Impact of Knowledge and Attitude on Preventive Practice Regarding Dengue Fever among Residents in Dasmariñas City, Cavite: A Structural Equation Modelling Approach

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Abstract: Dasmariñas City is one of the cities in the Philippines affected by dengue fever outbreak during the year 2015. This study aims to assess the current level and to identify the relationships between knowledge, attitude and preventive practice about dengue fever of the respondents within Dasmariñas City, Cavite. This study used purposive sampling in selecting respondents from ten barangays with the highest number of dengue cases during the year 2015. Survey questionnaires were used to gather information from 419 respondents about their demographic profile, involvement in health promotion and educational intervention, sources of information, knowledge, attitude, and preventive practice regarding dengue fever. The results of this study showed that most of the respondents have moderate knowledge level, positive attitude level, and fair preventive practice level. Preventive practice has a significant relationship with barangay, family income, health promotional activities and educational intervention, and received information. A structural equation model was developed, tested and fitted to the data well (chi-square= 74.651, df= 51, CFI= 0.958, TLI= 0.946, and RMSEA= .033). Furthermore, a positive attitude towards dengue fever had a positive impact on the dengue preventive practice of the residents in Dasmariñas, however high knowledge about dengue fever does not guarantee good practice of preventive measures.

Keywords: dengue fever, dengue cases, dengue preventive practice, structural equation model

INTRODUCTION

Background of the Study

In the Western Pacific Region, the Philippines had the highest incidence of dengue infections from years 2013 to 2015. Based on the report released by the Department of Health (DOH), there were almost 100,000 dengue cases recorded across the country for the year 2015 which was 23.5% higher than the previous year. The report of DOH from previous years regarding dengue incidence across the country indicates a possible increasing trend of dengue outbreak for upcoming years. However, the death toll was significantly lower, from 269 recorded cases compared to 316 cases in the year 2015. Furthermore, Central Luzon accounted for the highest number of cases at 14,127, followed by Calabarzon with 14,082, National Capital Region with 10,385, Ilocos region with 8,136, Northern Mindanao 6,451, Cagayan Valley 5,677 and Soccsksargen with 5,552. Thus, the main focus of the Department of Health (DOH) is to raise dengue awareness among people. They declared the month of June as "Dengue Awareness Month" as part of their campaign to build public knowledge on preventive measures against dengue.

According to Mayxay et al. (2013), dengue is a preventable disease. The only method needed to prevent the transmission of the dengue virus is to control the mosquito breeding sites. Good knowledge, attitudes and practices (KAP) among the public community are required to successfully prevent or control dengue outbreaks. Furthermore, understanding the KAP of the general community on dengue and prevention will provide valuable information for effective strategic planning and engaging the public in dengue control.

In the Calabarzon region, Cavite Province had the most number of dengue cases. The government officials of Cavite Province announced the city under a state of calamity after the provincial health office recorded
a double increase in the number of dengue cases from 2014’s 1,120. Cavite has seven cities and 16 municipalities. The Cavite Provincial Health Office identified five cities, namely, Dasmariñas, TreceMartires, Bacoor, Imus, and General Trias, with the highest number of cases. The dengue cases reached 10,457 incidents with 46 fatalities last November 15-21, 2015 according to the Morbidity 46 week report of the Cavite Provincial Epidemiology Surveillance Unit (PESU). As the state of dengue cases rose to Red Alert in 2015 by the Provincial Health Office (PHO), the local government is actively responding and taking actions against dengue by promoting province-clean up drive and by conducting lectures and seminars about dengue detection and prevention in every barangay.

Before the first world's Dengue vaccine, commonly known as Dengvaxia, was released last December of 2015, the only means of dealing with this epidemic disease in the past was by controlling or preventing the vector mosquitoes from transmitting dengue virus through denying their habitats and destroying their potential breeding sites and by conducting different programs to spread awareness to all parts of the world. Unfortunately, health promotional campaigns intended to encourage people in reducing mosquito breeding sites have not always been successfully implemented. Health promotion and educational intervention should focus on behavioural and motivational approaches that could increase the level and strength of self-efficacy in order to prevent and control dengue outbreaks in the community (Isa et al. 2013).

The 2015 record showed that Dasmariñas City had the most dengue deaths during the year. According to the report of two City Health Offices of Dasmariñas (CHO), a total of 2573 dengue cases were recorded from the year 2015 with 28 deaths. The highest number of dengue cases was recorded last October 2015, which corresponds to 742 cases. The 2015 record also shows that the high incidence of dengue fever occurred during the rainy season, particularly in the months of July, August, September, October, and December of 2015. Dasmariñas City has 75 barangays and the CHO identified 10 barangays with the highest number of dengue cases namely, Salawag, Paliparan III, Sampaloc IV, Salitran III, Langkaan II, Sampaloc II, Burol I, Salitran II, Salitran IV, and Paliparan II.

Dasmariñas city is one of the cities in Cavite affected by dengue fever outbreak. From the report of CHOs of Dasmariñas, a total of 2,573 dengue cases and 28 deaths were recorded during 2015. It is possible that more dengue cases will be recorded in the upcoming years. Thus, this topic was chosen to prevent or control dengue outbreak by promoting preventive measures and increasing the awareness on dengue fever of the residents in Dasmariñas city. According to DOH, Dengvaxia will be an additional strategy in the fight against dengue, but still, preventive measures such as cleaning one’s surroundings remain better. It is believed that “prevention is better than cure”. Prevention will be very helpful in minimizing the number of dengue cases in the city. It can only be done if the residents have good knowledge, attitude, and preventive practice towards dengue fever. This study aimed to determine the current level of knowledge, attitude, and preventive practice about dengue fever by the residents in Dasmariñas City, Cavite, particularly in the barangays that had recently experienced an outbreak or sudden increase of dengue fever during 2015. This also aimed to determine other factors that can affect the knowledge level and preventive practice of the respondents and develop a structural equation model that will explain the relationship between knowledge and preventive practice, and attitude and preventive practice regarding dengue fever.

Conceptual Framework

![Conceptual Framework Diagram]

- **Independent Variables**
  - Demographic Profile
    - Barangay
    - Age
    - Gender
    - Civil Status
    - Educational Level
    - Employment Status
    - Family Monthly Income
    - Members in the family
    - Number of children below 16 yrs. old
    - History of dengue in the family

- **Knowledge on Dengue**
  - (Fever, symptoms, mode of transmission, etc.)

- **Dependent Variable**
  - Preventive Practice towards Dengue fever
    - (Use of mosquito coils, nets, and repellants, eliminating breeding sites, keeping surroundings clean, etc.)
A structural equation model to explain the effects of knowledge and attitude on the preventive practice of dengue fever was developed. This study tested the significant direct relationship between the knowledge and preventive practice, and attitude and preventive practice regarding dengue fever. The model is based on Bandura’s Social Cognitive Theory and structural equation model of Isa et al. (2013). According to Severin & Tankard (2001), Bandura’s social cognitive theory shows that human learning develops through observing the environment and other people exemplify various behaviors. Thus, environment influences perception, knowledge, attitude and practice of a person. In the structural equation model of Isa et al. (2013), the level and strength of self-efficacy fully mediated the relationship between knowledge of dengue and dengue preventive behaviors. Furthermore, mass media, local contact, and direct information-giving sessions are the factors affecting the knowledge of dengue of an individual. Thus, involvement in health promotion and educational intervention to control dengue and receiving information about this epidemic disease from different type of sources could affect the knowledge, attitude, and preventive practices of an individual.

Statement of the Problem

Specifically, the study aims to answer the following questions:
1. What is the demographic profile of the respondents from Dasmariñas City, Cavite as to age, gender, civil status, educational level, and employment status?
2. What is the current level of knowledge, attitude, and preventive practice about dengue fever of the respondents in Dasmariñas City, Cavite?
3. What are the factors affecting the knowledge of Dengue and preventive practices of the respondents in Dasmariñas City, Cavite?
   3.1 Is there an association between the demographic profile and preventive practice about dengue fever by the respondents?
4. What is the relationship between the knowledge and preventive practice, and attitude and preventive practice regarding dengue fever of the respondents in Dasmariñas City, Cavite?

Scope and Limitations

This study is limited to Dasmariñas City, Cavite only, particularly to the barangays that experienced dengue outbreak during 2015. It focuses on identifying and analyzing the current level of knowledge, attitude, and preventive behavior towards dengue fever by the respondents from the 10 barangays with the highest incidence of dengue infections, which were identified by the City Health Office of Dasmariñas.

Significance of the Study

This study will inform the Cavite Provincial Epidemiology Surveillance Unit PESU of the current state of knowledge, attitude, and preventive behavior about dengue fever by the residents in Dasmariñas City, Cavite. It will serve as a guideline for more effective awareness and dengue prevention programs in controlling dengue outbreaks in Cavite Province. Furthermore, it will also inform the City Health Offices of Dasmariñas about the current state of knowledge, attitude, and preventive behavior about dengue fever.
by the respondents. It can also be used as a guideline for more effective health promotion and educational intervention programs in order to increase the level of knowledge, attitude, and preventive behavior of the residents in controlling dengue outbreak. This will also increase the awareness of the residents in Dasmariñas City, Cavite on preventive measures in minimizing dengue outbreak. It will also serve as a basis for conducting related study in other places with dengue outbreak and as the reference of future researchers for the enhancement of the study and for the discovery of other related results about controlling dengue outbreak.

**Definition of Terms**

**attitude.** It is the feeling and belief of the respondents about dengue fever and prevention. In this study, attitude was measured by a 6-point a Likert scale (1- Strongly disagree, 2- Disagree, 3- Slightly Disagree, 4- Slightly Agree, 5- Agree 6- Strongly Agree).

**dengue fever.** It is an acute infectious disease caused by a flavivirus transmitted by aedes mosquitoes, and characterized by headache, severe joint pain and a rash. It is considered to be an independent variable in the study.

**dengue outbreak.** It is the sudden rise or increase of dengue fever in a particular place

**dengue outbreak control.** It refers to actions or preventive measures to minimize dengue outbreak such as fogging, misting pesticides, and source reduction.

**educational intervention.** These are educational program and helpful tool for controlling dengue fever such as public lectures or seminars, individual advice, and demonstration.

**health promotion.** It is the process of enabling the respondents to increase dengue fever control.

**knowledge.** It is the understanding of the respondents about dengue fever, signs and symptoms, breeding sites and dengue preventive measures to control dengue fever transmission. The knowledge of the respondents was measured by a set of questions adapted from the questionnaires of Ahmed (2007), Shuaib et al. (2010), and Isa et al. (2013). A correct answer was given a score of one (1) and wrong answer was given a zero (0). The total scores were classified into 3 levels, “High", "Moderate", or "Low”.

**preventive practices.** These are the actions or behaviors of the respondents to prevent dengue fever such as the use of insecticides, professional pest controls, screened windows, fans, bed nets, mosquito coils, elimination of stagnant water, cut down bushes, covered water containers, general cleaning of community and seminars about dengue prevention.

**measured variables.** These are variables that directly measure things such as involvement in health promotion, educational intervention and sources of information, knowledge, attitude, and preventive behavior towards dengue fever.

**latent variables.** These are variables that are not directly measured, such as attitude towards dengue fever and attitude towards dengue control.
METHODOLOGY

Research Design

The study design was a descriptive and quantitative analytical cross-sectional study. It described and assessed the level of knowledge, attitude, and preventive practice about dengue fever of the residents in Dasmariñas City, Cavite and analyzed the relationships or effects of demographic profile, knowledge, and attitude on preventive practice.

Research Procedure

The researchers used Purposive sampling in selecting respondents which includes people of interest. The respondents were selected from the barangays in Dasmariñas City that experienced the dengue outbreak during 2015. The researchers recruited the heads of the family, spouse, or respondents aged above 18 years old to answer questionnaires that would identify their personal information, sources of information about dengue fever, level of knowledge, attitude, and their preventive practice towards dengue fever. The researchers used Raosoft to compute the sample size needed. The minimum number of respondents is 384 with 5% margin of error and a 0.05 level of significance.

During the development of the questionnaire, the content validity was established by taking recommendations from the experts. The questionnaire was also based on the related studies of Ahmed (2007), Shuaib et al. (2010), and Isa et al. (2013). And it was modified according to the suggestions of qualified persons. The researchers conducted a preliminary survey among 45 respondents, who are living in Dasmariñas City, to ensure reliability. The internal consistency was analyzed by using Cronbach’s Alpha Coefficient. According to Bruin (2006), a reliability coefficient of .70 or higher is considered to have an acceptable internal consistency. Upon analysis, the Cronbach’s Alpha for Knowledge part was 0.713, 0.811 for Attitude part, and 0.722 for Preventive Practice part. The overall Cronbach’s Alpha Coefficient value was 0.72, which was interpreted as reliable since the reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations (Bruin, 2006).
Each questionnaire consists of 5 parts, namely, (i) Demographic Profile, (ii) Involvement in Health Promotion and Educational Intervention and Sources of Information, (iii) Knowledge, (iv) Attitude, and (v) Preventive Practice. The questionnaire was translated in Filipino by Ms. Heidi Sarno, faculty from Filipino and Literature Department of DLSU-D. The questions in part II were adapted from the questionnaires of Isa et al. (2013). There are 4 questions in part II which include the involvement and type of activities in controlling of dengue outbreak and sources of information about dengue fever. Under the involvement in health promotion and educational intervention, the respondents were asked if they have been involved in any activities regarding dengue control program. 1 point was given for “Yes” and 0 for “No”. Respondents were also asked to enumerate the types of activities in which they were involved and scored these ranging from 1 to 5 accordingly, with the highest possible score of 15 if they were involved or participated in all the activities. Under the sources of information, the respondents were also asked if they receive information regarding dengue fever from different sources, 1 point was given for “Yes” and 0 for “No”. The respondents were also asked about the types of information sources and scored these ranging from 1 to 6 point, with the maximum total score of 21 if they received the information from different type of sources listed.

The questions in part III were adapted from the questionnaires of Ahmed (2007), Shuaib et al. (2010), and Isa et al. (2013). There are 14 questions in the Knowledge part about dengue fever which includes signs and symptoms, transmission, treatment, and prevention. A correct answer was given 1 score and wrong answer was given 0. The total scores were classified into 3 levels, “High, Moderate, or Low”. The statements in part IV were adapted from the questionnaires of Ahmed (2007) and Shuaib et al. (2010). There are 11 statements in the Attitude part which include the attitude of the people towards dengue fever, dengue control and risk of getting dengue fever, and they were assessed using an even-numbered Likert Scale (1- Strongly disagree, 2- Disagree, 3- Slightly Disagree, 4- Slightly Agree, 5- Agree 6- Strongly Agree). The total scores were classified into 3 levels, “Positive, Moderate, or Negative”. The statements in part V were adapted from the questionnaires of Shuaib et al. (2010). There are 15 statements in the Preventive Practice part which include practices or behavior towards dengue fever prevention, and they were assessed using even-numbered Likert Scale (1- Never, 2- Very Seldom, 3- Seldom, 4- Sometimes, 5- Frequently, 6- Always). The total scores were classified into 3 levels, “Good”, ”Fair”, or ”Poor”.

### Table 1 Knowledge Total Score Interpretation based on Bloom’s cut off point

<table>
<thead>
<tr>
<th>Levels</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>High (80%-100%)</td>
<td>16-20</td>
</tr>
<tr>
<td>Moderate (50%-79%)</td>
<td>10-15</td>
</tr>
<tr>
<td>Low (0%-49%)</td>
<td>00-09</td>
</tr>
</tbody>
</table>

### Table 2 Attitude Total Score Interpretation

<table>
<thead>
<tr>
<th>Levels</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>53-66</td>
</tr>
<tr>
<td>Moderate</td>
<td>40-52</td>
</tr>
<tr>
<td>Negative</td>
<td>11-39</td>
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</tbody>
</table>

### Table 3 Practice Total Score Interpretation based on Bloom’s cut off point

<table>
<thead>
<tr>
<th>Levels</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good (80%-100%)</td>
<td>58-72</td>
</tr>
<tr>
<td>Fair (50%-79%)</td>
<td>36-57</td>
</tr>
</tbody>
</table>
Data Gathering and Statistical Analysis

This research used the survey method in order to gather data from the respondents and health officers of Dasmariñas City. A letter of request for the data of dengue cases per barangay from the City Health Office was sent last April 26, 2016. The letters of permission to conduct the surveys were also sent to barangay captains of Salawag, Paliparan III, Sampaloc IV, Salitran III, Langkaan II, Sampaloc II, Burol I, Salitran II, Salitran IV, and Paliparan II, last August 8, 2016. The researchers were advised to go to respective Barangay Health Centers. The Barangay Health Workers helped and assisted with conducting the surveys. At least 38 respondents or households from each barangay were selected. Verbal or written consent was also taken from the respondents before conducting the survey for ethical consideration.

The surveys and interviews were conducted in the barangays with the highest number of dengue cases during 2015 namely, Salawag, Paliparan III, Sampaloc IV, Salitran III, Langkaan II, Sampaloc II, Burol I, Salitran II, Salitran IV, and Paliparan II, during August 15-September 26, 2016. The research followed the set schedule of survey for the following affected barangays.

Table 4 Distribution of Respondents per selected Area or Subdivision and schedule of Survey per Barangay
After the data gathering, the researchers analyzed and interpreted the data using the downloaded trial version of SPSS and AMOS program, version 21 for Microsoft Windows. The total scores and means were computed and interpreted. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used primarily to summarize and describe the data. This research used the Chi-square Test of Relationships to analyze the relationship between the demographic profile/characteristics of the respondents and their preventive practice. This research analyzed the relationships of the measured variables, “involvement in health promotion and educational intervention, sources of information, knowledge, attitude, and preventive practice” using the Structural Equation Modeling (SEM) which is a combination of Factor Analysis and Path Analysis. This research used factors instead of original variables from involvement in health promotion and educational intervention and sources of information because some of these variables were correlated. The factor analysis was done using principal component extraction with Equamax rotation. The factor scores were derived by regression and saved for use in SEM. Then, SEM was done in AMOS to determine significant paths between those variables in order to derive a better explanation of significant relationships of the factors, knowledge, attitude, and preventive practice.

Structural equation modeling (SEM) is a multivariate statistical framework that is used to model complex relationships between directly and indirectly observed (latent) variables. SEM is a general framework that involves simultaneously solving systems of linear equations and encompasses other techniques such as regression, factor analysis, path analysis, and latent growth curve modeling (Stein et al. 2012). Its two goals are to understand the patterns of correlation or covariance among a set of variables and to explain as much of their variance as possible with the model specified (Kline, 1998).
According to Suhr (2006), SEM explicitly specifies error and provides no straightforward tests to determine model fit. The best strategy to evaluate model fit is to examine multiple tests, such as Chi-square, Comparative Fit Index (CFI), and Root Mean Squared Error of Approximation (RMSEA). Goodness of fit indices are used as indicators of model fit. Chi-square tests are used as an index of the significance of the discrepancy between the original (sample) correlation matrix and the (population) correlation matrix estimated from the model. The CFI and RMSEA must be considered because the significance of chi-square tests depends on the number of subjects. CFI values are derived from the comparison of the hypothesized model with the independence model. RMSEA values help to answer the question of how well the model with unknown but optimally chosen parameter values would fit the population covariance matrix if it were available. The acceptable values for CFI are greater than 0.90 and RMSEA are less than 0.08 (Isa et al., 2013).

Furthermore, the use of SEM could be impacted by the research hypothesis being tested and the requirement of sufficient sample size. A desirable goal is to have a 20:1 ratio for the number of subjects to the number of model parameters. However, a 10:1 may be a realistic target. If the ratio is less than 5:1, the estimates may be unstable. SEM also considers measurement instruments, multivariate normality, parameter identification, outliers, missing data, and interpretation of model fit indices (Schumacker & Lomax, 1996).

A graphical language provides a convenient and powerful way to present complex relationships in SEM. Model specification involves formulating statements about a set of variables. Then, a diagram or a pictorial representation of a model is transformed into a set of equations. The set of equations are solved simultaneously to test model fit and estimate parameters. The general structural equation model as outlined by Joreskog (1973) consists of two parts: (a) the structural part linking latent variables to each other via systems of simultaneous equations, and (b) the measurement part which links latent variables to observed variables via a restricted (confirmatory) factor model. The structural part of the model can be written as

$$\eta = B\eta + \Gamma \xi + \zeta$$

where $\eta$ is a vector of endogenous (criterion) latent variables, $\xi$ is a vector of exogenous (predictor) latent variables, $B$ is a matrix of regression coefficients relating the latent endogenous variables to each other, $\Gamma$ is a matrix of regression coefficients relating the latent endogenous variables to each other, $\zeta$ is a vector of disturbance terms.

The latent variables are linked to observable variables via measurement equations for the endogenous variables and exogenous variables. These equations are defined as

$$y = \Lambda y \eta + \epsilon$$

and

$$x = \Lambda x \xi + \delta$$

where $\Lambda_y$ and $\Lambda_x$ are matrices of factor loadings, respectively, and $\epsilon$ and $\delta$ are vectors of uniqueness, respectively.

**RESULTS AND DISCUSSION**

**Demographic Information**

This study was conducted in Dasmarinas City, Cavite. Four hundred nineteen respondents completed the survey. The majority of the respondents came from Baranggay Salawag (11%) which corresponds to 46 respondents. Most of the respondents who answered the questionnaires were female which corresponds to 351 respondents. The mean age of the respondents was 40 years with a standard deviation of 12.659. Their age ranges from 18 to 82 years. Most of the respondents (27.9%) were in the age range of 31-40 years old. Almost 80% of them were already married. Furthermore, most of the respondents were educated in High school which corresponds to 43.9%. Almost 53% of them were unemployed. Majority of the respondents (30.5%) had a family monthly income ranges from Php 7,001 to Php 15,000. When it comes to size of the
family, more than 50% of the respondents belong to the family consisting of 3 to 5 members living in the house. At least 70% of the respondents have 0-2 children under 16 years old in their family. Among 419 respondents, 83% of them had no history of dengue in the family in the last two years.

**Involvement in Health Promotional Activities and Sources of Information about Dengue Fever**

Among 419 respondents, 71% of them had been involved in some sort of health promotional activities and educational intervention about dengue in their respective barangay while 29% of them had not been involved in any activities. Moreover, 97% of the respondents had received some sort of information about Dengue in their respective barangay while 3% of them had not received any information.

Respondents were allowed to select one or more types of health promotional activities and sources of information regarding dengue fever. Among the respondents who had been involved in any health promotional activities on dengue, the majority of them were involved in Public Lecture or Seminar which corresponds to 152 respondents, followed by Fogging/ Misting Pesticides which corresponds to 127 respondents. Among the respondents who received information regarding dengue fever, the majority of them selected Television [Local/ National] as one of their sources of information which corresponds to 268 respondents, followed by Public Announcement which corresponds to 223 respondents. Therefore, it can be concluded that most of the respondents got their information through a public lecture or seminar and television is their source of information.

**Knowledge, Attitude, and Preventive Practice**

Respondents answered a total of 14 questions about knowledge on dengue fever. One question was about symptoms of dengue fever and there were 7 correct answers in that item. Each correct answer was given one mark with a total of 20 marks. The mean knowledge score for the respondents was 12.87 with standard deviation of 2.871. The range of knowledge total score was 3 – 20. The distribution of knowledge level of the respondents regarding dengue fever showed that 67.1% of them have “moderate knowledge” while 20.3% of the respondents have “high knowledge” and 12.6% of them have “low knowledge”. Therefore, most of the respondents based on their self-assessment have only a moderate level of knowledge about Dengue.

The respondents answered a total of 11 questions about attitude towards dengue which had a total score of 66. Among 419 respondents, 70% of the respondents had Positive Attitude, 28.6% of them had Moderate Attitude, while 1.4% had Negative Attitude towards dengue fever. The mean attitude score for all respondents was 54.18 out of possible 66 points with a standard deviation of 5.622. The range of attitude total score was 16 – 66. Therefore, it can be concluded that most of the respondents have Positive Attitude towards dengue fever.

The respondents answered a total of 12 questions about preventive practice regarding dengue fever which had a total score of 72. Among 419 respondents, 53.7% of the respondents have fair practice, 44.4% of them have good practice, while 1.9% have poor practice towards dengue fever prevention. The mean practice score for all respondents was 55.82 out of possible 72 points with standard deviation of 9.307. The range of preventive practice total score was 28 – 72. Thus, most of the respondents have only Fair Level of preventive practice towards dengue fever.

**Association between Grouping Variables and Preventive Practice**

Table 5 Association of Independent Variables and Preventive Practice Level
Table 5 shows that Practice level has a significant relationship with Barangay, Family Monthly Income, Health Promotional Activities and Educational Intervention, Received Information, Knowledge Level, and Attitude level of the respondents. Therefore, the preventive practice regarding dengue fever of the respondents depends on the barangay or community where they live. It was found that every barangay implements different health promotional activities and local dengue control program such as source reduction, clean-up drive, larvae survey and fogging. Because of that, people tend to have better preventive practices regarding dengue fever. According to Chandren et al. (2015), frequency of fogging, which is one of the mosquito control programs in the Orang Asli community in Peninsular Malaysia, is a significant factor in dengue prevention practice. The preventive practice of the respondents also depends on family monthly income. According to the study of Wong et al. (2015), households with lower income, unemployed and unskilled workers carry out more dengue prevention practices. In contrast to the results of the research conducted by Ahmed (2007), preventive practice dengue fever does not depend on family income.

Moreover, the preventive practice of the respondents also depends on their involvement in Health Promotional Activities and Educational Intervention. According to Isa et al. (2013), health promotion campaigns encourage local people to engage in activities that reduce the number of mosquito breeding sites close to home. Individual health education was also effective in improving the practice of source reduction in a community with poor knowledge of vector biting and breeding habits (Saurabh, 2014). The preventive practice also depends on the information they received regarding dengue. Information received regarding dengue fever may increase awareness and knowledge about dengue. According to Isa et al. (2013), mass media, local contact and direct information-giving sessions significantly predicted the level of knowledge of dengue. The knowledge-based education campaigns will substantially increase dengue preventive practices in the community (Wong et al., 2015). Furthermore, the preventive practice of the respondents depends on their knowledge of dengue, and attitude towards dengue fever. In contrast to the study of Shuaib et al. (2010), their findings suggest that good knowledge about dengue fever among residents of
Westmoreland did not translate to adoption of preventive measures. In the study of Isa et al. (2013), knowledge had significant indirect effect on preventive behavior with mediation effect of strength and level of self-efficacy. In contrast to the study of Ahmed (2007), attitude had no significant association with preventive practice while on the other hand, practice towards dengue prevention had significant association with knowledge.

Table 6 Rotated Component Matrix showing the correlation between the four factors and involvement in health promotional activities and educational intervention, and sources of information

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Lecture/ Seminar</td>
<td>-.128</td>
<td>.384</td>
<td>.237</td>
<td>.601</td>
</tr>
<tr>
<td>Individual Advice</td>
<td>.120</td>
<td>.187</td>
<td>.881</td>
<td>.061</td>
</tr>
<tr>
<td>Source Reduction</td>
<td>.084</td>
<td>.875</td>
<td>.230</td>
<td>.104</td>
</tr>
<tr>
<td>Fogging/Misting Pesticides</td>
<td>.155</td>
<td>.861</td>
<td>.256</td>
<td>-.005</td>
</tr>
<tr>
<td>Demonstration</td>
<td>.096</td>
<td>.342</td>
<td>.797</td>
<td>.157</td>
</tr>
<tr>
<td>Public Announcement</td>
<td>.222</td>
<td>-.112</td>
<td>.010</td>
<td>.857</td>
</tr>
<tr>
<td>Outdoor Media</td>
<td>.749</td>
<td>.321</td>
<td>-.131</td>
<td>.202</td>
</tr>
<tr>
<td>Television</td>
<td>.773</td>
<td>.119</td>
<td>.223</td>
<td>-.070</td>
</tr>
<tr>
<td>Radio</td>
<td>.800</td>
<td>.043</td>
<td>.222</td>
<td>.167</td>
</tr>
</tbody>
</table>

Four factors were extracted with Equamax rotation from the original variables on health promotional activities, educational intervention and sources of information regarding dengue fever. The total variance explained is 75.58%. Factor 1 is associated with obtaining information from outdoor media, television, radio, newspaper, and printed media. This was named “Mass Media”. Factor 2 is associated with involvement in source reduction and fogging or misting pesticides. This factor was named “Local Control Program”. Factor 3 is associated with obtaining information from individual advice and demonstration. This factor was named “Dengue Information-Giving”. Factor 4 is associated with obtaining information from public announcement and involvement in Public Lecture and Seminar. This factor was named “Public Promotion”. The factors scores were saved for use in the Structure Equation Model.

Table 7 Correlation matrix between 4 factors, knowledge level, attitude level, and preventive practice level

<table>
<thead>
<tr>
<th></th>
<th>Mass Media</th>
<th>Local Control Program</th>
<th>Dengue Information-Giving</th>
<th>Public Promotion</th>
<th>Knowledge</th>
<th>Attitude</th>
<th>Preventive Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass Media</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.249**</td>
<td>.035</td>
<td>-.167**</td>
</tr>
<tr>
<td>Local Control Program</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
<td>.026</td>
<td>.032</td>
<td>.116*</td>
</tr>
<tr>
<td>Dengue Information-Giving</td>
<td>.000</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.301**</td>
<td>.039</td>
<td>-.141**</td>
</tr>
</tbody>
</table>
Each factor and measured variables in the study were included in the correlation matrix. Table 7 shows that most of the independent variables have a weaker relationship with dependent variables. The relationship between Dengue Information - Giving and Knowledge ($r=0.301$, $p<0.01$) was the strongest among other factors. There is a very small negative correlation between knowledge and preventive practice. Thus, if the knowledge level increases, the preventive practice level decreases and vice-versa. In contrast to the result of the research of Isa et al. (2013), there is a positive correlation between knowledge and preventive practice. The table also shows that there is no significant correlation among the four factors and attitude. Only Mass Media and Dengue Information - Giving have significant correlation with knowledge at $p<0.01$. Local control program has a significant correlation with preventive practice at $p<0.05$. Mass Media, Dengue Information - Giving, and public promotion have significant correlation with preventive practice at $p<0.01$. Furthermore, there is a moderately small positive correlation between attitude and preventive practice. If the attitude level increases, then preventive practice also increases. Knowledge and attitude has no significant correlation with each other. Knowledge is also significantly correlated with preventive practice ($r=0.147$) at $p<0.01$. The research of Ahmed (2007) also showed that there is significant correlation between knowledge and preventive practice. Attitude is also significantly correlated with preventive practice ($r=0.243$) at $p<0.01$. In contrast to the result of the research of Ahmed (2007), attitude is not significantly correlated with preventive practice. On the other hand, the study of Dhimal et al. (2014) found a significantly positive correlation among knowledge, attitude and practice ($p<0.001$).

**Structural Equation Modeling**

The researchers used factor analysis to determine the dimensions of the Attitude part of the questionnaire. The attitude towards dengue is a latent or unobserved variable and cannot be measured directly. Some questions included in this part were highly correlated. Upon analysis, three factors were extracted with Varimax rotation, namely “attitude towards dengue control”, “attitude towards fever”, and “attitude towards the risk of getting dengue”. From 11 statements in the attitude part, the researchers did not include or retain statements 5, 7, and 8 because statement 5 is interrelated to statement 9. These two statements are redundant.
as they are testing one statement but are different in appearance. Furthermore, statements 7 and 8 have factor loadings below 0.5.

Table 8 Rotated Component Matrix showing the correlation between the first three factors and statements in Attitude part of the questionnaire

<table>
<thead>
<tr>
<th>Statements</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>.145</td>
<td>.753</td>
<td>.048</td>
</tr>
<tr>
<td>A2</td>
<td>.106</td>
<td>.369</td>
<td>.562</td>
</tr>
<tr>
<td>A3</td>
<td>.051</td>
<td>.740</td>
<td>-.083</td>
</tr>
<tr>
<td>A4</td>
<td>.397</td>
<td>.499</td>
<td>.143</td>
</tr>
<tr>
<td>A6</td>
<td>.747</td>
<td>.200</td>
<td>-.009</td>
</tr>
<tr>
<td>A9</td>
<td>.824</td>
<td>.101</td>
<td>-.079</td>
</tr>
<tr>
<td>A10</td>
<td>-.069</td>
<td>-.183</td>
<td>.835</td>
</tr>
<tr>
<td>A11</td>
<td>.815</td>
<td>.077</td>
<td>.093</td>
</tr>
</tbody>
</table>


a. Rotation converged in 4 iterations.

Three factors were extracted with Varimax rotation from the original variables of Attitude towards dengue. The total variance explained is 59.317%. Factor 1 is associated with statements 6, 9, and 11. This factor was named “Attitude towards dengue control”. Factor 2 is associated with statements 1, 3 and 4. This factor was named “Attitude towards fever”. Factor 3 is associated with statements 2 and 10. This factor was named “Attitude towards risk of getting dengue”.

Table 9 Goodness of fit indices for structural equation model of reporting dengue preventive practice

<table>
<thead>
<tr>
<th>Model</th>
<th>Chi-square</th>
<th>df</th>
<th>P</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed</td>
<td>216.974</td>
<td>73</td>
<td>.000</td>
<td>.770</td>
<td>.713</td>
<td>.069</td>
</tr>
<tr>
<td>Second</td>
<td>144.953</td>
<td>51</td>
<td>.000</td>
<td>.834</td>
<td>.785</td>
<td>.066</td>
</tr>
</tbody>
</table>

Table 9 shows the models’ goodness fit indices. The proposed model with chi-square=216.974, df=73, CFI=0.770, TLI=0.713, and RMSEA=0.069 using SEM of AMOS 21 indicates adjustment is needed to improve the match between data and model. Path analysis eliminated the paths that were not significant one at a time in order to obtain the most parsimonious model. First, the path was removed between “Attitude-Risk” and “Practice”. Last, then removed the path between “Attitude- Dengue Control” and “Practice”, then added path between “Attitude- Dengue Control and Attitude-Fever”.

The researchers final model fitted the data well with chi-square=74.651, df=51, CFI= .058, TLI= .946, and RMSEA=. .033. Bentler and Chou (1987) recommend CFI and TLI values must be greater than 0.90 as indicators of good fit model. Byrne (2000) recommends that models with RMSEA values less than or equal to 0.05 indicate good fit.
Figure 2 Final Model of 4 factors, knowledge, attitude towards dengue control, attitude towards fever, and preventive practice.

Figure 2 shows that the path between “Attitude- Dengue Control” and practice was eliminated, then added path between “Attitude- Dengue Control” and “Attitude-Fever”. This model indicates a good fit model with \( \chi^2 = 74.651 \), \( df = 51 \), CFI= 0.958, TLI= 0.946, and RMSEA=.033.

Table 10 Unstandardized and standardized regression weights of final structural equation model

<table>
<thead>
<tr>
<th>Hypothesized Paths</th>
<th>Unstandardized Estimates</th>
<th>Standardized Estimates</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge --- Mass Media</td>
<td>606</td>
<td>.219</td>
<td>.127</td>
<td>4.787***</td>
<td></td>
</tr>
<tr>
<td>Knowledge --- Dengue Info</td>
<td>.780</td>
<td>.231</td>
<td>.127</td>
<td>6.155***</td>
<td></td>
</tr>
<tr>
<td>Attitude-Fever --- Attitude-Dengue Control</td>
<td>.419</td>
<td>.631</td>
<td>.069</td>
<td>6.090***</td>
<td></td>
</tr>
<tr>
<td>Practice --- Mass Media</td>
<td>-1.495</td>
<td>-.160</td>
<td>.437</td>
<td>-3.418***</td>
<td></td>
</tr>
<tr>
<td>Practice --- Local Control</td>
<td>1.090</td>
<td>.117</td>
<td>.426</td>
<td>2.558 .011*</td>
<td></td>
</tr>
<tr>
<td>Practice --- Knowledge</td>
<td>-.370</td>
<td>-.110</td>
<td>.164</td>
<td>-2.252 .024*</td>
<td></td>
</tr>
<tr>
<td>Practice --- Public Promotion</td>
<td>1.438</td>
<td>.154</td>
<td>.426</td>
<td>3.376 ***</td>
<td></td>
</tr>
<tr>
<td>Practice --- Dengue-Info</td>
<td>-1.219</td>
<td>-.130</td>
<td>.445</td>
<td>-2.740 .006**</td>
<td></td>
</tr>
<tr>
<td>A6 --- Attitude-Dengue Control</td>
<td>1.000</td>
<td>.667</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A9 --- Attitude-Dengue Control</td>
<td>1.120</td>
<td>.751</td>
<td>.105</td>
<td>10.635 ***</td>
<td></td>
</tr>
</tbody>
</table>
Table 10 shows that all hypothesized paths are significant at a different level. Mass Media significantly predicted Knowledge with standardized β=0.219 at p<0.001. Dengue-Info significantly predicted Knowledge with standardized β=0.281 at p<0.001. Knowledge significantly predicted Preventive Practice with standardized β= -0.110 at p=0.024. Attitude towards Dengue Control significantly predicted Attitude towards Fever with standardized β= 0.631 at p<0.001. This Attitude towards Fever significantly predicted Preventive Practice with standardized β= 0.199 at p=0.001. Mass Media significantly predicted Preventive Practice with standardized β= -0.160 at p<0.001. Local Control significantly predicted Preventive Practice with standardized β= 0.117 at p=0.011. Dengue-Info significantly predicted Preventive Practice with standardized β= -0.130 at p=0.006. Public Promotion significantly predicted Preventive Practice with standardized β= 0.157 at p<0.001.
Table 11 shows the coefficient of determination of Attitude towards Fever, Knowledge, statements A1, A3, A4, A6, A9, and A11, and Practice. It implies that 39.8% is the amount of variance in attitude towards Fever that can be explained by attitude towards dengue Control. It also implies that 12.7% is the amount of variance in knowledge that can be explained by Mass Media and Dengue- Information Giving. Furthermore, the amounts of variance in statements A1, A3, and A4 accounted for by attitude towards Fever are 25.7%, 21.5%, and 36.8% respectively. Also, the amounts of variance in statements A6, A9, and A11 accounted for by attitude towards Control are 44.5%, 56.4%, and 47.4% respectively. Last, 14.7% is the amount of variance in Practice explained by Mass Media, Local Control Program, Dengue- Information Giving, Public Promotion, knowledge, and attitude towards Fever.

The Unstandardized Equations are:

- \[ A_1 = \text{Attitude towards Fever} + e_4, \text{where } e_4 \text{ is a residual error for } A_1 \]
- \[ A_3 = 0.91 \times \text{Attitude towards Fever} + e_5, \text{where } e_5 \text{ is a residual error for } A_3 \]
- \[ A_4 = 1.33 \times \text{Attitude towards Fever} + e_6, \text{where } e_6 \text{ is a residual error for } A_4 \]
- \[ A_6 = \text{Attitude towards Control} + e_1, \text{where } e_1 \text{ is a residual error for } A_6 \]
- \[ A_9 = 1.12 \times \text{Attitude towards Control} + e_2, \text{where } e_2 \text{ is a residual error for } A_9 \]
- \[ A_{11} = 1.03 \times \text{Attitude towards Control} + e_3, \text{where } e_3 \text{ is a residual error for } A_{11} \]

- \[ \text{Attitude towards Fever} = 0.42 \times \text{Attitude towards Control} + e_{11}, \text{where } e_{11} \text{ is a residual error for Attitude towards Fever} \]

- \[ \text{Practice} = -0.37 \times \text{Knowledge} + 4.67 \times \text{Attitude towards Fever} - 1.5 \times \text{Mass Media} + 1.09 \times \text{Local Control} - 1.22 \times \text{Dengue- Info} + 1.44 \times \text{Public Promotion} + e_{10}, \text{where } e_{10} \text{ is a residual error for Practice} \]

Since knowledge partially mediated the relationship of mass media, dengue- information giving and practice, the unstandardized equations can be:

- \[ \text{Knowledge} = 0.61 \times \text{Mass Media} + 0.78 \times \text{Dengue- Info} + e_9, \text{where } e_9 \text{ is a residual error for Knowledge} \]

- \[ \text{Practice} = -0.37 \times \text{Knowledge} + 4.67 \times \text{Attitude towards Fever} + 1.09 \times \text{Local Control} + 1.44 \times \text{Public Promotion} + e_{10}, \text{where } e_{10} \text{ is a residual error for Practice} \]

Thus, when Mass Media increases by 1 point and holds Dengue- Info constant, Knowledge increases by 0.61 points on the average and when Dengue- Info increases by 1 point and holds Mass media constant, Knowledge also increases by 0.78 points on the average. Additionally, when knowledge increases by 1 point and holds other variables constant, Practice decreases by 0.37 points on the average, when Attitude towards Fever increases by 1 point and holds other variables constant, Practice also increases by 4.67 points on the average, when Local Control increases by 1 unit and keeps other variables constant, Practice increases by 1.09 points on the average, and when Public Promotion
increases by 1 point and keeps other variables constant, Practice also increases by 1.44 points on the average.

The Standardized Equations are:
A1= 0.51* Attitude towards Fever + e4, where e4 is a residual error for A1
A3= 0.46* Attitude towards Fever + e5, where e5 is a residual error for A3
A4= 0.61* Attitude towards Fever + e6, where e6 is a residual error for A4
A6= 0.67* Attitude towards Control + e1, where e1 is a residual error for A6
A9= 0.75* Attitude towards Control + e2, where e2 is a residual error for A9
A11= 0.69* Attitude towards Control + e3, where e3 is a residual error for A11

Attitude towards Fever= 0.63* Attitude towards Control + e11, where e11 is a residual error for Attitude towards Fever

Practice= -0.11*Knowledge + 0.20* Attitude towards Fever - 0.16*Mass Media + 0.12*Local Control - 0.13*Dengue- Info + 0.15*Public Promotion + 0.9236*e10, where e10 is a residual error for Practice

Since knowledge partially mediated the relationship of mass media, dengue-information giving and practice, the standardized equations can be:

Knowledge= 0.22* Mass Media + 0.28* Dengue- Info + 0.9343*e9, where e9 is a residual error for Knowledge

Practice= -0.11*Knowledge + 0.20* Attitude towards Fever + 0.12*Local Control + 0.15*Public Promotion + 0.9236*e10, where e10 is a residual error for Practice

Thus, when Mass Media goes up by 1 standard deviation unit and holds Dengue- Info constant, Knowledge goes up by 0.22 standard deviation units, and when Dengue- Info goes up by 1 standard deviation unit and holds Mass Media constant, knowledge also goes by 0.28 standard deviation units. Additionally, when Knowledge increases by 1 standard deviation unit and holds other variables constant, Practice decreases by 0.11 standard deviation units, when Attitude towards Fever increases by 1 standard deviation unit and holds other variables constant, Practice also increases by 0.20 standard deviation units, when Local Control increases by 1 standard deviation unit and holds other variables constant, Practice increases by 0.12 standard deviation units, and when Public Promotion increases by 1 standard deviation unit and holds other variables constant, Practice also increases by 0.15 standard deviation units.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS
Summary

After the data gathering and data analysis had been completed, the results of this study showed that most of the respondents came from Barangay Salawag (11%). Majority of the participants who answered the questionnaires were female (83.8%), within the age group of 30-41 years old (27.9%), Married (78%), with High School Education Level (43.9%), and currently Unemployed (53.5%). For the level of awareness, most of the respondents have a moderate knowledge level (67.1%) with mean of 12.87 and standard deviation of 2.871, a positive attitude (70%) with mean of 54.18 and standard deviation of 5.622, and a fair preventive practice level (53.7%) with mean of 55.82 and standard deviation of 9.307 on Preventive Practice. Preventive practice has a significant relationship with Barangay (p =0.01), Family Income (p=0.05), Health Promotional Activities and Educational Intervention (p=0.001) and Received Information (p=0.001). Therefore, the Preventive Practice towards dengue fever of the respondents depends on the barangay where they live, their family monthly income, their involvement in Health Promotional Activities and Educational Intervention, and information they received regarding dengue.

A Structural Equation Model was developed, tested and fitted the data well (chi-square= 74.651, df= 51, CFI= 0.958, TLI= 0.946, and RMSEA= .033).Since the Attitude towards dengue part was considered as a latent variable, using Factor Analysis, the researchers extracted 3 factors with Varimax rotation namely, "Attitude towards Dengue Control", "Attitude towards Dengue Fever", and "Attitude towards the Risk of Getting Dengue". Furthermore, four factors were extracted using Factor Analysis with Equamax Rotation in Sources of Information and Health Promotion. These factors were labeled as Mass Media, Local Control Program, Dengue Information-Giving and Public Promotion. The final structural model shows that factors labeled as Mass Media (r=0.249, p<0.01) and Dengue-Information Giving (r=0.301, p<0.01) have a direct effects toward Knowledge. On the other hand, Local Control Program (r=0.116, p<0.05) and Public Promotion (r=0.171, p<0.05) factors have direct effects on Preventive Practice. Mass Media factor has both direct and indirect effects towards Preventive Practice at p<0.01 with mediation effect of knowledge. All hypothesized paths are significant at different level. Mass Media significantly predicted Knowledge with standardized β=0.219 at p<0.001. Dengue Information-Giving significantly predicted Knowledge with standardized β=0.281 at p<0.001. Knowledge significantly predicted Preventive Practice with standardized β= -0.148 at p=0.002. Attitude towards Dengue Control significantly predicted Attitude towards Fever with standardized β= 0.631 at p<0.001. This Attitude towards Fever significantly predicted Preventive Practice with standardized β= 0.178 at p=0.004. Mass Media significantly predicted Preventive Practice with standardized β= -0.150 at p=0.001. Local Control Program significantly predicted Preventive Practice with standardized β= 0.115 at p=0.012. Public Promotion significantly predicted Preventive Practice with standardized β= 0.157 at p<0.001.

Conclusions

In conclusion, most of the respondents came from Barangay Salawag and the majority of the participants who answered the questionnaires were female, within the age group of 30-41 years old, Married, with High School Education Level and currently Unemployed. Based from observation, females are considered to be the homemakers and the males are the breadwinners. Preventive practice has a significant relationship with Barangay, Family Income, Health Promotional Activities and Educational Intervention and Received Information. It could indicate that some of the barangays has leaders who are actively taking actions on health problems such as dengue where it can lead to good implementations of Health Promotional Activities and wide spread dissemination of information about dengue to the community.

The final structural equation model using unstandardized and standardized estimates implies that having a positive attitude towards fever may translate to adoption of a good dengue preventive practice. The model also shows that having good exposure in Mass Media such as outdoor media, television, radio, newspaper, brochures, and other printed media increases the level of knowledge about dengue with the residents in Dasmariñas. Good involvement in Dengue Information- Giving sessions such as individual
advice and demonstration may also increase the knowledge level of the residents about dengue. Furthermore, it also implies that good involvement of the residents in local dengue control programs such as source reduction and fogging/misting pesticides may translate to good dengue preventive practice. Good exposure and participation in Dengue Public Promotions such as public lectures or seminars and announcements about dengue fever and its prevention may also have a positive impact on dengue preventive practice for the residents. The model does not guarantee that residents in Dasmarinas, who have good knowledge level about dengue fever, will have good dengue preventive practice. Some of the residents may have a high level of knowledge about dengue fever but they do not put it into good preventive practices against dengue. Also, it does not guarantee that residents in Dasmarinas, who have good involvement and exposure in Mass Media and Dengue-Information Giving, will have good dengue preventive practice. Even if Mass Media and Dengue-Information Giving Sessions may increase the knowledge of the residents about dengue fever and its prevention, it does not necessarily mean that they will put it into good preventive practices against dengue.

**Recommendations**

This study indicates that the impact of public health campaigns to raise awareness/knowledge about dengue fever could also have an effect to the preventive practices of the people. Majority of the respondents consider dengue as a threat to the community and well aware of their responsibilities in dengue prevention yet dengue cases within the province keeps on increasing every year, therefore a proper prevention program needs to be developed and properly designed; A campaign that could raise the people's awareness which then could lead to motivating themselves to change their behaviors. Further studies about designing public health campaigns about mosquito-borne diseases should also be given focus. Recently, there are news reports that some Local Government Units (LGUs) do not properly cooperate with the National Government, specifically the Department of Health (DOH). This issue must also be taken into consideration because they must work hand-in-hand for more effective campaigns.

For Cavite Provincial Epidemiology Surveillance Unit (PESU) and City Health Office(s) of Dasmarinas City, Cavite (CHO), it is suggested that by gaining the current level of Knowledge, Attitude and Preventive Practice of the people who live within the barangays with the highest incidence of dengue they can now use that as a guideline for more effective health promotion and educational programs. They must increase the awareness that dengue fever can occur anytime of the year and dengue transmitting mosquitoes lay eggs mostly on stagnant clean water and not in the dirty water. Of course, educational campaigns must be carried out throughout the year with the help of the Department of Health.

For the Department of Health (DOH), it is recommended that as being the head of the country, assuring and maintaining public health and safety of the people within the country a management plan for dengue prevention and control should be developed. It could consist of guidelines, protocols and policy decisions, names of authorities and a list of actions that must be done through the whole year. They must also maintain a good relationship with the Local Government Units (LGUs) for better practice and implementation of the health programs.

For Other Provinces/Places, this research could serve as a basis for conducting a related study in other places with dengue outbreaks.

For Future Researchers, this study will serve as their reference for the enhancement of the study and for the discovery of other related results about controlling dengue outbreak.

**Future Research Suggestions**
Due to time and resource limitation, this study has been conducted only within the top 10 barangays with highest incidence of dengue cases in the Dasmariñas City, Cavite. Hence the data presented in this study cannot be a representation of the country as a whole. However, the same study could be conducted in other places in the country with the highest number of dengue cases such as Central Luzon, for it is possible that we could find a pattern of Knowledge, Attitude and Preventive Practice in these populations.

In measurement tools, future researchers could revise a better questionnaire with higher reliability and validity. If possible, make the questions short but precise, for the respondents are easily distracted and discarded by lengthy questionnaires. Self-administered should also be avoided.

Future studies should look for other factors affecting the preventive practice of dengue fever as behavior can be affected by many other factors other than ones this study provided.

CITED REFERENCES


