

## A Knowledge, Attitudes, and Practices (KAP) Study on Dengue Fever among the Rowenas Community in the Philippines<sup>1</sup>

Dong-Hwan Kwon and Rey Lemuel Crizaldo

### Abstract

A survey was conducted to assess the level of knowledge, attitudes, and practices relating to Dengue Fever (DF) among an urban poor community, called Rowenas, in the Philippines from July 4-8, 2011. Out of the 50 surveys, 48 were valid for analysis. More than half (56.3%) of the participants had moderate knowledge about DF, whereas 93.8% recalled that television was their main source of information on DF. The primary respondents' attitude was negative. Half of the respondents (50%) had moderate practice, whereas 39.2% of the participants did considerable prevention practice in their everyday life. There is no significant association found between demographic information and practice relating to Dengue Fever. Nor was a significant association found between knowledge and attitudes and practice level. It is, therefore, recommended to implement level of knowledge into practices.

### Background of the Study

Within the span of the past sixty years, Dengue Fever (DF) or Dengue Haemorrhagic Fever (DHF) dramatically became a major international public health concern. DF/DHF is a mosquito-transmitted disease which causes a flu-like illness that could harm a person's life. A particular mosquito, *Aedes aegypti*, carries this fatal disease. *A. aegypti* is found in tropical and sub-tropical regions around the world, predominantly in urban and semi-urban areas where the affected areas around the globe are continuously spreading heavily. For instance, by June 2013, the Department of Health (DoH) of the Philippines reported 42,027 cases and 193 cases died due to Dengue Fever (GMA News, 2013).<sup>2</sup> The disease is one of

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<sup>2</sup> The dengue cases have rapidly increased in the past few years. Department of Health reported 11, 915 cases in 2007; 13,014 cases in 2008; 49,319 cases in 2009; and 119,789 in 2010, which led to 724 cases of death (Uy, 2010).

the most fatal viral diseases in the world, and it is the fastest increasing mosquito-borne viral disease (WHO, 2009).

Notably, DF/DHF has been increasing due to the rapid urbanization and globalization process in the south. It has been associated with rapid expansion of urban population without proper infrastructure for living (such as inadequate potable water supply, solid waste collection system and unplanned illegal settlers). Temperature and humidity affect the rate of mosquito larval development, adult survival, vector size and gonotrophic (literally reproductive-feeding) cycle as well as extrinsic and intrinsic incubation periods (EIP) of the virus in the vector. Increased breeding and survival of vector populations can lead to rapid replication of the virus (Nerlander et al., 2011). DF/DHF, therefore, has been a general concern in developing countries, especially in the global south, that cityhood and fast urbanization most often bypassed the rigorous strategic planning of the different sectors of the local government unit (LGU) (Parks & Lloyd, 2004; WHO, 2009).

To eliminate DF/DFH, the ownership of the dengue prevention project has been in the center of discussion among medical experts and development scholars. Inspired by Brazilian social reformer and educator, Fraire (1970), and Quebral in Asia (1971) community communication for social change provides an alternative model in the social mobilization and communication approach (Melkote & Krishnatray, 2012). Compared to the scientific and linear development paradigm, it emphasizes a process of liberation and deliberation (Vargas, 1995; White, 1994) and proactive social participation for social changes (Díaz Bordenave, 1994; Nair & White, 1994a).

On the other hand, health and community development utilizes knowledge, attitudes and practices (KAP) studies as a means of understanding the cognitive and behavioral aspects of preventive intervention. The KAP research design has been widely used to diagnosis the present awareness of any kinds of diseases and practices and to test the effectiveness of any treatment or intervention program for any health-related issues. The topics include family planning (Baba, 1990), HIV/AIDS-related issues (Mishra, 1998; Atulomah & Oladepo, 2002; Crossley, 2004), travel-related infectious diseases (Van Herck et al., 2003; Van et al., 2004), and women's health issues such as breast cancer self-examination (Leslie, 2003; Seo,

2003; Tae & Kim, 2003; Jung et al, 2002) and breast feeding (Spear, 2004). KAP studies have also been utilized in order to analyze the level of status quo of community members in DF and DHF prevention and control (Ahmed et al, 2008; Santos, 2006).

The Rowenas community, located in Taytay City in the Philippines, is a typical urban poor community whose nature and composition represents the dark side of urbanization in the Philippines. Located in the outskirts of Metro Manila, a first class urban municipality of the Rizal province, Rowenas community has been formed over decades from various groups who migrated to Metro Manila for a living. The migration is ongoing, according to the Barangay officials.<sup>3</sup> The area of Rowenas is home to an estimated 1,236 people residing in 260 houses. More than half of these households accommodate extended families. The majority of Rowenas residents are challenged in providing for their members' basic needs (i.e., education, shelter, water, and health care) since 81.5% of the households have monthly earnings of 12,000 pesos and below. Only 59 houses can afford to install the Manila Water Line, while 77.7% do not personally own access to clean water for drinking. As a result of struggles for the environment and low income, the Rural Health Unit (RHU) has reported that there were 82 cases of DF/ DHF admitted in hospitals in RHU-1, Barangay Dolores Area alone in 2010.<sup>4</sup>

This study, therefore, attempts to measure the Knowledge, Attitudes, and Practices of urban poor residents with DF or DHF as a preliminary understanding for the basis of "Dengue Prevention and Control Project."<sup>5</sup> The purpose of this project is to create a pilot program for an effective Dengue Prevention and Control Program implementing a participatory approach in community development. The communication aspect in this

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<sup>3</sup> Taytay City reached 262,485 inhabitants in 48,620 households. The population has reached more or less 300,000 in 2011. Barangay Dolores, which is the most populated barangay among the five barangays of Taytay City, has 59, 914 (August 2007, Census). As of 2011, the barangay officials already estimated that they have about more or less 80,000 residents due to fast migration into the center barangay of the town (Personal interview with Poblacion).

<sup>4</sup> This community survey was done by the project for an initial understanding of the community. Many thanks to the community youth who collected and analyzed the survey data. This survey data was compiled by Kwon and Callejo (2013).

<sup>5</sup> This project was funded by Korea Food for the Hungry International (KFHI).

program is a vital part of the intervention to enhance dengue prevention and control in an urban poor community in the Philippines. The research problems are as follows:

1. What is the profile of respondents?
2. What are the levels of Knowledge, Attitudes, and Practices on Dengue Fever and prevention programs among community members?
3. Is there any significant relationship between Knowledge, Attitudes and Practices?

## **Review of Literature**

### *Christian Approaches to Environmental Preservation*

There is a close link between theology, poverty and concern for the environment. Lynn White (1967) called Christians accountable for today's environmental crisis. He roots the modern ecological crisis in the historic Christian doctrine of "dominion over nature." He argued that the environmental abuse committed by the Western Christian world has been staged by this "power" supposedly granted to humans. According to White, since "the roots of our trouble are largely religious, the remedy must also be essentially religious. We must rethink and refeel our nature and destiny" (White, 1967).

Nowadays, environmental degradation and mass poverty are recognized to be two of the most pressing challenges in the world. Nitschke (2007) noted that the correlation between the two is quite strong given the fact that the poor live in the most environmentally devastated places. Given the growing thrust of Christian missiology towards holistic transformation, concerns for environmental sustainability have started to be integrated in current evangelical Christian responses to addressing poverty. In 2004, a global network of evangelical denominations and relief organizations under the banner of "The Micah Challenge" adopted the framework of the United Nations Millennium Development Goals (MDGs) by 2015 (Thacker and Hoek, 2008).

Certain elements of natural life serve as barometers of environmental health. This includes the presence of butterflies, bees, birds, mosquitoes and other insects—the massive presence of mosquitoes being the negative indication of poor sanitation and poor environmental care. Among the ur-

ban poor settlers, environment has serious health consequences, with dengue infection as one of the most serious concerns.

### *Best Approaches in Dengue Prevention*

Due to the continuous spreading of Dengue Fever (DF) or Dengue Haemorrhagic Fever (DHF) and its emergence as one of the most serious health problems, the World Health Organization (WHO) has conducted intensive studies for the prevention and control of the disease. Much of the research focuses on conceptualization of control programs (WHO, 2008; 2009; Parks & Lloyd, 2008).

Increasingly, DF/DHF prevention and control programs emphasize communication and attitude change of the community members. Will Parks and Linda Lloyd (2004) have provided every country with a step-by-step guide for DF/DHF prevention and control which highlights the significance of social mobilization and effective communication in implementing programs. That public education is necessary to address knowledge gaps is confirmed through studies such as that of Nahida Ahmed which looked into the level of knowledge, attitude, and practice among the people of Male', Maldives (2007). Her finding that knowledge had significant positive association with practice of dengue prevention was consistent with two previously conducted studies (Koenraadt et al., 2006; van Benthem, et al., 2002). Both studies showed that people with knowledge of dengue reported a significantly higher use of prevention measures than people without knowledge of dengue. The study of Wan Rozita et al. (2006), among the people of Kuala Lumpur, Malaysia, also echoed a similar observation with emphasis on using mass media in designing information and education campaigns.

Evidence of successful DF/DHF prevention and control programs comes from nation-wide and top-down approaches. Some countries such as Hong Kong, Singapore, and Queensland in Australia have come up with strategic government planning and implementation (<http://www.cdc.gov>, August 2011). These countries have systematic and intensive programs on capacity building, sustainability, budget, ownership, political will, specific health legislations, law enforcements, and participatory systems which are some key elements in the success of implementation. Still many development projects used a "top-down" approach, while others

combined “top-down” and “bottom-up” approaches.

Fortunately, a community based health care approach has opened up a combination of “top-down” and “down-up” that integrate external intervention from experts, NGOs, to the participation of local beneficiaries. Some studies argued that it is imperative that the community participates in eliminating mosquito breeding with targeted awareness campaigns and community engagement strategies (DMP, 2011), with community ownership and the inclusion of grassroots organizations as a major requirement for effective long-term control of dengue (NEA, 2005). The study of Rozita et al. (2005) made strong recommendations that in cooperative community action, young people rather than adults within the community are better tapped and used for implementing control programs. In consideration with the principle of dynamic, participatory, and synergistic facilitation, the Community-Based Health Care (CBHC) system model best fits the implementation of the social mobilization and intimate communication approach (CBHC Model, WHO, 2004).

### *The Philippine Experience*

The Philippines has done intensive “top-down” approaches and strategies in order to communicate and mobilize the community through the Department of Health (DoH). Many partnerships have also been established among the other government offices and DoH. Also, the 4S Program of the Department of Health is thoroughly promoted and well campaigned in media forms. The 4S Program includes the following processes: search and destroy, self-protection measures, seek early consultation, and say no to indiscriminate fogging. In spite of the information dissemination, campaigns, and DoH partnerships to increase knowledge and awareness, there was still a dramatic increase of DF from 2009 to 2010. Dr. Eric Tayag, the Head of the National Epidemiology Center, said that the rise of the number of dengue cases by 75 percent clearly indicated that Filipino households had gone back to old habits (Uy, 2010).

As an example of the campaign of the DoH and other sectors in the government, the month of June is the month of Awareness of Dengue, and the DoH and DepEd Secretaries visit schools and communities to remind the local people of dengue (Uy, 2010). Yet it was pointed out that the primary Philippine strategies in dengue prevention are so-called, “post-

incident measures” and compared to the “pre incident measures” (Cervantes, July 2011, 2008). The attitude of the Filipinos towards DF/DHF prevention and control has a low correlation to the extensive campaign for knowledge and awareness by the government. Failures are still evident based on the national statistics of dengue mortality.

## **Research Methodology**

This study is quantitative and descriptive in nature, employing a survey with open-ended questions as its primary research method. The survey study was conducted at Rowenas Community, Dolores Barangay, Taytay, Rizal. It seeks to describe the current status of the knowledge, attitude, and practice of the residents of Rowenas Community with regards to dengue infection and prevention. A survey instrument was prepared to elicit answers from the residents. The team purposefully chose random samples of 50, but only 48 questionnaires were finished. Based on the later household survey data, totaling 128 households, the size of the sample is about 40% of the total population. Purposive random sampling methods were used (at least three houses interval in the community). The Rowenas community was divided into five clusters: Bungad, Harapan (community entrance area), Lower Gitna, Upper Gitna, and Purok Dos. Data gathering was done on July 4-8, 2011 at the Rowenas community. The interpretation of data relies mainly on results of descriptive statistical analysis, which include Chi-square Test and Spearman Rank Rho Correlation for inference. SPSS 14 was used to test the data.

## **Findings**

### *General Knowledge about Dengue in the Community*

#### Demographic Information about the Participants

The study was conducted at Rowenas Community, Dolores Barangay, Taytay, Rizal. There were forty-eight (48) individuals participating in the survey. As set forth in the tables below, the mean age of the participants was 38 years with a standard deviation of 11.17. The ages ranged from 18 to 61 years. Most of the participants were female (91.7%), married (77.1%), had completed secondary education (52.1%), and unemployed (60.4%), Furthermore, a great number of them had a monthly income

ranging from PhP 3,001 to PhP 5,000. Thus, the data reveal that most of the participants are economically marginalized.

	Frequency	Percent
<b>Age (years)</b>		
18-29	11	22.9
30-41	17	35.4
42-53	16	33.3
54 and above	4	8.3
<b>Gender</b>		
Male	4	8.3
Female	44	91.7
<b>Marital Status</b>		
Single	10	20.8
Married	37	77.1
Separated	1	2.1
<b>Educational Attainment</b>		
Elementary Graduate	16	33.3
Secondary Graduate	25	52.1
College Graduate	4	8.3
Graduate Level	3	6.3
<b>Employment Status</b>		
Employed	15	31.3
Economically Active	4	8.3
Unemployed	29	60.4
<b>Monthly Income (PhP)</b>		
None	13	27.1
1,500-3,000	7	14.6
3,001-5,000	16	33.3
5,001 and above	12	25.0

**Table 1:** Demographic Information

### Information about Dengue

Among the respondents, most had received some sort of information on dengue (77.1%) through television (93.8%). Other sources of information on dengue were friends (4.2%) and radio (2.1%).

Received Information about Dengue Fever	Frequency	Percent
Yes	37	77.1
No	11	22.9
Total	48	100

**Table 2:** Received Information about Dengue Fever

Source of Information	Frequency	Percent
TV	45	93.8
Radio	1	2.1
Friends	2	4.2
Total	48	100

**Table 3:** Source of Information on Dengue Fever

### Knowledge on Dengue Fever

Distribution of knowledge on Dengue Fever disclosed that more than half (56.3%) of the respondents had moderate knowledge, 43.8% had low knowledge, and none had great knowledge. Details on the correct responses of the participants are provided in Table 5.

Level	Frequency	Percent
Low (0-8 scores)	21	43.8
Moderate (9-11 scores)	27	56.3
Great (12-14 scores)	0	0
Total	48	100

**Table 4:** Distribution of Knowledge Level on Dengue Fever

### *Knowledge of Dengue Fever Answered by the Respondents (n=48)*

The top five correct answers on knowledge of Dengue Fever reported by

the respondents are: empty stagnant water from old tires, trash cans, and flower pots can be breeding places for mosquitoes (96%); Dengue Fever is a severe, flu-like illness that affects infants, young children and adults (94%); dengue viruses are transmitted to humans through bites of infective female *Aedes aegypti* (90%); dengue patients have chills, headache, pain upon moving the eyes, and low backache (83%); and the only method of controlling dengue infection is to combat the vector mosquitoes (79%).

The questions least answered correctly by respondents include: mosquitoes that transmit dengue infection lay their eggs in dirty sewage water (15%); stored water containers/tanks for drinking water if not covered should be cleaned every 7 days (15%); the possibility of getting Dengue Fever if one of the family members has Dengue Fever (25%); and rainy season is the only epidemic season for dengue infection (25%).

As to the possibility and degree of infection, 48% of the respondents “agree” that everybody has a chance to be infected with the dengue virus and the majority of people (77%) disagree that a strong and healthy person will not get dengue infection. More than half (60%) “disagree” that a person who once got dengue infection cannot get dengue infection again but only 13% “strongly agree” that it is possible to recover completely from dengue infection.

As to the possibility and ways of preventing infection (Table 6), half (50%) of the respondents “agree” that Dengue Fever is a disease that cannot be prevented. Fortunately, more than half “agree” that they are important people in preventing the spread of the infection, and 66% “strongly disagree” that elimination of larval breeding sources is a waste of time and very complicated. More than half (52%) “agree” that sleeping in a mosquito net can prevent dengue infection, 45% disagree that only smogging is enough to prevent mosquitoes with no need for other preventative measures, and more than a quarter (27%) of the respondents “strongly agree” that eliminating the breeding places of the mosquitoes is the responsibility of the public health staff and health volunteers.

Item	Frequency	Percentage
The principal mosquito vector for Dengue Fever is <i>Aedes aegypti</i> .	30	62.5

Dengue Fever is a severe, flu-like illness that affects infants, young children and adults.	45	93.8
Dengue patients have chills, headache, pain upon moving the eyes, and low backache.	40	83.3
Rainy season is the only epidemic season for dengue infection.	12	25
Mosquitoes transmitting dengue infection bite only during day time.	32	66.7
The mosquito that transmits dengue infection lays its eggs in dirty sewage water.	7	14.6
Empty stagnant water from old tires, trash cans, and flower pots can be breeding places for mosquitoes.	46	95.8
Dengue viruses are transmitted to humans through bites of infective female <i>A. aegypti</i> .	43	89.6
Only method of controlling dengue infection is to combat the vector mosquitoes.	38	79.2
There is no specific treatment for dengue infection, and the drug of choice is paracetamol.	23	47.9
Abate sand can be beneficial in killing the mosquito larvae.	28	58.3
Abate sand, if put in standing water, can help prevent the mosquito breeding for 3 months.	23	47.9
Stored water containers/tanks for drinking water if not being covered should be cleaned every 7 days.	7	14.6
I am afraid of getting Dengue Fever if one of my family members has Dengue Fever.	12	25

**Table 5:** On Knowledge of Dengue Fever by the Respondents (n=48)

Statement	Percentage				Mean
	Disagree	Uncertain	Agree	Strongly Agree	
<b>Positive:</b>					
Only method of controlling or preventing dengue infection is to combat the vector mosquitoes.	10.4	14.6	31.3	43.8	3.08
Everybody has a chance to be infected with dengue virus.	6.3	18.8	47.9	27.1	2.95

It is possible to recover completely from dengue infection	35.4	35.4	16.7	12.5	2.06
Restricting and checking the availability of potential breeding habits should be conducted 1-2 times/year.	66.7	6.3	18.8	8.3	1.68
Sleeping in mosquito net can prevent dengue infection.	4.2	6.3	52.1	37.5	3.22
You are one of the important people in preventing Dengue Fever.	2.1	4.2	54.2	39.6	3.31
<b>Negative:</b>					
Dengue Fever is a disease that cannot be prevented.	27.1	12.5	50	10.4	2.43
Eliminating the breeding places is the responsibility of the public health staff and health volunteers.	31.3	16.7	25	27.1	2.47
Only smogging is enough to prevent mosquitoes, and there is no need for other ways.	45.8	10.4	31.3	12.5	2.10
Persons who once got dengue infection cannot get dengue infection again.	60.4	25	8.3	6.3	1.60
Elimination of larval breeding sources is a waste of time and very complicated.	66.7	12.5	16.7	4.2	1.58
Strong and healthy persons will not get dengue infection.	77.1	8.3	12.5	2.1	1.39

**Table 6:** Percentage of Responses on the Attitude towards Dengue Fever

### *Attitude towards Dengue Fever*

The participants of the study answered 12 items which had a total score of 60. Distribution of attitude towards Dengue Fever indicated that 95.8% of the participants had negative attitude, 4.2% had neutral attitude, and none had positive attitude. The mean attitude score for all participants was 27.9

of the total 60 scores. The lowest score was 18, whereas the highest score was 48.

Level	Frequency	Percent
Negative (12-40 scores)	46	95.8
Neutral (41-46 scores)	2	4.2
Positive (47-60 scores)	0	0
Total	48	100
<i>Mean = 27.93    SD = 5.34    Minimum = 18    Maximum = 48</i>		

**Table 7:** Level of Attitudes on Dengue

### *Practices on Dengue Fever*

#### Items Which Participants Have and Do Not Have in the Households

As shown in the table below, a greater number of the participants reported that they had water tanks with covers (91.7%) and flower pots (52.1%) in their houses. However, more than half of them claimed that they did not have indoor plants (66.7%) and plates supporting the flower pots (64.6%).

Item	Have		Do Not Have	
	Frequency	Percentage	Frequency	Percentage
Covers for water tanks	44	91.7	4	8.3
Water tanks	44	91.7	4	8.3
Flower pots	25	52.1	23	47.9
Indoor plants	16	33.3	32	66.7
Plates supporting flower pots	17	35.4	31	64.6

**Table 8:** Items Which Participants Have and Don't Have in the Households

#### Distribution of Practice Levels for Dengue Fever Prevention

As presented in Table 9, half of the participants (50%) had fair practice, 29.2% had good practice and 20.8% had low practice. The mean practice score for all participants was 5.45, based on the correct responses they provided vis-à-vis the eight items in Table 10.

Level	Frequency	Percent
Low (0-4 scores)	10	20.8
Fair (5-6 scores)	24	50.0
Good (7-8 scores)	14	29.2
Total	48	100
<i>Mean = 5.45      SD = 1.79      Minimum = 1      Maximum = 8</i>		

**Table 9:** Distribution of Practice Levels for Dengue Fever Prevention

#### Practice of Dengue Fever Prevention, As Answered by the Respondents

As to the items correctly answered by the respondents with regards to various practices of preventing dengue, the top five include: immediately covering water jars after use (92%), examining mosquito larvae in water containers in the toilet (88%), disposing refuse into the garbage (81%), using mosquito net/mosquito coils in the house (77%), and checking and cleaning roof gutters during rainy season (69%). The least correctly answered item was examining any discarded thing that can hold water around the house (52%).

All of the respondents say that they cover all stored water containers/tanks and water jars, 77% observe that the house environment is kept neat and tidy, and 62% observe that there is no kind of stored water containers inside the toilet. However, 71% answered negatively in observing that there is no dirty water in the flower vases or indoor plants, or forms of water collection on the plates of flower pots at home (69%), or dirty water in the drinking containers for pets (60%), or if there are coconut shells, discarded bottles, cans or anything that can hold water around the house (58%).

Item	Frequency	Percentage
Covering water jars immediately after use.	44	91.7
Examining any refuse that can hold water around the house.	25	52.1
Disposing discarded thing into the garbage.	39	81.3
Using mosquito net/mosquito coils in the house.	37	77.1
Participating in any campaigns on dengue infection prevention in the community.	27	56.3
Participating when community has been sprayed fog.	31	64.6

Examining mosquito larvae in water containers in the toilet.	42	87.5
Checking and cleaning roof gutters during rainy season.	33	68.8

**Table 10:** Number and Percentage of Items on Practice of Dengue Fever Prevention Answered Correctly by the Respondents (n=48)

### *Observation Results*

Item	Yes		No	
	Frequency	Percentage	Frequency	Percentage
The house environment is kept neat and tidy.	37	77.1	7	14.6
Dirty water in the flower vases or indoor plants.	14	29.2	34	70.8
Water collection on the plates of flower pots at home.	15	31.3	33	68.8
Any kind of stored water containers inside the toilet.	30	62.5	18	37.5
There are coconut shells, discarded bottles, cans or anything that can hold water around the house.	20	41.7	28	58.3
Dirty water in the drinking containers for pets.	19	39.6	29	60.4
Stored water containers/tanks and water jars are covered.	48	100	0	0

**Table 11:** Observation Results

### *Comparison between Dengue Prevention Practice Scores and Demographic Variables of the Participants*

In comparing the dengue prevention practice scores with the demographic variables of the participants, a Chi-square was employed. As provided in the table below, there was no statistically significant association established between dengue prevention practice and the various demographic variables of the participants. This implies that dengue prevention practice is independent of age, gender, civil status, educational attainment, employment status, family size, having children under 15 years of age, monthly income, dengue history in the family, and received information on den-

gue. Hence, the demographic variables do not have significant bearing nor influence on how the participants behave in preventing dengue.

Demographic Variables	Dengue Prevention Practice			
	Chi-square Test Value ( $X^2$ )	Degrees of Freedom	Probability Value	Interpretation
Age	4.07	6	.66	No significant association
Gender	6.69	4	.15	No significant association
Civil status	3.27	4	.51	No significant association
Educational attainment	5.40	6	.49	No significant association
Employment status	5.74	4	.22	No significant association
Monthly income	4.38	6	.62	No significant association
Received information about dengue	.93	2	.62	No significant association

**Table 12:** Comparison between Dengue Prevention Practice Scores and Demographic Variables of the Participants Using Chi-Square Test

*Comparison between Prevention Practice, Knowledge, and Attitude toward Dengue Fever Using Chi-square Test and Spearman Rank Rho Correlation*

Like demographic variables, knowledge on and attitude towards dengue do not have any bearing on the dengue prevention practice of the participants. This lack of significant association between knowledge, attitude, and practice is probably due to the fact that most of the participants did not really have sufficient information and full awareness on dengue at the time of the study, as evident in the low knowledge and negative attitude scores they obtained. Spearman rank rho correlation further confirmed this insignificant relation between practice, knowledge on, and attitude towards dengue.

Variables	Dengue Prevention Practice			
	Chi-square Test Value ( $X^2$ )	Degrees of Freedom	Probability Value	Interpretation
Knowledge on Dengue Fever	2.35	2	.30	No significant association
Attitude towards Dengue Fever	1.46	2	.48	No significant association

**Table 13:** Chi-square Test on Dengue Prevention Practice

	Dengue Prevention Practice		
	$r_s$ Coefficient	Probability Value	Interpretation
Knowledge on Dengue Fever	.36	.80	No significant correlation
Attitude towards Dengue Fever	.17	.24	No significant correlation

**Table 14:**  $r_s$ Coefficient test on Dengue Prevention Practice

## Conclusion and Recommendations

Based on the observation of the community, dengue vector breeding ground was found. It was due to the high percentage of storing water in containers of most houses due to lack of water access (only the water well supplies water for most of the household, more than MWSS). Furthermore, improper disposal of garbage provided dengue mosquito breeding ground. Lastly, the close presence of bamboo and forest also created ground.

Moreover, based on the data, there has been a significant difference between knowledge and practice. Through various media sources, community members have moderate knowledge about dengue, yet it has not been put into practices. Therefore, the project recommends plans to elevate moderate knowledge of dengue prevention and control into high and proposes various activities to link the knowledge into practice.

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