-post analysis.

The Larva-Free Index of 64% was an important environmental finding. Although all targeted households were successfully inspected, 36% remained positive for mosquito larvae. This figure indicates that mosquito breeding sites remain a tangible problem at the household level. A nearly similar result was reported in a study conducted in Kupang, where the Larva-Free Index was 64.65% and larval density remained high (Leri et al., 2021). An evaluation in Jombang also demonstrated that a Larva-Free Index below the target requires strengthened vector-control activities (Yusy et al., 2022). A systematic review of household-level interventions confirmed that larval-stage control may produce positive entomological outcomes, although its effectiveness depends strongly on adherence, sustainability, and implementation support (Montenegro-Quinonez et al., 2023).

Experiences with community-based larval surveillance further emphasize the importance of community health volunteer competence and continuous monitoring. Nontapet et al. (2022) demonstrated that village health volunteers' understanding of dengue solutions and larval index systems needs to be continuously strengthened through education and surveillance. A study in Padang found that the role of jumantik coordinators, together with knowledge, attitudes, and availability of facilities, was associated with vector-control behavior within the One House One Jumantik Movement (Huvaed et al., 2024). Other findings in Indonesia have also indicated that the role of jumantik volunteers is associated with dengue preventive behaviors within communities (Hardianti et al., 2024). In Cangkudu, the involve-

ment of five jumantik volunteers represents an important community asset; however, monitoring should be extended to the household level to shorten the interval between the emergence and detection of mosquito breeding sites.

The community clean-up activity and PSN 3M Plus simulation strengthened the practical dimension of the intervention. All 22 participants who attended remained involved until the activity was completed, indicating that hands-on activities were well accepted by the community. This finding is consistent with community-based studies in Indonesia that identify participation and empowerment as important components of dengue control (Widyantoro et al., 2021), as well as a systematic review demonstrating the benefits of community participation for behavioral indicators and vector control (Arfan et al., 2024). A community needs assessment conducted in hotspot areas also emphasized the importance of multisectoral partnerships, community ownership, and activities that actively involve residents to achieve more sustainable behavioral change (Samsudin, Othman, et al., 2024). Compared with educational sessions that primarily target knowledge, collective practical activities provide residents with opportunities to identify high-risk containers and immediately undertake corrective measures.

Although participation among those attending reached 100%, coverage of the target population remained at 55%. The distinction between participation and coverage is important. High participation indicates that the activity method was acceptable to residents who attended, whereas lower coverage suggests barriers related to recruitment or accessibility. A systematic review from the Indo-Pacific region demonstrated that community engagement in dengue control is influenced by intervention characteristics, organizational conditions, available resources, and implementation processes (Naing et al., 2023). An implementation study in Malaysia also identified limitations in capacity, coordination, and dissemination of educational information as factors that can restrict community engagement (Samsudin, Karim, et al., 2024). Therefore, appropriate scheduling, repeated invitations, support from local community leaders, and diversified communication channels should be considered in subsequent intervention cycles.

System- and PDCA-based evaluations demonstrated that most inputs and processes could be fulfilled, although several gaps remained. The limited availability of audio equipment during the educational session, participant attendance below the target, and a Larva-Free Index substantially below the expected level were evaluation findings that should be translated into program improvements. Implementation literature emphasizes that successful community engagement is strongly influenced by resources, coordination, implementer capacity, and consistency of communication (Naing et al., 2023; Samsudin, Karim, et al., 2024). Therefore, the findings from this one-day intervention should be regarded as a starting point for improving recruitment methods, inspection frequency, communication media, and logistical support during subsequent cycles.

From a behavioral-change perspective, the three interventions followed a complementary logic. Education provided knowledge regarding what should be done and why such actions were important. Larval inspection provided tangible evidence of household conditions and reduced the gap between abstract perceptions of risk and residents' everyday environments. Community clean-up activities and simulations provided opportunities to practice preventive measures. Such a multicomponent model is potentially more promising than a single intervention because dengue risk factors are also multidimensional. Nevertheless, its impact on dengue incidence can only be assessed if the activities are repeated and accompanied by surveillance over an adequate period.

Sustainability remains a major concern. Immediate improvements in knowledge may diminish if they are not reinforced by reminders, social support, and monitoring systems. Leaflets may serve as household reminders, but they should be complemented by other accessible media and repeated messaging. Research conducted in the Yunnan border region demonstrated that information sources and levels of knowledge influence mosquito-control behaviors (Lun et al., 2023). Community needs assessments have also shown that education should be continuous and integrated with partnerships and the involvement of different community groups (Samsudin, Othman, et al., 2024). Therefore, printed materials, digital communication, jumantik volunteers, and environmental activities can be used simultaneously to ensure that preventive messages do not end after a single meeting.

A practical implication for Gembong Community Health Center is the need to integrate health promotion, surveillance, and environmental action within a single program cycle. Stand-alone educational activities may improve knowledge, but the Larva-Free Index data

demonstrate that environmental change requires follow-up measures. Conversely, inspection without education may become a staff-led activity that fails to build community independence. The combination of education, larval inspection, community clean-up activities, and household monitoring is consistent with the principles of community-based dengue control (Widyantoro et al., 2021), evidence from household-level interventions (Montenegro-Quinonez et al., 2023), and efforts to strengthen the One House One Jumantik Movement for vector control (Huvaaid et al., 2024).

This study has several limitations. The design did not include a comparison group, and the posttest was administered immediately after the educational intervention. Only 22 participants took part in the intervention, and all were women, limiting the representation of men and younger age groups. Pretest and posttest data were available only as aggregate distributions rather than individual scores, preventing paired statistical testing and precise identification of participants who simultaneously met both success indicators. Larval inspections were conducted in only 25 households within a single area and did not include complete measurements of other larval indices such as the House Index, Container Index, or Breteau Index. Medium-term outcomes, including behavioral changes, improvements in the Larva-Free Index, and reductions in dengue cases, could also not be evaluated on the day of implementation.

These limitations also define the agenda for subsequent evaluation. Individual scores should be collected using anonymous identification codes so that pretest and posttest changes can be paired. Reassessment after 4–8 weeks could be used to evaluate knowledge retention and behavioral changes. Periodic larval inspections could determine whether the Larva-Free Index improves after residents implement PSN 3M Plus. Where feasible, coverage could be expanded and comparisons conducted between neighborhood units or between areas receiving different intervention intensities. With more structured documentation, the community health center would be able to evaluate not only the successful implementation of activities but also the effectiveness of behavioral changes and their impact on entomological indicators and dengue case trends.

4. Conclusions and Acknowledgments

The community diagnosis conducted in the Gembong Community Health Center service area identified dengue as the priority health problem and Cangkudu Village as the primary intervention site. The mini-survey showed that the majority of respondents still had inadequate knowledge, attitudes, and dengue preventive behaviors. Following the educational intervention, the distribution of knowledge scores shifted toward higher values, with the mean score increasing from 85.0 to 95.9; 90.9% of participants achieved a posttest score of ≥ 90 , and 68.2% experienced an increase of at least 10 points. However, participant coverage reached only 55% of the initial target.

Larval inspection successfully covered all 25 targeted households but identified mosquito larvae in 36% of households and produced a Larva-Free Index of 64%, substantially below the 95% target. All participants who attended completed the community clean-up activity and PSN 3M Plus simulation. These findings indicate that improvements in knowledge need to be accompanied by repeated larval monitoring and environmental action. The community health center is therefore encouraged to strengthen routine education, the One House One Jumantik Movement, periodic monitoring of the Larva-Free Index, training of jumantik volunteers, and partnerships with neighborhood associations (RT/RW), Family Welfare Empowerment groups (PKK), schools, and youth organizations to improve the coverage and sustainability of dengue-control activities.

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