*Human Behavior, Development and Society*
E-ISSN 2651-1762, Vol 23 No 2, August 2022

# Knowledge, Attitudes, and Preventive Practices Regarding Dengue Fever and Chikungunya among Villagers in Muak Lek District, Saraburi Province

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Date Received: 7 February 2022 Revised: 21 April 2022 Accepted: 28 April 2022

**Abstract**

In this study, differences regarding knowledge, attitudes, and preventive practices in relation to dengue fever and Chikungunya were investigated among villagers in the Muak Lek District, Saraburi Province. Respondents (*N* = 220) were purposively selected from a population of 436. Survey questionnaires were used for data collection, and the information was analyzed using descriptive statistics. The majority of respondents' (71.82%) level of knowledge about dengue fever was at the highest level, whereas knowledge about Chikungunya was at a moderate level; this difference was statistically significant ($p < .001$). Attitudes regarding dengue fever and Chikungunya were at a moderate level, while dengue fever and Chikungunya prevention practices were at a high level. The findings showed that public health personnel, including health volunteer workers, should continue their public relations efforts with the villagers concerning knowledge and practices about dengue fever and Chikungunya prevention, including demonstrations of mosquito larva eradication campaigns.

**Keywords:** *Knowledge, attitude, dengue fever, Chikungunya prevention practices*

## Introduction

At present, dengue fever and Chikungunya are contagious viral diseases meriting concern as public health problems. They can spread rapidly in any season, especially during the rainy season. Dengue fever and Chikungunya are transmitted by *Aedes* mosquitoes, and it is believed that the symptoms become more and more severe each year. They affect both men and women of all ages at any location. If proper and immediate treatment is not given, they may even endanger the patients' lives. From 2014 to 2017 in Thailand, there were only 21,232 cases of dengue fever reported with 11 deaths. The morbidity rate per 100,000 population was 32.6%, and the mortality rate was 0.05%.

However, in recent years, incidence rates have been increasing. In 2018, it was reported that dengue fever was responsible for 14,193 cases and 19 deaths in Saraburi Province alone. Per 100,000 population, 22.74% were infected, with a mortality rate of 0.13% observed. In 2019, there were 26,430 cases and 40 deaths; per 100,000 population, 40.01% were infected with a mortality rate of 0.15% observed (Department of Disease Control, 2020). The cases from the whole country from January 1 to February 8, 2020 totaled 2,422 cases (3.65% morbidity rate). However Saraburi Province alone had a total of 31 cases (3.88% morbidity rate) during this time period. Thus, Saraburi Province ranked eighth in the country for its dengue morbidity rate. Statistics from the five previous years suggested that in the province, the groups most likely to contract the disease were, in order of highest to lowest morbidity rates, those aged 10–14 years old, 5–9 years old, 15–24 years old, 0–4 years old, 45–54 years old, 35–44 years old, 25–34 years old, and above 65 years old. Additionally, no particular clustering was observed, but the disease was spread sporadically among the 13 districts of Saraburi Province (Disease Prevention and Control Office, 2020).

Chikungunya was reported to be responsible for a total of 3,570 morbidity cases, with a morbidity rate of 5.41 per 100,000 population from January 1 to December 31, 2018. The morbidity cases consisted of 2,188 females and 1,382 males and came mostly from the southern parts of Thailand, with sporadic cases in the central provinces. Most outbreaks occured during the rainy season and were associated by dense populations of *Aedes* mosquitoes. Cases were continuously reported from May, peaking in December (1,748 morbidity cases), and followed by high figures in November (1,172 cases) that tailed off in October with 225 cases (Disease Prevention and Control Office, 2018).

The researchers were interested in applying Bloom's Learning Theory (Bloom, 1956) as a conceptual framework for a study of knowledge, attitudes, and practices in the prevention of dengue fever and Chikungunya among the villagers of Moo 7, Baan Langkhao, Muak Lek Subdistrict, Muak Lek District, Saraburi Province. The guidelines produced may be beneficial for public health officials in improving prevention plans, promoting people's proper knowledge, attitudes, and practices regarding prevention of dengue fever and Chikungunya resulting in a better quality of life.

**Research Objectives**

1. To study the level of knowledge, attitudes, and the practices of dengue fever and Chikungunya prevention held by the respondents.
2. To study the relationship among knowledge, attitudes, and practices of dengue fever and Chikungunya prevention among the respondents.
3. To compare the variations of knowledge, attitudes, and practices of dengue fever and Chikungunya prevention among respondents in respect to age, gender, educational level, income, marital status, and occupation.
4. To compare the knowledge about dengue fever with the knowledge about Chikungunya held by the respondents.

**Research Hypotheses**

1. Age, monthly income, knowledge, and attitudes are related to the practices adopted to prevent dengue fever and Chikungunya of the respondents.
2. The respondents, who were different in age, gender, educational level, income, marital status, and occupation, had significant differences in attitudes and practices towards dengue fever and Chikungunya prevention.
3. The respondents' knowledge of dengue fever differs from that regarding Chikungunya.

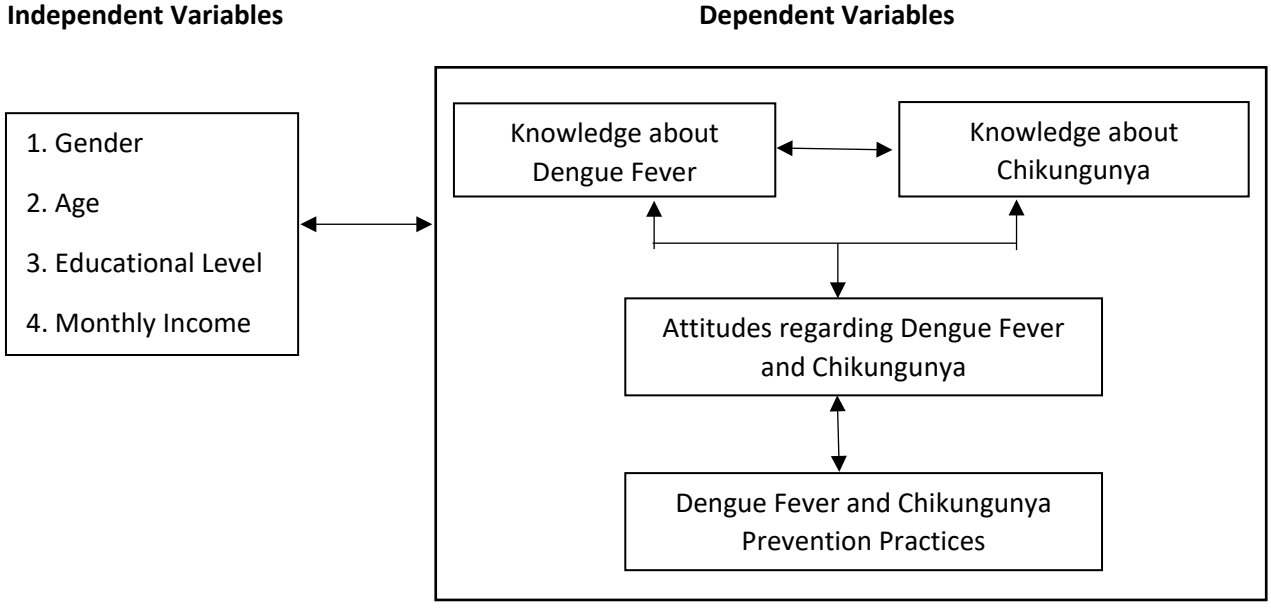
**Operational Definitions Adopted**

1. Knowledge is the recall or recognition of the life cycle of *Aedes egypti*, the causes, signs and symptoms, and preventive measures recommended for the control of dengue fever and Chikungunya.
2. Attitudes are the beliefs regarding dengue fever and Chikungunya, the significance of taking care of the environment around the house, and participation in preventive measures.

**Research Conceptual Framework**

In this research, the researchers applied Bloom's Learning Theory (Bloom, 1956) as a conceptual framework to study knowledge, attitudes, and practices in preventing dengue fever and Chikungunya among the respondents as shown in Figure 1.

**Figure 1** *Conceptual Framework in Research*



## Research Methodology

A descriptive approach was taken in the research reported here.

### *Population and Sample*

The population used in this study were the villagers of Moo 7 Baan Langkhao, Muak Lek Sub-district, Muak Lek District, Saraburi Province numbering 436 people. The sample group used (220 respondents) were selected by purposive sampling.

### *Data Collection Tools*

The tool used to collect the information for this study was a questionnaire to measure knowledge, attitudes, and practices of dengue fever and Chikungunya prevention. The instrument was modified from Saminpanya et al. (2017) and consisted of four sections:

Section 1: General information of the sampled respondents, which included gender, age, education level, occupation, monthly income, and marital status.
Section 2: Knowledge about dengue fever and Chikungunya.
Section 3: Attitudes towards dengue fever and Chikungunya.
Section 4: Preventive practices adopted for dengue fever and Chikungunya.

### *Criteria Used and Interpretation*

The criteria for evaluating knowledge were divided into five levels—*highest level* (score range 81–100%), *high level (*score range 61–80%), *moderate level* (score range 41–60%), *low level* (score range 21–40%), and *lowest level* (score range 0–20%).

The criteria for evaluating attitudes and preventive practices were divided into five levels—*lowest level* (average score of 1.00–1.49), *low level* (average score of 1.50–2.49), *moderate level* (average score of 2.50–3.49), *high level* (average score of 3.50–4.49), and *highest level* (average score of 4.50–5.00).

### *Psychometric Evaluation of the Questionnaire*

Reliability testing of the questionnaire, which was composed of items regarding knowledge, attitudes, and preventive practice, was tested on a group of 42 respondents using similar research criteria adopted in the study. Results were calculated as a reliability coefficient using K-R 20 and Cronbach's Alpha Coefficient methods. The reliability of each section, which involved knowledge about dengue fever and Chikungunya, attitudes, and preventive practices of dengue fever and Chikungunya was .731, .829, .725, and .777, respectively.

### *Protecting the Rights of Participants*

The research study was reviewed and approved, in accordance with the ethical guidelines conforming to international standards, by the Research Committee of Asia-Pacific International University. According to committee action No. RRDC 2021-41, participants' rights were adequately protected given the research design. The researchers introduced themselves and asked for the consent of the sample group to participate in the study. The researchers also clarified the right of invitees to accept or decline participation in the study. The participants were informed that they could terminate their participation in this study at any time. An overview of the data obtained are presented.

### *Data Analysis*

1.1 Statistical analysis of questionnaire repondents' answers are given as frequency and percentage values.
1.2 Statistical analysis as indicated under **Objective 1** consisted of frequencies, percentages, Means ($\bar{x}$), and Standard Deviation (*SD*) derivations.
1.3 Statistical analysis as indicated under **Objective 2** was undertaken by calculating Pearson's product-moment correlation coefficient.

1.4 Statistical analysis as indicated under **Objective 3** was accomplished using a *t*-test and one-way ANOVA.

1.5 Statistical analysis as indicated under **Objective 4** was achieved using a paired *t*-test.

**Results**

***Demographics of Questionnaire Respondents***

There were 220 respondents from Moo 7 Baan Langkhao. Among these, 67.73% were female, 29.55% were 61-85 years old, 46.82% were elementary school graduates, 45.45% were generally employed, 63.18% were married (registered), and 64.10% had average monthly incomes ranging from 0–10,000 Baht as shown in Table 1.

**Table 1** *Demographic Information of Research Respondents* (*N* = 220)

| Variables | Number | Percentage |
|---|---|---|
| **1. Gender** | | |
| Male | 71 | 32.27 |
| Female | 149 | 67.73 |
| **2. Age (Years)** | | |
| 15–30 | 29 | 13.18 |
| 31–45 | 55 | 25.00 |
| 46–60 | 64 | 29.09 |
| 61–85 | 65 | 29.55 |
| 86 and above | 7 | 3.18 |
| **3. Educational Level** | | |
| Never Been to School | 17 | 7.73 |
| Primary School | 103 | 46.82 |
| Junior High School | 36 | 16.36 |
| Senior High School | 37 | 16.82 |
| Diploma/High Vocational Certificate | 11 | 5.00 |
| Bachelor Degree or Higher | 16 | 7.27 |
| **4. Occupation** | | |
| Agriculture | 24 | 10.91 |
| Hired Employees | 100 | 45.45 |
| Government Service/State Enterprise Employee | 12 | 5.45 |
| Private Business/Trading | 29 | 13.18 |
| No Job | 55 | 25.00 |
| Student | 28 | 12.73 |
| **5. Marital Status** | | |
| Single | 51 | 23.18 |
| Married (Registered) | 139 | 63.18 |
| Divorced | 8 | 3.64 |
| Widow/Widower | 13 | 5.91 |
| Married (Not Registered) | 9 | 4.09 |
| **6. Average Monthly Income** (Thai Baht) | | |
| 0–10,000 | 141 | 64.10 |
| 10,001–20,000 | 60 | 27.27 |
| 20,001–30,000 | 10 | 4.54 |
| 30,001–40,000 | 4 | 1.82 |
| 40,001–50,000 | 5 | 2.27 |

***Knowledge, Attitudes, and Practices Regarding Dengue Fever and Chikungunya Prevention***

The results (Table 2) showed that 71.82% of respondents' had the highest level of knowledge about dengue fever. When considering the knowledge about Chikungunya, however, it was found that the most common level of knowledge was a moderate level (23.18%).

**Table 2** *Respondents Level of Knowledge about Dengue Fever and Chikungunya* (*N* = 220)

| Variable | Number | Percentage | Level |
|---|---|---|---|
| Knowledge about dengue fever | 158 | 71.82 | Highest Level (81–100%) |
| | 33 | 15.00 | High Level (61–80%) |
| | 12 | 5.45 | Moderate Level (41–60%) |
| | 10 | 4.55 | Low Level (21–40%) |
| | 7 | 3.18 | Lowest Level (0–20%) |
| Knowledge about Chikungunya | 42 | 19.10 | Highest Level (81–100%) |
| | 34 | 15.45 | High Level (61–80%) |
| | 51 | 23.18 | Moderate Level (41–60%) |
| | 45 | 20.45 | Low Level (21–40%) |
| | 48 | 21.82 | Lowest Level (0–20%) |

The research findings showed that the overall level of attitudes regarding dengue fever and Chikungunya was moderate ($\bar{x}$ = 3.41). Taking care of the environment around the house and keeping it clean was well understood as assisting in helping to reduce the number of mosquito larvae. It received the highest average score, followed by the belief that dengue fever is a disease that can infect any individual and can be cured over time without any treatment ($\bar{x}$ = 4.21). The belief that destroying mosquito breeding sites is a duty of every household and it must be done every week, received the lowest mean score ($\bar{x}$ =2.04), as shown in Table 3.

**Table 3** *Respondent Attitudes about Dengue Fever and Chikungunya* (*N* = 220).

| Attitudes on Perceived Risk Factors Associated with Dengue Fever and Chikungunya | Mean ($\bar{x}$) | Standard Deviation (*SD*) | Interpretation |
|---|---|---|---|
| Keeping the environment around the house hygienic will help reduce mosquito larvae (+) | 4.61 | 0.566 | Very High |
| Adding chemical sand granules to the water will change the taste of the water (-) | 2.42 | 1.260 | Low |
| Removal of mosquito larvae is unnecessary because mosquitoes are short-lived (-) | 3.41 | 1.483 | Moderate |
| Putting the chemicals once into the water is sufficient to destroy the larvae forever and it doesn't need to be repeated (-) | 3.45 | 1.412 | Moderate |
| Chikungunya infects only children (-) | 3.74 | 1.265 | High |
| People who are in good health will not develop dengue fever even if they are infected by the *Aedes aegypti* mosquito (+) | 2.85 | 1.468 | Moderate |
| I think getting rid of mosquito larvae in houses is the duty of the public health officials and the Village Health Volunteers only (-) | 3.73 | 1.370 | High |
| I think dengue fever is a disease that can be cured by itself (-) | 4.21 | 1.035 | High |
| I think the *Aedes* mosquitoes cannot lay their eggs in vases or saucers because there's only a small amount of water (-) | 3.71 | 1.336 | High |
| I think destroying the mosquito breeding grounds (three collections) is a duty of every household who has to do it every week (-) | 2.04 | 1.274 | Low |
| **Total** | **3.41** | **0.674** | **Moderate** |

The overall level of dengue and Chikungunya prevention practices was in the high range ($\bar{x}$ = 4.02). When considering items from the highest to the lowest score, it was found that respondents had a habit of sleeping under a mosquito net or sleeping in a room with a mosquito mesh wire screen to

prevent mosquito bites. This measure received the highest average score ($\bar{x}$ = 4.49) followed by the arrangement of house conditions to have enough light and good ventilation, and also the closure of drinking water containers (both $\bar{x}$ = 4.48). The lowest score was received regarding the application of mosquito repellent lotion and the use of mosquito coils to prevent mosquito bites ($\bar{x}$ = 3.09), as shown in Table 4.

**Table 4** *Respondent Dengue Fever and Chikungunya Prevention Practices* (*N* = 220)

| Items | $\bar{x}$ | *SD* | Interpretation |
|---|---|---|---|
| I arranged the conditions of the house to be well lit and well ventilated. | 4.48 | 0.743 | High |
| I regularly inspect the mosquito larvae in water storage containers inside and outside of the house. | 4.10 | 1.006 | High |
| I clean the water tank by scrubbing the water container before changing it. | 4.09 | 1.063 | High |
| I close the lid of the drinking water container or water storage container | 4.48 | 0.943 | High |
| I sleep with a mosquito net or sleep in a room with a mosquito mesh wire screen to prevent mosquito bites | 4.49 | 1.108 | High |
| I apply mosquito repellent lotions/light mosquito coils to prevent mosquito bites. | 3.09 | 1.479 | Moderate |
| I put fish in the water to get rid of the mosquito larvae. | 3.54 | 1.547 | Moderate |
| I get rid of mosquito larvae by putting chemical sand granules to eliminate larvae. | 3.88 | 1.170 | High |
| I eliminate breeding grounds for *Aedes* larvae by removing waste materials/equipment that can hold water, such as tires, bags, pots, etc. | 4.23 | 0.990 | High |
| I persuade family members and neighbors to clear the breeding grounds of *Aedes* mosquitoes to prevent dengue fever. | 3.91 | 1.121 | High |
| **Total** | **4.02** | **0.596** | **High** |

***Relationships among Age, Monthly Income, Knowledge, Attitude, and Preventive Practices of Respondents Regarding Dengue Fever and Chikungunya.***

The results showed that age was negatively correlated with knowledge about dengue fever, reaching statistical significance at the .05 level. Age was correlated with attitudes about dengue fever and Chikungunya, and also with dengue fever and Chikungunya preventive practices ($p$ < .01), as shown in Table 5.

**Table 5** *Relationships among Age, Monthly Income, Knowledge, Attitudes and Preventive Practices of Respondents Regarding Dengue Fever and Chikungunya*

| Variable | Age | Monthly Income | Knowledge about Dengue Fever | Knowledge about Chikungunya | Attitudes about Dengue Fever & Chikungunya | Preventive Practices of Dengue Fever & Chikungunya |
|---|---|---|---|---|---|---|
| Age | 1 | | | | | |
| Monthly Income | .010 | 1 | | | | |
| Knowledge about dengue fever | .135* | .065 | 1 | | | |
| Knowledge about Chikungunya | .005 | .037 | -.038 | 1 | | |
| Attitudes on dengue fever and Chikungunya | .021 | .051 | .039 | .477** | 1 | |
| Preventive practices of dengue fever and Chikungunya | .084 | -.117 | .197** | .182** | .071 | 1 |

**$p$ < .01, *$p$ < .05

***Comparative Analysis: Gender Differences in Knowledge, Attitude and Preventive Practices for Dengue Fever and Chikungunya***

The results revealed that knowledge about dengue fever differed between men and women, and were significant at the .05 level. No other significant differences were noted (Table 6).

**Table 6** *Comparison by Gender of Knowledge, Attitude, and Practices towards Dengue Fever and Chikungunya Prevention* (*N* = 220).

| Variables | Gender | *n* | $\bar{x}$ | *SD* | *t* | *df* | Sig. |
|---|---|---|---|---|---|---|---|
| Knowledge about dengue fever | Male | 71 | 7.86 | 2.04 | -2.284* | 218 | .024 |
| | Female | 149 | 8.49 | 1.61 | | | |
| Knowledge about Chikungunya | Male | 71 | 6.17 | 1.95 | 0.913 | 218 | .362 |
| | Female | 149 | 5.94 | 1.72 | | | |
| Attitude about dengue fever and Chikungunya | Male | 71 | 3.42 | 0.73 | 0.023 | 218 | .982 |
| | Female | 149 | 3.42 | 0.59 | | | |
| Practices regarding dengue fever and Chikungunya prevention | Male | 71 | 3.95 | 0.62 | -1.381 | 218 | .169 |
| | Female | 149 | 4.07 | 0.59 | | | |

*$p < .05$

When different levels of education and occupation were analyzed, no significant differences were found relating to knowledge about dengue fever and Chikungunya, preventive practices, or attitudes towards the diseases. However, the results showed differences in knowledge about Chikungunya according to marital status ($p < .05$), but no significant difference was found in knowledge about dengue fever practices and attitudes (Table 7).

**Table 7** *Comparison by Marital Status of Knowledge, Attitudes and Disease Prevention Practices of Dengue Fever and Chikungunya* (*N* = 220)

| Variables | Marital Status | *SS* | *df* | *MS* | *F* | Sig. |
|---|---|---|---|---|---|---|
| Knowledge about dengue fever | Among Groups | 16.14 | 4 | 4.04 | 1.28 | .280 |
| | Within Groups | 678.82 | 215 | 3.16 | | |
| | Total | 694.96 | 219 | | | |
| Knowledge about Chikungunya | Among Groups | 41.61 | 4 | 10.40 | 3.37* | .011 |
| | Within Groups | 662.37 | 215 | 3.08 | | |
| | Total | 703.98 | 219 | | | |
| Attitude about dengue fever and Chikungunya | Among Groups | 0.43 | 4 | 0.11 | 0.26 | .903 |
| | Within Groups | 87.82 | 215 | 0.41 | | |
| | Total | 88.25 | 219 | | | |
| Practices regarding dengue fever and Chikungunya prevention | Among Groups | 2.50 | 4 | 0.62 | 1.78 | .135 |
| | Within Group | 75.49 | 215 | 0.35 | | |
| | Total | 77.99 | 219 | | | |

Individuals with a registered marital status were significantly different from other groups ($p < .05$), as shown on the following page in Table 8.

**Table 8** *Differences of Marital Status and Knowledge about Chikungunya Using Scheffe's Method (Pairs)*

| Marital Status | Mean ($\bar{x}$) | Single | Married (Registered) | Divorced, Separated | Widow/ Widower | Married (Unregistered) | Total |
|---|---|---|---|---|---|---|---|
| | | 5.77 | 6.25 | 6.13 | 5.62 | 4.22 | 6.01 |
| Single | 5.77 | - | | | | | |
| Married (Registered) | 6.25 | -0.48 | - | | | | |
| Divorced, Separated | 6.13 | -0.36 | 0.12 | - | | | |
| Widow/Widower | 5.62 | 0.15 | 0.63 | 0.51 | - | | |
| Married (Unregistered) | 4.22 | 1.54 | 2.02* | 1.90 | -1.40 | - | |
| Total | 6.01 | | | | | | - |

*$p < .05$

***Comparative Analysis of Knowledge about Dengue Fever and Chikungunya among Respondents***

The results obtained showed that knowledge about dengue fever and Chikungunya differed at the .001 level, as shown in Table 9.

**Table 9** *Comparison of Knowledge of Dengue Fever and Chikungunya* (*N* = 220)

| Variables | $\bar{x}$ | *SD* | *t* | *df* | Sig |
|---|---|---|---|---|---|
| Knowledge about dengue fever | 8.29 | 1.78 | 1.32*** | 219 | .000 |
| Knowledge about Chikungunya | 6.01 | 1.79 | | | |

**Discussion**

***Knowledge about Dengue Fever and Chikungunya***

The results showed that most respondents' (71.8%) level of knowledge about dengue fever was at the highest level; this contrasted with their knowledge (23.2%) about Chikungunya, which was at a low level. This is consistent with the research findings of Banchawang (2018), who studied the prevention and control of dengue fever of people in Nong Yong Subdistrict, Pak Khat District, Bueng Kan Province. It was found that 59.5% of participants were knowledgeable about dengue fever at a moderate level. It is also in accordance with the research of Tunyarak and Chuaikhlai (2019), who studied knowledge and attitudes about dengue hemorrhagic fever prevention by citizens in Kreng Sub-district, Cha-Ut District, Nakhon Si Thammarat. The average knowledge about dengue fever reached 56.8%, which was consistent with the study of Petchchai et al. (2013). The latter results came from a participatory research study on primary prevention of Chikungunya disease in a community in Surat Thani Province. Their knowledge about Chikungunya was at a moderate level, as was their participation in the prevention of Chikungunya.

The results of comparing knowledge about dengue fever and Chikungunya revealed that knowledge of dengue fever was significantly higher than for Chikungunya ($p < .001$). This may have been due to the fact that dengue fever is a common disease, and that people have gained knowledge from Langkhao public health personnel (Lang Khao Subdistrict Health Promotion Hospital staff), as well as village health volunteers continuously for many years. On the other hand, Chikungunya is a new disease in the community. They may not understand it, have no knowledge about, or cannot tell the differences between the two diseases yet.

***Attitudes about Dengue Fever and Chikungunya***

From this study, it was found that most participants scored at a moderate level regarding risk factors associated with contracting dengue fever or Chikungunya. Taking care of the environment around the house to reduce the number of mosquito larvae achieved the highest average score, followed by the belief that dengue fever is a disease that can be transmitted and cured by itself. The

duty to destroy mosquito breeding sites every week received a low mean score. This is inconsistent with the findings of Saminpanya et al. (2017), who studied the knowledge, attitudes, and dengue preventive practices of the people from Ban Khan Takhian, Mittraphap Sub-district, Muak Lek District, Saraburi Province. It was found that their attitude towards the prevention of dengue fever was at the highest level, representing a score of 82.0% out of a possible 100%. It was not consistent with the study of Petchchai et al. (2013) either. They considered the attitudes of community members in Surat Thani Province about primary prevention measures to be adopted regarding Chikungunya disease. Their attitudes towards Chikungunya prevention were at a high level.

***Preventive Practices of Dengue Fever and Chikungunya***

The study results revealed that most preventive practices for dengue fever and Chikungunya were at a high level. It was found that the practices of sleeping with mosquito nets or sleeping in a room with a mosquito mesh wire screen to prevent mosquito bites received the highest average score. This was followed by good house lighting and ventilation, the closure of drinking/used water storage containers, and applying mosquito repellent lotion/lighting mosquito coils to prevent mosquito bites. These observations were consistent with Saminpanya and her colleagues' (2017) study. They found that knowledge, attitudes, and dengue preventive practices of the people from Ban Khan Takhian, Mittraphap Sub-district, Muak Lek District, Saraburi, were at a moderate level.

The results revealed that men and women differed in their knowledge about dengue fever ($p < .05$), but not Chikungunya. This was consistent with the study of Chamnoi (2015), who studied knowledge about dengue fever, preventive measures, and control. The differences attained in the latter study were at the same level of significance.

Age was negatively correlated with knowledge about dengue fever, with attitudes about dengue fever and Chikungunya, and with dengue fever prevention practices. This was consistent with the study of Chamnoi (2015), who researched aspects about dengue fever and its prevention and control in Phran Kratai District, Kamphaeng Phet Province. Perception about the risk of dengue fever also differed significantly with age.

The results also revealed that knowledge about dengue fever and Chikugunya were correlated with attitude and preventive practices. This was consistent with the research of Saminpanya et al. (2017), who studied the knowledge, attitude, and preventive practices of dengue among people of Ban Khan Takhian, Mittraphap Sub-district, Muak Lek District, Saraburi. It was found that knowledge and attitudes were positively correlated with low levels of preventive practices. A knowledge-building approach and programs supporting positive attitudes about dengue fever in the community would contribute to better dengue preventive practices.

**Practical Recommendations Derived from Research Results**

1. The results of this research provide basic information that may help health workers find ways to enhance their knowledge and support positive attitudes about dengue fever and Chikungunya in their communities, which will influence the preventive practices that are adopted. Informing the people in the community regularly, with a particular focus on the elderly, would be helpful, as it was found that age was inversely correlated with knowledge of dengue fever.

2. The differences between dengue fever and Chikungunya need to be explained to the public, so that they can better care for themselves and their families

3. The research results indicated that respondents had a low average score regarding the advisability of destroying mosquito breeding sites weekly. Therefore, public health personnel, staff of Lang Khao Subdistrict Health Promoting Hospital, and village health volunteers should demonstrate how to destroy mosquito breeding sites as part of a continuous campaign to prevent dengue fever and Chikungunya. This practice compliments household cleanliness, removing garbage continually, keeping dwellings well-lighted, changing water in pots and vases weekly, and keeping lids on water storage devices to prevent mosquitoes from laying eggs. Eliminating mosquito breeding sites can prevent three diseases–namely, dengue fever, Zika virus infection, and Chikungunya.

4. From the research results, it was found that the respondents received a moderate score regarding the practices of applying lotion/ lighting mosquito coils to prevent mosquito bites. The staff of Baan Langkhao Subdistrict Health Promoting Hospital, including village health volunteers, would be advised to encourage people to continue to consistently engage in such practices. This will help prevent dengue fever and Chikungunya.

**Suggestions for Further Research**

1. There should be a study of the relationship between knowledge, attitudes and preventive practices of dengue fever and Chikungunya among other villages and districts in Saraburi Province and other places where there are still outbreaks of dengue and Chikungunya.

2. There should be a study of factors that contribute to the community's effective participation in the prevention of dengue fever and Chikungunya so that this data could be used in a community trial following an outbreak of dengue fever or Chikungunya.

3. Various health promotion programs for dengue fever and Chikungunya should be studied in different communities.

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