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People's knowledge, attitude and practices on dengue in two barangays with high dengue incidences in Cebu city, Philippines

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Abstract

People's knowledge, attitude and practice surveys provide a suitable tool to evaluate existing programs and to identify effective strategies for behaviour change on dengue disease and mosquitoes. The study aims to evaluate the people's knowledge, attitude and practices towards dengue incidences during the last two years (2013-2014) based on the data in the Department of Health Region 7. A cross-sectional study was conducted among the residents of Barangays Guadalupe and Lahug, Cebu City, Philippines. Fifty respondents from Barangay Guadalupe and fifty-one from Barangay Lahug were chosen randomly. A self-administered questionnaire was prepared, validated, and eventually used to collect information regarding the knowledge, attitude and practices of the covered residents on dengue fever. Findings showed no association between demographic variables and knowledge on dengue symptoms, on mosquitoes and dengue virus transmission and preventive practices. Results also showed no correlation between knowledge of dengue and preventive practices.

Keywords: Dengue, knowledge, attitude, practices, Cebu city

Introduction

Dengue fever (DF) and dengue haemorrhagic fever (DHF) have commonly emerged as major public health problems. They are caused by one of four closely-related, but anti-genetically distinct virus serotypes (DEN1-, DEN-2, DEN-3, and DEN-4) of the genus *Flavivirus* [1]. Since the first global appearance of DHF in Manila, Philippines in 1953, 1958 in Bangkok, Thailand and 1968 in Surabaya, Indonesia, this has already been considered presently as one of the leading viral diseases that cause hospitalization and death among children and adults in 100 tropical and subtropical countries throughout the Americas, South-East Asia, the Western Pacific Islands and Africa. About 500,000 people get hospitalized, 95% of those affected are children and about 24,000 fatalities are reported annually [2,3].

Urbanization has made many households unmindful of keeping their water supply safe from becoming mosquito-breeding places, a factor that hastens the spread of the dengue virus. It is alarming that majority of the people do not realize the seriousness of the situation, not until they get infected. Many of them do not practice proper waste or garbage disposal. They put their garbage by the door step, by the roadside, on vacant lots, almost everywhere. These improperly disposed wastes catch water during rainfall that will become potential breeding sites of the vector mosquitoes.

Dengue vector control requires effective participation of the local community. While there is an increased people awareness on dengue, how this is translated into practice and what extent this practice has resulted to reduce the mosquito population remains unclear. People's knowledge, attitude and practice surveys serve a suitable tool to evaluate existing programs. This is also a means by which to identify effective strategies for proper mind-setting.

The Philippines is considered a "high risk" dengue zone. It ranks 1st on dengue cases with 125,975 cases and 654 fatalities in 2011 among the member states of World Health Organization Western Pacific Region [4]. There were 59, 943 reported dengue cases in January to September, 2014, which was 59.57% lower compared to the same period in 2013 with 148,279 reported dengue cases [5].

Central Visayas, Philippines, the different reporting units (DRUs) reported a total of 2,479 cases between January-September, 2014 with 10 deaths (CFR-0.4%). This was 79.7% lower compared to the same period in 2013 with 41 deaths out of 12, 233 cases [6].

Between January to April 2015, the Department of Health's (DOH) record showed that among the areas reported with high incidence of dengue, Cebu City ranked 1st among with 288 reported cases. The identified Barangays (smallest administrative division) in Cebu City with high dengue incidences of dengue are: Lahug, Guadalupe, Talamban, Inayawan and Duljo [7].

At present, there is no sufficient data available on the people's knowledge, attitude, and practices towards dengue among the areas in Cebu City with high dengue incidences. Thus far, this study is rare in dengue research and has primarily been used to evaluate the impact of health education and community-based programs. These data are regarded as very important in undertaking an integrated mosquito control program to reduce the spread of the virus to the people around.

This study aimed to evaluate the people's knowledge, attitude, and practices towards dengue in the two Barangays in Cebu City with high dengue incidences in two year time covering 2013-2014, based on the data of the Department of Health [7].

Specifically, it aimed to:

1. Find out if the differences in people's knowledge of dengue could be explained by their demographic background;
2. Determine if knowledge of *Aedes aegypti* and *Aedes albopictus* mosquitoes, dengue symptoms, and/or preventive measures contribute to better preventive measures;
3. Find out if these practices have a positive impact on immature and adult populations of *Ae. Aegypti* and *Ae. albopictus* mosquitoes; and
4. Make results of this study serve as a major tool in developing a key strategy for an integrated vector control program (IVCP).

Methodology

The study was conducted in Cebu City, Philippines which is located at the center of the archipelago, particularly in Barangay Lahug and Barangay Guadalupe. Barangay Guadalupe is around 3.8 kilometers from Cebu City Hall via V. Rama Avenue. It has a total land area of 350 hectares and a population 68,000 residents. It is divided into 84 sitios (is a territorial enclave that forms part of a barangay) and the largest barangay in Cebu City in terms of population while barangay Lahug is situated in the North District of Cebu, estimated at 5.6 kilometers via M. J. Cuenco Avenue. It has a total land area of 443 hectares and a population of estimated

50,000 residents. Barangay Guadalupe is separated from barangay Lahug by the Guadalupe River.

Cross-sectional survey was administered among the residents of Barangays Lahug and Guadalupe, Cebu City, Philippines from May 1, 2015 to July 30, 2015. These two barangays were chosen because during the past six years, high incidence of dengue fever occurrences was noted by the Department of Health.

A total of 51 respondents from Barangay Lahug and 50 respondents from Barangay Guadalupe were chosen randomly. This was done with the help of Barangay health workers who identified the appropriate respondents in relation to the areas with several dengue incidences reported to the Barangay.

Self-administered questionnaire was prepared, validated and used to collect information from the residents of the subject barangays on the knowledge, attitude & practices regarding dengue fever. Data were collected on the inhabitants "knowledge, attitude and practices regarding dengue using an interviewer-administered questionnaire. The questionnaire covered the following areas: (1) demographic information (Barangay or sitios, sex, age, approximate income and education), (2) knowledge about dengue symptoms, signs, and transmission modes; (3) attitude towards dengue; (4) preventive practices against dengue e.g. methods used to reduce breeding sites, and reduce potentials human-mosquito contact (repellents, bed nets, and window screens). Data were analyzed using minitab version 11 statistical software. Frequencies and percentage were used for analyzing socio-demographic data while simple percentage was used to assess the respondents on knowledge questions. The Pearson correlation coefficient was used to test the relationship between knowledge and dengue preventive practices, and attitude and demographic profile. Chi-square correlation was used to determine the relationship between age, sex, income, and education level with the preventive practice

Results and Discussion

Results showed that in both barangays, the participants are high school graduate students belonging to age category of 30-49 and majority are females. In terms of income, majority of the respondents from Barangay Lahug are in the 0-P3, 332, (45%) income bracket while in Guadalupe, 44% are from the income bracket P 5,000-P 8,332.00, which in the present economic conditions, is a marginal income (Table 1).

Table 1: Socio-Demographic Profile of Respondents

Demographic Variable	Category	Guadalupe	%	Lahug	%	Total
Gender	Male	8	16	14	27	
	Female	42	84	37	73	
	Total	50		51		101
Age	29 and below	9	18	11	22	20
	30-49	30	60	30	59	60
	50-64	10	20	6	12	16
	65 and above	1	02	4	.078	5
	Total	50		51		101
Income	0-3,332	7	14	23	45	30
	3,333-4,999	3	06	1	.02	4
	5,000-8,332	22	44	8	.2	30
	8,333-20,832	18	36	19	37	37
	Total	50		51		101
Education	College	10	2	16	31	26
	High School	25	50	26	51	51
	Elementary	15	30	9	18	24
	Total	50		51		101

Table 2 shows that most respondents from both barangays are knowledgeable on dengue symptoms, 62.66% accounting for Barangay Guadalupe and 61.22% in Barangay Lahug. A good majority of them are aware that fever (N=45; 90% for Guadalupe and (N=51; 100% in Barangay Lahug), rash (N=33; 66% in Guadalupe, (N= 39; 75% in Lahug) and headache (N= 33; 66% in Guadalupe, (N= 39; 75% in Lahug) are symptoms of dengue fever. Many of the respondents also did not recognize that pain behind the eyes is a dengue symptom (N=11; 22% Guadalupe; (N=12; 23.08% in Lahug). In confirmed cases of dengue fever, retro-orbital pain (pain behind the eyes) is infrequent among patients^[8]. Most of the respondents are familiar only with the flu-like symptoms which could be common to some other types of infections. A good knowledge of the symptoms of the disease is important for the rapidity of proper measures to initiate in order to prevent death of the victim. According to WHO, dengue fever is caused by four closely related virus or serotypes, namely: DENV 1, DENV 2, DENV 3, and DENV 4. Symptoms of the infection is characterized by a sudden onset of high fever (103-106 F), severe headache, backache, intense pain in joints and muscles, retro-orbital pain, nausea, vomiting and a generalized erythematous rash that begin 4-7 days after the mosquito bites and typically lasts 3-10 days. Infections with a dengue virus serotype, however; can also produce a more complex and severe form of clinical manifestations like haemorrhage and shock. It is important to note that dengue fever presents a wide variety of symptoms and a good knowledge of all these symptoms will save many lives of victims most especially children. Young children, in particular, maybe less able than adults to compensate for capillary leakage and are consequently of greater risk of dengue shock^[9]. About 500,000 people are hospitalized of this disease (95% of those affected are children) and about 24,000 fatalities are reported annually^[3, 10]. In the Philippines, children aged 5-14 years old represent the age group with the highest proportion of dengue^[11]. In another study, confirmed infections of dengue tended to be highest in the 6-10 age group^[8]. In 2011, most deaths occurred in the 10-19 years category with 33,472 cases, where 106 died^[8].

In regards to knowledge on mosquitoes and dengue virus transmission in Table 2, findings indicate that participants from both barangays are one in saying that the mosquito vector for dengue fever breeds in clean and stagnant water (80% and 96.15%, respectively). Only 2 (3.85%) respondents from Lahug believe that not all mosquitoes transmit dengue virus, while in Guadalupe only 8 (N=8) 16% say so. Further, 9 (18%) of Guadalupe respondents say they are aware that only the female mosquito bites.

In Lahug, 4 participants (7.69%) are conscious of this. Moreover, 46 respondents from Guadalupe know that dengue carrier mosquitoes bites during daytime while in Guadalupe, 15 participants believe so. About one third of the respondents from both barangays believe that there is cure for dengue fever. As to average score, respondents from both barangays got low scores in this area (Guadalupe, 39.3%; Lahug, 30.77%) (Table 2).

In bridging this knowledge gap, it is an important part to emphasize the life cycle of the mosquito vector in the education campaign and to correct this knowledge gap where it is rooted. Only female mosquitoes bite and the biting habit is during daytime that must be known to the public. Dengue mosquitoes lay their eggs in clean, stagnant water and warm places. The eggs are difficult to control for it can survive in more than a year and will emerge as soon as water becomes

available.

It is reported that (DF) observes seasonal pattern where highest incidence will occur during the rainy months from June- November. This knowledge must be corrected for dengue will occur throughout the year although there is a good water system in the place but during the summer months when water becomes scarce most people will store water in their household which could also be a habitat for the dengue carrying mosquito. The researchers observed that in both barangays many possible breeding places are noted like: uncovered drums, discarded tires, artificial pond, flower pots, empty bottles, uncovered septic tank outlets and water pools. Garbage piles are also plentiful in the place and all these could be a potential site for the mosquitoes to lay their eggs. Most of the houses surveyed is near Guadalupe river with many bushes along, is also another breeding site for mosquitoes. It is important to note that the best way of preventing mosquito bites is to eliminate and destroy all their breeding places. Further, this mosquito has developed resiliency to urban living and has adapted indoor habitats like dwelling inside closets, water dispensers and plate racks. Findings show that most female *Aedes aegypti* spends most of their lifetime in and around the houses where they emerge as adults. This means that people rather than mosquitoes, rapidly move the virus within and outside their communities^[9].

Table 2 shows the result of the findings to dengue management and treatment practices, respondents from both barangays shows a positive attitude like consulting a physician, taking plenty of rest, and plenty of water when affected by the disease. Residents from Guadalupe are favourable in giving aspirin to control fever as compared to Lahug residents in which their response is negative. This wrong information needs to be corrected for aspirin and other NSAIDs may aggravate gastritis or bleeding^[9]. Another interesting finding in the study is the positive attitude of the Lahug respondents to taking herbal medicine and the use of apple tonic in the management of (DF). Guadalupe participants give the opposite response to these two variables. Majority of the respondents belong to the low income group and home remedy which includes the use of herbals is a common practice. Interview with the respondents from Lahug said they give concoction of a local herb named "mangagaw", "tawa-tawa" or gatas-gatas (*Euphorbia hirta*) and according to them will make the blood platelets count increase. Most medical practitioners do not approve the use of it because until now there is no clinical study that proves such claim. A study on the effect of *Euphorbia hirta* decoction on platelet counts of albino mice (*Mus musculus*) rendered a positive result^[12]. The role of *Euphorbia hirta* for dengue treatment is not yet definite. As regards to the use of apple tonic, it prevents dehydration, and helps lower body temperature.

As to knowledge on preventive practices towards dengue transmission in Table 2, covering water receptacles, and removal of standing water, respondents from both barangays has a positive response. Guadalupe, 88%, 96% while Lahug 96.15%, 92.13%. Only (N=16) 30.77% from barangay Lahug confirmed that house screening is a good practice for dengue prevention while from Guadalupe more than one half of the participants considers it as effective practice. Using mosquito nets is also another preventive practice which gets 60% approval from the participants from barangay Guadalupe where only 21 participants from Lahug approves it. Preventive methods like using mosquito coils, Guadalupe residents scores 64%, while Lahug residents scored only 38.46%, and burning dried leaves 48% from Guadalupe

participants believes it is effective only 18% from Lahug believes doing it will prevent mosquitoes from biting.

The used of mosquito nets and mosquito coils is employed during night time and is ineffective since the mosquito bites from during daytime to dusk. This will render the residents unprotected during daytime. However, findings reveal that they use other methods of protecting themselves like the use of electric fans, application of insect repellents and the use of insect spray, insect splatter, wearing of long pants, long sleeves and stockings when mosquitoes swarm and very

plentiful (Table 2). There was a time when barangay Guadalupe was declared a hot spot where there was a reported case of (DF) in the locality every other week. During this time the City Health conducted fogging using chemical adulticide which according to the respondents was ineffective because the mosquitoes were just driven away to neighboring barangays and came back again. It must be emphasized that the most effective way of preventing bites is to search and destroy all the possible breeding places of *Aedes aegypti*.

Table 2: Knowledge on Dengue Symptoms

Questions	Frequency of Respondents on Knowledge on dengue symptoms			
	Guadalupe		Lahug	
Knowledge on Dengue Symptoms				
1. Is stomach or abdominal pain a symptom of dengue?	26 (52%)		36 (69.23%)	
2. Is headache a symptom of dengue?	36 (72%)		34 (65.38%)	
3. Is fever a symptom of dengue?	45 (90%)		51(100%)	
4. Is muscle pain a symptom of dengue fever?	37 (74%)		19 (36.54%)	
5. Is pain behind the eyes a symptom of dengue?	11 (22%)		12 (23.08%)	
6. Is rash a symptom of dengue?	33 (66%)		39 (75%)	
7. Average	62.66%		61.22%	
Knowledge on Mosquito and Dengue Virus Transmission				
8. Are all mosquitoes transmitting the dengue virus?	8 (16%)		2 (3.85%)	
9. Are male and female mosquitoes transmitting the dengue virus?	9 (18%)		4 (7.69%)	
10. Are the dengue mosquitoes biting during daytime, night time?	23 (46%)		15 (28.85%)	
11. Are mosquitoes breeding in flowing water, standing water?	40 (80%)		50 (96.15%)	
12. Dengue mosquitoes are breeding in what type of water: canal/polluted, clean & stagnant, brackish	23 (46%)		32 (61.54%)	
13. Is there a treatment for dengue fever?	15 (30%)		16 (30.77%)	
14. Average	39.3%		38.14%	
Dengue Management and Treatment Practices (Attitude)				
	Group Mean	Description.	Group Mean	Description.
15. Would you take herbal medicine/plant against dengue?	-0.45	negative	0.8	positive
16. Would you drink apple tonic against dengue fever?	-0.3	negative	0.8	positive
17. Would you take aspirin against dengue fever?	0.5	positive	-1.0	negative
18. Would you take plenty of water against dengue fever?	0.1	positive	-1.0	negative
19. Would you take plenty of rest against dengue fever?	0.1	positive	1.0	positive
20. Would you consult a physician against dengue fever?	1.0	positive	1.0	positive
Average	positive			
Knowledge on Preventive Practices Towards Dengue Virus Transmission				
21. Is covering water receptacles reducing the number of dengue mosquitoes?	44 (88%)		50 (96.15%)	
22. Is the removal of standing water preventing mosquitoes from breeding?	48 (96%)		48 ((92.31%)	
23. Is burning of dried leaves preventing you from dengue infection?	24 (48%)		18 (34.62%)	
24. Is planting Neem trees helping to prevent you from dengue infection?	14 (28%)		21 (40.38%)	
25. Is burning mosquito coils helping you preventing dengue infection?	32 (64%)		20 (38.46%)	
26. Is screening the house reducing dengue infection?	30 (60%)		16 (30.77%)	
27. Is using mosquito nets reducing dengue infection?	34 (68%)		21 (40.38%)	
28. Average	64.57%		53.29%	

Legend: 81-100- very high knowledge

61-80- high knowledge

41- 60- average knowledge

21- 40- low knowledge

1-20- very low knowledge

Table 3 below shows the results of comparing dengue prevention practice scores with demographic variables of the participants. It shows that age, gender, income, educational level, has no statistical relationship, with the demographic variables on the participant's behaviour on dengue fever practices. Further, it does not follow that people who are employed are more knowledgeable about dengue fever and is able to translate such knowledge into better dengue fever

preventive practice. Same results show with educational attainment where it is not related to the preventive practices of the respondents. It means that the education of an individual is not a guarantee for him to make use of such knowledge in the practice of preventive measures against dengue fever. Therefore, demographic profile does not have significance on how the respondents act in the prevention of dengue fever incidence in Barangay Guadalupe and Lahug.

Table 3: Summary Table for Chi Square Correlation

	X ²	p-value	remarks
Sex and knowledge category	0.936/3.252	0.626/0.197	The result is not significant at $p \leq 0.05$.
Sex and preventive practices category	2.227/1.544	0.328/0.462	The result is not significant at $p \leq 0.05$.
Income, knowledge category	0.654/4.790	0.957/0.310	The result is not significant at $p \leq 0.05$.
occupation, PP category	3.482/4.985	0.481/0.289	The result is not significant at $p \leq 0.05$.
education level, knowledge category	5.667/13.272	0.842/0.209	The result is not significant at $p \leq 0.05$.
education level, PP category	7.898/14.523	0.639/0.150	The result is not significant at $p \leq 0.05$.

In table 4 both barangays knowledge on dengue symptoms and dengue virus transmission, and attitude are not translated into better practice. There is no significant association found among knowledge on dengue symptoms, attitude and preventive practices. This study is in consonance to the findings that knowledge about (DF) is not translated into positive attitude and improved preventive practices^{13, 14, 15, 16}.

Good knowledge does not lead to good practice because the residents wavers their good practice when there is no reported death case or no recent dengue outbreak in the area. As a common Filipino habit, preventive behaviours are done when people are monitored and when they are not monitored they will return to their old habits. Public vigilance as to mosquito bites, and sustaining clean up drive are some of the best practices we will do and will continue to do. When visited in their homes during interview sessions and made to answer the questionnaires, they give correct answers even they are not practicing it.

Questions like covering water receptacle, cleaning their surroundings, covering their septic tanks and checking if there are cracks, and removing water pools are some of the approving acts that will bring vector control to success, but during house visits these were not put into practice. In one instance of home visitation in barangay Lahug, a pail was left uncovered in the yard with about 10 liters of clean water was found with mosquito wrigglers of first, second, third and fourth instar. This was scooped and brought to the laboratory and upon analysis they were all larvae of *Aedes aegyti* mosquitoes. In another instance in Guadalupe, an unused aquarium left in the backyard also collected water with so many larvae of mosquitoes. It was larvae of *Aedes agypti* and *Aedes albopictus* mosquitoes.

Such good knowledge translated into practice will improve the people from these two barangays in preparedness and response during dengue disease outbreak. These could be some of reasons why Guadalupe has the highest dengue cases in Cebu City followed by Barangay Lahug. Regional Epidemiological Surveillance Unit 7 (RESU 7) in 2015 reported 242 dengue cases with 2 deaths in barangay Guadalupe while barangay Lahug has 154 cases with no death. During the first quarter of 2016 barangay Guadalupe has already recorded 26 dengue cases while Lahug has 13.

In order to address this behaviour gap, massive education on

anti- dengue campaign initiated by the barangay must be pursued and house to house visits must be done by barangay health workers for larval breeding sites and dengue surveillance. Increased awareness and education of the residents of both barangays is one of the effective ways of preventing the disease. Further, knowledge on mosquito habitats would greatly help to reduce the spread of the infection. Most of the respondents are familiar with the word dengue and virus but not on the vector of dengue fever.

As shown in their scores in Table 4 on knowledge on mosquitoes and dengue virus transmission, residents from both barangays scored very low Guadalupe, 39.3%, Lahug, 53.29%. It is in this area where the barangay and LGU would focus on their campaign. Public health education campaign must be carried out on a person to person basis to ensure that people will understand the message and make it easier for them to adopt desired behaviour change. It must be fully explained to them the life cycle of the vector and process how the dengue virus is transmitted to humans by the mosquito and thus will understand that humans play an important role in the transmission of the infection. Dengue virus circulating in the blood of an infected individual is ingested by female mosquitoes during feeding and infect the mosquito^[9]. Thereafter the mosquito remains infective for the rest of its life. *Ae. Agypti* is one of the most efficient vectors for the arbovirus because it is highly anthropophilic frequently bites several times before completing oogenesis, and thrives in close proximity to humans. Another important aspect of dengue awareness program is to educate the families on dengue symptoms, its vector and transmission so that they can immediately identify bleeding, rashes, pain. To empower them is of great advantage so that they will avoid self-medication but instead will know as to when to seek medical attention at the appropriate time. Generally, in most cases in the patient is sent to the hospital when the symptoms are already in the advance stage like, bleeding, plasma leakage and irregular pulse rate.

Since dengue is hyper-endemic in the Philippines it is also appropriate to include mosquito education in the school curriculum so that full and correct knowledge regarding the disease will be thoroughly imparted. As observed by the researchers most of the respondents from both barangays have fragmented knowledge regarding the disease.

Table 4: Relationship between Knowledge on Dengue Symptoms and Knowledge on Preventive Practices towards Dengue Virus Transmission

Location	Knowledge on	Mean	SD	SE Mean	r-value	p-value
Guadalupe	Dengue Symptoms	62.67	28.08	3.97	0.135	0.351
	Preventive Practices Towards Dengue Virus Transmission	64.57	18.31	2.59		
Lahug	Dengue Symptoms	62.67	28.08	3.97	0.059	0.681
	Preventive Practices Towards Dengue Virus Transmission	54.34	15.12	2.12		
Pooled	Dengue Symptoms	62.67	28.08	3.97	0.100	0.320
	Preventive Practices Towards Dengue Virus Transmission	59.41	17.47	1.74		

Table 5: Relationship between Knowledge on Dengue and Attitude on Treatment

	Mean	SD	SE Mean	r-value	p-value
Knowledge	53.69	13.18	1.31	0.145	0.147
Attitude	0.0901	0.75	0.08		

Despite the limitations of our findings there is the need to employ effective behavioural strategies that will address ways to translate the people's knowledge about dengue into positive practices that will reduce dengue occurrences in the two barangays. There is also a need to identify and remove barriers that will promote success in vector control. Based on observation of the two localities there were many dengue vector breeding grounds were found. Garbage disposal is not properly observed by the barangay in effect many waste are dumped waiting to be collected and disposed. Moreover, there is no significant correlation between knowledge on dengue and preventive practices.

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