

Knowledge, Attitudes, and Practices Regarding Dengue Prevention Among Health Volunteers in an Urban Area – Malang, Indonesia

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Objectives: The dengue prevention program known as “One House One Mosquito Larva Inspector” involves health volunteers who play a crucial role in the surveillance of mosquito larvae and reporting their findings to local public health officials. This study aimed to identify factors related to the knowledge, attitudes, and practices (KAP) of dengue prevention behavior among these health volunteers.

Methods: A study was conducted in 5 sub-districts in Malang, an urban area in Indonesia. We employed a cross-sectional design and utilized a semi-structured questionnaire to assess the KAP of 400 health volunteers. Data were collected through face-to-face interviews.

Results: Multiple logistic regression analysis revealed that individuals with a more positive attitude (odds ratio [OR], 1.69; $p < 0.05$) and those with family sizes greater than five persons (OR, 1.90; $p < 0.05$) were more likely to engage in effective dengue prevention practices. Additionally, possessing good knowledge was significantly associated with more positive attitude (OR, 2.24; $p < 0.001$). Furthermore, 40% reduction in positive attitude was observed in those over 45 years (OR, 0.60; $p < 0.05$). The best practices most frequently reported by the majority of respondents included always reporting their surveillance activities (75.8%) and cleaning the water container in the bathroom at least once a week (65.2%). However, only 52.2% of respondents regularly checked for mosquito larvae in their neighborhood.

Conclusions: Sustainable promotion and training for the “One House One Mosquito Larva Inspector” initiative are necessary, particularly among young health volunteers, to improve dengue prevention behaviors both within their own homes and in the surrounding environment.

Key words: Dengue, Knowledge, Attitude, Public Health, Indonesia

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INTRODUCTION

Dengue remains a health challenge in East Java, Indonesia, including in Malang. Given that Malang is an urban region, there is a higher chance of dengue cases there due to the increased risk of dengue transmission based on earlier research [1]. Malang, the second-largest city in East Java, has seen a consistent increase in dengue cases year over year. In 2015, there were 335 reported cases of dengue with 3 fatalities, and in 2016,

the number of cases rose to 446, with 2 deaths reported [2,3].

Dengue fever prevention programs in Indonesia include surveillance systems, case management, vector control, and initiatives to change people's behavior. Vector control efforts are integrated with behavior change strategies through a surveillance system known as "3M Plus," which encourages the community to periodically combat mosquito breeding sites. Despite these efforts, the incidence of dengue cases remains high [4-6]. In 2016, the Indonesian Ministry of Health launched the Healthy Indonesia Program, which aims to improve health services by adopting a family-centered strategy. Families are engaged in the eradication of mosquito breeding sites by monitoring, inspecting, and eliminating mosquito larvae. The program mandates that each household designate an individual to be responsible for larva monitoring, a concept referred to as "*Satu Rumah Satu Jumentik*" ("One House One Mosquito Larva Inspector") [7]. Nevertheless, the support of health volunteers continues to be necessary for effective monitoring.

Similar to their position in Thailand [8], health volunteers play a significant role in Indonesia due to their direct engagement with primary health care providers and neighboring communities. Health volunteers play a crucial role in dengue control efforts in. They coordinate with primary health care to be larva monitoring teams, which are responsible for inspecting homes and public areas for larvae. They also provide health education to families and communities, and they diligently record and report larval surveillance data on a weekly and monthly basis. These actions are comparable to those of a prior research conducted in Thailand, which included standard procedures including assessments of larvae, the elimination of mosquito breeding grounds, and efforts to reduce dengue deaths [9].

Several factors could influence dengue prevention behavior, including knowledge, perceptions, the involvement of family members, the roles of health volunteers, and employment status [2,10-14]. People with strong understanding of dengue vector control measures were 7.62 times more likely than adults with low knowledge to display good overall preventative behavior regarding dengue vector breeding control measures [13]. Those with a positive perception are often more likely to engage in effective prevention behaviors [2].

Recommendations from health volunteer influenced community participation in carrying out mosquito nest eradication behavior. As many as 70.7% of respondents participated in dengue prevention practiced because of recommendations from health volunteers [14]. Building dengue community ca-

capacity is crucial to creating a long-term strategy for eliminating dengue. According to the findings, the model with a high dengue community capacity level demonstrated little risk on the entomological and epidemiological dengue indexes [15]. Health volunteers are part of the dengue community capacity, under the "One House One Mosquito Larva Inspector" program, are expected to act as coordinators, overseeing and encouraging larval inspectors in each household. Consequently, health volunteers are anticipated to exhibit better prevention behaviors than the general population. Therefore, this study aimed to identify factors associated with the knowledge, attitudes, and practices (KAP) of dengue prevention behavior among health volunteers.

METHODS

Study Setting

This research was conducted in an urban area of Malang, Indonesia, from November 2017 to April 2018. Malang is divided into 5 sub-districts, which are further subdivided into 57 villages. For this study, 2 villages from each sub-district were randomly selected. From the total of 10 selected villages, 40 health volunteers were randomly recruited from each village for the study.

Study Design

This was a cross-sectional study with 400 respondents selected based on a previous study [2]. The study enrolled female health volunteers since all health volunteers in Indonesia are female. Respondents aged 18 and above who had resided in Malang for at least one year were included in this study. Trained enumerators administered the KAP questionnaire to the participants.

Measures

KAP regarding dengue prevention

To explore KAP regarding dengue prevention, data were collected using a semi-structured questionnaire administered through face-to-face interviews. The questionnaire was adapted from a previous study [2] and was pre-tested for validity. Reliability was assessed using the Cronbach's alpha coefficient, yielding scores of 0.59 for knowledge, 0.61 for practice, and 0.87 for attitude.

Knowledge was assessed through open-ended questions. There were 4 questions in total, with the first and third questions each offering 3 points for correct answers, leading to a

maximum score of 3 for these questions. If respondents provided only 1 or 2 correct responses, their knowledge was considered partially accurate. The maximum possible knowledge score was 8. Respondents scoring 7-8 were categorized as having more accurate knowledge (code 1), while those scoring between 0 and 6 were considered to have less accurate knowledge (code 0).

Attitudes were assessed using a Likert scale-based tool, with a maximum score of 56. Attitudes were deemed more positive (coded as 1) if the score exceeded 47, and less positive (coded as 0) if the score ranged from 14 to 47. The highest possible score for prevention behavior was 35. Practices were categorized as more frequent best practices (coded as 1) if the score

was above 25, and as less frequent best practices (coded as 0) if the score fell between 7 and 25. The cut-off for these variables was established based on the mean. Table 1 presents a comprehensive list of the questions and codes utilized in this study to evaluate KAP.

Socio-demographic factors

We categorized participants into two age groups: young and middle adults (17-45 years, code 0), and senior adults (over 45 years, code 1). Formal education was divided into 2 levels: elementary school and junior secondary school (code 0), and high school or higher (code 1). Marital status was classified as married (code 0) and unmarried (code 1). For employment,

Table 1. Questionnaire of KAP on dengue

| Variables | Coding and cut-off level |
|--|--|
| Knowledge about dengue (more accurate knowledge if >6) | |
| What age group can get dengue? | Correct answer=3, partially correct answer=2/1, wrong answer=0 |
| What is the cause of dengue? | Correct answer=1, wrong answer=0 |
| List three activities of dengue prevention! | Correct answer=3, partially correct answer=2/1, wrong answer=0 |
| What is the program "Satu Rumah Satu Jumantik" ("One House One Mosquito Larva Inspector")? | Correct answer=1, wrong answer=0 |
| Attitudes toward dengue (more positive attitude if >47) | |
| Everyone can suffer from dengue fever | Strongly agree =4, agree =3, disagree=2, strongly disagree=1 |
| Dengue fever is a dangerous illness | |
| Dengue fever can cause death | |
| Putting "abate" powder in the water tank is safe | |
| Replacing water and cleaning the water tank are easy to do | |
| Cleaning the bathtub regularly can be time-consuming | Strongly agree =1, agree =2, disagree=3, strongly disagree=4 |
| Replacing water in the bathtub regularly wastes water | |
| I have done many kinds of useful activities to prevent dengue fever cases | Strongly agree=4, agree=3, disagree=2, strongly disagree=1 |
| I have adequate knowledge about dengue fever | |
| I have done the right things to prevent dengue fever | |
| Every household must be responsible for checking for mosquito larvae in their house | |
| I will clean around my house area regularly | |
| After I read this questionnaire, I intend to keep my house clean in order to avoid the dengue fever illness | |
| After I read this questionnaire, I intend to persuade people besides me to keep the environment clean in order to avoid the dengue fever illness | |
| Practice on dengue (more frequent best practice if >25) | |
| I clean the bathtub at least once per week | Always=5, often=4, sometimes=3, rarely=2, never=1 |
| I close the water tank except the bathtub and the pool | |
| I replace water inside the water tank and clean it, as well as the bathtub | |
| I use a mosquito repellent before I sleep in the morning or afternoon | |
| I use a mosquito repellent lotion in the morning or afternoon | |
| I check for mosquito larvae around the neighborhood of my house | |
| I report the mosquito larvae monitoring result to the chief of health volunteers or the health care center district | |

participants were categorized as housewives (code 0) and workers (code 1). Monthly family income was categorized as less than 2.5 million Indonesian rupiah (IDR) (code 0) and more than 2.5 million IDR (code 1). We also divided the duration of being a health volunteer into two categories: 0-15 years (code 0) and over 15 years (code 1). Lastly, we inquired about the history of dengue in both the health volunteers and their families. The response options were “yes” or “no” (no=0, yes=1).

Statistical Analysis

Descriptive statistics were presented as frequencies and percentages. Data analysis was conducted using Stata version 14 (StataCorp., College Station, TX, USA). Multiple logistic regression was employed to quantify the associations between socio-demographic factors and KAP. All results were reported as odds ratios (ORs) with 95% confidence intervals (CIs).

Ethics Statement

This study was approved by the Ethics Committee of the Faculty of Medicine, Universitas Brawijaya Malang (No. 404/EC/KEPK/12/2017). Respondents in this study provided written informed consent for publication.

RESULTS

Socio-demographic Factors

Table 2 presents socio-demographic factors and KAP regarding dengue prevention. All 400 respondents were female, with 65.7% aged over 45 years. The majority were married (85.3%) and identified as housewives (81.0%). A significant portion had completed senior high school (64.0%) and had 0-15 years of experience as health volunteers (66.3%). Approximately 61.0% reported an average total family income 1-3 million IDR per month. Approximately 79.3% had households comprising 1-5 people. Most respondents reported no previous history of dengue illness, either personally (95.7%) or among their family members (76.7%). Regarding KAP, 51.7% of the respondents demonstrated less accurate knowledge, 52.3% had less positive attitudes, and 62.8% engaged in dengue prevention practices infrequently.

Knowledge, Attitudes, and Practices Regarding Dengue Prevention

Table 3 presents the questions related to KAP concerning dengue prevention. The majority of respondents demonstrated

Table 2. Socio-demographic characteristics and KAP of study participants (n=400)

| Characteristics | n (%) |
|--|------------|
| Sex | |
| Female | 400 (100) |
| Age (y) | |
| Young adult (17-30) | 7 (1.7) |
| Middle-aged adult (31-45) | 130 (32.6) |
| Older adult (>45) | 262 (65.7) |
| Length of experience as a health volunteer (y) | |
| 0-15 | 264 (66.3) |
| >15 | 134 (33.7) |
| Education | |
| Elementary or less | 53 (13.3) |
| Junior secondary | 91 (22.7) |
| Senior high school or more | 256 (64.0) |
| Marital status | |
| Married | 341 (85.3) |
| Unmarried | 59 (14.7) |
| Monthly income (million IDR) | |
| <1 | 74 (18.5) |
| 1-3 | 244 (61.0) |
| >3 | 82 (20.5) |
| No. of family members | |
| 1-5 | 317 (79.3) |
| >5 | 83 (20.7) |
| Type of employment | |
| Housewife | 324 (81.0) |
| Workers | 76 (19.0) |
| History of dengue | |
| Yes | 17 (4.3) |
| No | 383 (95.7) |
| Family history of dengue | |
| Yes | 93 (23.3) |
| No | 307 (76.7) |
| Knowledge | |
| Less accurate | 207 (51.7) |
| More accurate | 193 (48.3) |
| Attitudes | |
| Less positive | 191 (52.3) |
| More positive | 209 (47.7) |
| Practices | |
| Less frequent best practices | 211 (62.8) |
| More frequent best practices | 125 (37.2) |

KAP, knowledge, attitudes, and practices; IDR, Indonesian rupiah.

ed good knowledge about the cause of dengue (79.5%). Although the level of knowledge regarding dengue prevention

Table 3. Knowledge, attitudes, and practices regarding dengue prevention

| Knowledge | True | Partially true | False | | | Total | | |
|--|-----------------------|-----------------------|------------------|--------------------------|---------------|--------------|--------------|--------------|
| Age group of getting dengue | 244 (61.0) | 142 (35.5) | 14 (3.5) | | | 400 | | |
| Cause of dengue | 318 (79.5) | - | 82 (20.5) | | | 400 | | |
| Three activities of dengue prevention | 306 (76.5) | 76 (19.0) | 18 (4.5) | | | 400 | | |
| “One House One Mosquito Larva Inspector” program | 53 (13.3) | - | 347 (86.7) | | | 400 | | |
| Attitude | Strongly agree | Agree | Disagree | Strongly disagree | | | Total | |
| Everyone can suffer from dengue fever | 160 (40.0) | 199 (49.7) | 38 (9.5) | 3 (0.7) | | | 400 | |
| Dengue fever is a dangerous illness | 232 (58.0) | 162 (40.5) | 5 (1.2) | 1 (0.2) | | | 400 | |
| Dengue fever can cause death | 220 (55.0) | 175 (43.7) | 5 (1.2) | 0 (0.0) | | | 400 | |
| Putting “ <i>abate</i> ” powder in the water tank is safe | 96 (24.0) | 234 (58.5) | 67 (16.7) | 3 (0.7) | | | 400 | |
| Replacing water and cleaning the water tank are easy to do | 191 (47.7) | 203 (50.7) | 3 (0.7) | 3 (0.7) | | | 400 | |
| Cleaning the bathtub regularly can be time-consuming | 12 (3.0) | 23 (5.7) | 243 (60.7) | 122 (30.5) | | | 400 | |
| Replacing water in the bathtub regularly wastes water | 5 (1.2) | 22 (5.5) | 241 (60.2) | 132 (33.0) | | | 400 | |
| I have done many kinds of useful activities to prevent dengue fever cases | 148 (37.0) | 245 (61.2) | 4 (1.0) | 3 (0.7) | | | 400 | |
| I have adequate knowledge about dengue fever | 61 (15.2) | 291 (72.2) | 46 (11.5) | 2 (0.5) | | | 400 | |
| I have done the right things to prevent dengue fever | 117 (29.2) | 272 (68.0) | 8 (2.0) | 3 (0.7) | | | 400 | |
| Every household must be responsible for checking for mosquito larvae in their house | 233 (58.2) | 163 (40.7) | 3 (0.7) | 1 (0.2) | | | 400 | |
| I will clean around my house area regularly | 201 (50.2) | 195 (48.7) | 3 (0.7) | 1 (0.2) | | | 400 | |
| After I read this questionnaire, I intend to keep my house clean in order to avoid the dengue fever illness | 232 (58.0) | 164 (41.0) | 1 (0.7) | 5 (1.2) | | | 400 | |
| After I read this questionnaire, I intend to persuade people besides me to keep the environment clean in order to avoid the dengue fever illness | 230 (57.5) | 162 (40.5) | 3 (0.7) | 5 (1.0) | | | 400 | |
| Practices | Never | Rarely | Sometimes | Often | Always | | | Total |
| I clean the bathtub at least once per week | 7 (1.8) | 9 (2.3) | 35 (8.8) | 87 (21.9) | 259 (65.2) | | | 397 |
| I close the water tank except the bathtub and the pool | 36 (10.6) | 6 (1.8) | 31 (9.2) | 48 (14.2) | 217 (64.2) | | | 338 |
| I replace water inside the water tank and clean it, as well as the bathtub | 25 (7.4) | 3 (0.9) | 49 (14.5) | 70 (20.6) | 192 (56.6) | | | 339 |
| I use a mosquito repellent before I sleep in the morning or afternoon | 148 (37.0) | 32 (8.0) | 133 (33.2) | 39 (9.7) | 48 (12.0) | | | 400 |
| I use a mosquito repellent lotion in the morning or afternoon | 222 (55.5) | 48 (12.0) | 84 (21.0) | 12 (3.2) | 33 (8.2) | | | 400 |
| I check for mosquito larvae around the neighborhood of my house | 10 (2.5) | 14 (3.5) | 83 (20.7) | 84 (21.0) | 209 (52.2) | | | 400 |
| I report the mosquito larvae monitoring result to the chief of health volunteers or the health care center district | 21 (5.3) | 17 (4.3) | 23 (5.8) | 35 (8.8) | 301 (75.8) | | | 397 |

Values are presented as number (%).

activities was 76.5%, only 13.3% of participants accurately described the “One House One Mosquito Larva Inspector” program.

The majority of respondents exhibited a more positive attitude towards dengue prevention overall. Over 90% of participants (combining those who strongly agreed and agreed) held positive views regarding the severity of dengue, the benefits of prevention, cues to action, and the maintenance of dengue prevention measures. A significant portion of them strongly agreed (58.0%) and agreed (40.5%) that dengue is a

dangerous disease that can lead to death. However, there was a less positive attitude towards perceived barriers related to cleaning and replacing water containers in bathrooms. Only 3.0% of respondents strongly agreed, and 5.7% agreed, that regularly cleaning water containers is time-consuming.

Meanwhile, fewer than 40% (37.2%) of health volunteers engaged in best practices for dengue prevention more frequently. The best practice most commonly reported as always being performed by the majority of respondents was the reporting of their surveillance activities (75.8%), followed by

Table 4. Multiple logistic regression of knowledge, attitudes, and practices regarding dengue prevention

| Variables | OR (95% CI) | p-value |
|--------------------------|-------------------|---------|
| Knowledge | | |
| Age >45 y | 1.20 (0.74, 1.95) | 0.448 |
| Unmarried | 0.84 (0.46, 1.53) | 0.580 |
| High school or more | 1.37 (0.89, 2.10) | 0.155 |
| Workers | 1.14 (0.68, 1.91) | 0.628 |
| Income >2.5 million IDR | 1.25 (0.79, 1.96) | 0.336 |
| Experience > 15 y | 1.12 (0.70, 1.79) | 0.643 |
| >5 family members | 1.20 (0.74, 1.97) | 0.460 |
| History of dengue | 0.55 (0.19, 1.56) | 0.262 |
| Family history of dengue | 0.97 (0.60, 1.57) | 0.915 |
| Attitudes | | |
| Age >45 y | 0.60 (0.37, 0.99) | 0.046 |
| Unmarried | 0.87 (0.47, 1.61) | 0.661 |
| High school or more | 1.15 (0.74, 1.78) | 0.546 |
| Workers | 1.46 (0.85, 2.48) | 0.166 |
| Income >2.5 million IDR | 1.08 (0.68, 1.71) | 0.751 |
| Experience > 15 y | 1.30 (0.80, 2.11) | 0.290 |
| >5 family members | 1.43 (0.86, 2.37) | 0.165 |
| History of dengue | 2.08 (0.72, 6.02) | 0.177 |
| Family history of dengue | 0.99 (0.58, 1.55) | 0.828 |
| More accurate knowledge | 2.24 (1.49, 3.39) | <0.001 |
| Practices | | |
| Age >45 y | 1.04 (0.56, 1.95) | 0.890 |
| Unmarried | 0.91 (0.43, 1.90) | 0.800 |
| High school or more | 0.79 (0.46, 1.36) | 0.399 |
| Workers | 1.24 (0.64, 2.40) | 0.515 |
| Income >2.5 million IDR | 1.52 (0.87, 2.63) | 0.138 |
| Experience > 15 y | 1.50 (0.82, 2.72) | 0.185 |
| >5 family members | 1.90 (1.06, 3.39) | 0.031 |
| History of dengue | 0.61 (0.16, 2.33) | 0.468 |
| Family history of dengue | 0.75 (0.40, 1.41) | 0.382 |
| More accurate knowledge | 1.47 (0.89, 2.43) | 0.133 |
| More positive attitudes | 1.69 (1.01, 2.81) | 0.043 |

OR, odds ratio; CI, confidence interval; IDR, Indonesian rupiah.

cleaning water containers in the bathroom at least once a week (65.2%). Conversely, the practice of examining mosquito larvae in the surrounding neighborhood was only carried out by 52.2% of the volunteers. This finding indicates that improvement is needed in this area, as health volunteers have the responsibility to monitor their local environment.

Multiple Logistic Regression Results

Table 4 presents the results of a multiple logistic regression analysis examining the relationships of variables with KAP re-

garding dengue prevention. Two socio-demographic factors showed significant associations with attitudes. Specifically, possessing more accurate knowledge about dengue was associated with a 2.24-fold increase in the likelihood of having a positive attitude toward dengue prevention. Furthermore, forty percent reduction in positive attitude was observed in those over 45 years compared to those 17-45 years. In addition, the practice of dengue prevention was influenced by both the number of family members and the individual's attitude. Households with more than 5 members had 1.90 times higher odds of adhering to dengue prevention best practices. Similarly, a more positive attitude was linked to a 1.69-fold increase in the likelihood of consistently engaging in recommended prevention practices.

DISCUSSION

This study found no association between socio-demographic factors and knowledge. This contrasts with a study in Malaysia [16] that reported an association between ethnicity and occupation with knowledge. The discrepancy may be due to differing socio-demographic characteristics between the 2 studies. Our study did not differentiate participants by ethnicity, and the majority were housewives.

More than half of the respondents (51.7%) demonstrated an average level of knowledge, which aligns with findings from other studies [2,11]. This could be attributed to the fact that the majority of respondents typically receive information about dengue from their primary healthcare providers, as was also observed in a previous study [2]. Health volunteers, who are tasked with promoting dengue awareness in their communities [8,9], may consequently possess more knowledge about the disease than the general population.

A previous study revealed that 85.6% of respondents were aware that mosquitoes act as vectors [17]. Among these respondents in this study, 79.5% identified mosquitoes as a cause of dengue, although some were not familiar with the specific species of mosquito involved. Conversely, the lowest level of knowledge pertained to the "One House One Mosquito Larva Inspector" program. This may be because the program was only recently introduced, and primary healthcare providers may not have communicated this information effectively, resulting in a lack of awareness among health volunteers. Another study [18] also found that the community possessed a fair understanding of preventive measures, which

aligns with the findings of this study.

The multivariable analysis indicated that individuals under the age of 45 and those with a high level of knowledge were associated with a more positive attitude. Similar findings in Malaysia [16] and Nepal [19] have shown a positive correlation between knowledge and attitude although the degree of correlation was fair <0.5 . The attitude of respondents, whether positive or negative, can be influenced by their level of knowledge. In turn, knowledge about dengue fever can impact attitudes toward dengue prevention. Additionally, younger individuals are more likely to have received a good education in recent times, which may influence their level of knowledge. A previous study discovered that participant education level was an independent predictor of attitude level [20].

Approximately 47.7% of respondents held a more positive attitude towards dengue. The majority of health volunteers in this study exhibited a positive attitude regarding the severity of dengue, agreeing that it is a dangerous disease that can lead to death. Supporting this view, another studies revealed that individuals considered dengue to be a severe and potentially fatal disease [2,19,21]. Furthermore, the majority of health volunteers expressed a willingness to contribute to dengue control efforts, which is consistent with findings from another study [16].

Attitudes were associated with practices in this study, aligning with previous studies in Indonesia [2,22]. According to prior research, individuals with positive perceptions were more likely to engage in effective dengue prevention behaviors [2,22,23]. However, unlike previous studies, this study did not find a direct association between knowledge and practice which similar with previous studies [2,20]. Most research participants already possessed a good level of knowledge, which might be attributed to the study being conducted during the rainy season—a time when dengue fever is more prevalent. Although health education initiatives can indeed raise public awareness about dengue during an outbreak, they are likely insufficient on their own to sustain larva monitoring efforts [22].

It was found that the practice of dengue prevention was associated with the number of family members in a household. This result aligns with findings from other study [2]. A previous study indicated that respondents from households with more than 4 people, as well as those from households with 3-4 people, practiced prevention more effectively than those only 1-2 people in household [2]. This could be due to the addition-

al help from family members in carrying out household chores and dengue prevention measures. Another factor could be that larger families have access to a wider range of sources for dengue knowledge and share this information among themselves [2]. Indeed, the presence of many family members appears to place a significant responsibility on parents or guardians, compelling them to maintain a clean and safe home environment.

As members of the healthcare community, health volunteers are expected to demonstrate better practices than the general population. They are also tasked with organizing their neighborhoods to adopt the routine of eliminating mosquito breeding sites within their homes. However, according to this survey, only 37.2% of the volunteers engaged in effective dengue prevention practices. A previous study [24] found that just 25% of health volunteers adhered to excellent larva monitoring practices in their neighborhood, and 42.5% followed good practices for eradicating mosquito larvae. These suboptimal results may be attributed to the volunteers' lack of information and their negative attitudes. Indeed, they often did not see it as their responsibility to encourage community involvement in larva monitoring as well previous study reported that community do not think they are at least partly responsible for dengue control [12].

Additionally, 95.7% had never experienced dengue themselves. The lack of personal experience with dengue among health volunteers who practiced poor prevention behaviors might be explained by their own lack of illness from the disease. A prior study suggested that individuals are more likely to engage in good practices if they perceive a higher risk of becoming ill [11]. This implies that because they did not perceive themselves at risk, they practiced poor prevention behaviors. This study identified a specific behavior in need of improvement: the use of mosquito repellent or coils before going to bed in the morning or evening. The volunteers believed that there were not many mosquitoes in their vicinity, which led them to think that using repellents or mosquito coils was unnecessary.

There are limitations to this study; firstly, the KAP levels were only evaluated once, which may not reflect changes over time. Additionally, these KAP levels were based on self-assessment, which could introduce bias into the actual responses. However, the study demonstrated that a positive attitude is an important factor affecting the practice of dengue prevention. Therefore, to alter people's preventative practices, it is essential to

change their perceptions of dengue. Healthcare practitioners must develop an appropriate and effective strategy to shift people's perceptions of dengue infection. Sustainable promotion and training for the "One House One Mosquito Larva Inspector" initiative are essential, particularly among young health volunteers, to improve dengue prevention behaviors both within their own homes and in the surrounding environment.

NOTES

Conflict of Interest

The authors have no conflicts of interest associated with the material presented in this paper.

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Author Contributions

Both authors contributed equally to conceiving the study, analyzing the data, and writing this paper.

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