International Journal of Public Health Science (IJPHS)
Vol.2, No.2, June 2013, pp. 59~66
ISSN: 2252-8806

Dengue Knowledge and Preventive Practices among Rural Residents in Samar Province, Philippines

Begonia C. Yboa, MAN, RN[1], Leodoro J. Labrague, MAN, RN[2]
[1]Clinical Instructor, College of Nursing & Health Sciences, Samar State University, Philippines
[2]Associate Dean, College of Nursing & Health Sciences, Samar State University, Philippines

Article Info

Article history:

Received March 2, 2013
Revised Apr 30, 2013
Accepted May 23, 2013

Keyword:

Dengue fever
Dengue preventive practices
Dengue knowledge
Samar Province

ABSTRACT

The World Health Organization (WHO) classifies dengue as a disease important in public health. The epidemiology and ecology of dengue infections are strongly associated with human habits and activities. The present study aimed to evaluate the knowledge and practices regarding dengue infections among rural residents in Samar Province, Philippines. A cross sectional design was adopted for this investigation A convenience samples of six hundred forty six (646) residents who were visiting the rural health units in different municipalities of Samar, Philippines were taken as participants in study. More than half of the respondents had good knowledge (61.45%) on causes, signs and symptoms, mode of transmission, and preventive measures about dengue. More than half of the respondents used dengue preventive measures such as fans (n = 340, 52.63%) , mosquito coil (n = 458, 70.90%), and bed nets (n = 387, 59.91%) to reduce mosquitoes while only about one third utilized insecticides sprays (n = 204, 31.58%) and screen windows (n = 233, 36.07%) and a little portion used professional pest control (n = 146, 22.60%). There was no correlation between knowledge about dengue and preventive practices (p=0.75). Television/Radio was cited as the main source of information on dengue infections. Findings suggest that better knowledge does not necessarily lead to better practice of dengue measures. Educational campaigns should give more emphasis on cost effective ways of reducing mosquito and preventing dengue such as environmental measures and control. Furthermore, wide range of information, skills and support must be provided by the government to increase dengue awareness among residents.

Corresponding Author:

Leodoro J. Labrague, RN, MAN,
Associate Dean, College of Nursing & Health Sciences,
Samar State University, Philippines.
Email: Leo7_ci@yahoo.com

1. INTRODUCTION

Dengue fever (DF) is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue transmitted by bites of *Aedes aegypti and Aedes albopictus mosquito* [1]. Dengue fever (DF) is caused by any of four closely related viruses, or serotypes: (DENV 1, DENV 2, DENV 3, DENV 4). Symptoms of infection characterized by characterized by a sudden onset of high fever (103-106°F), severe headache, backache, intense pain in joints and muscles, retro-orbital pain, nausea and vomiting and a generalized erythematous rash that usually begin 4-7 days after the mosquito bite and typically last 3 - 10 days [2];[3]. However, infection with a dengue virus serotype can also produce a more complex and severe form of clinical manifestations like hemorrhage and shock.

In the recent years it have become international global public health concern as there has a dramatic increase of cases of dengue in tropical and subtropical regions around the world, predominantly in urban and

semi-urban areas. According to the World Health Organization, dengue fever which in its severest form is a leading cause of serious illness and death among children in some Asian and Latin American countries -- is endemic in more than 100 countries. It is estimated that 50—500,000 cases of dengue fever occur worldwide [2, 4]. Out of the 2.5 billion people at risk globally; about 1.8 billion or more than 70 percent live in the Asia-Pacific region [5]. Emergence of dengue could be the result of growing levels of urbanization, international trade and travel which disseminate both vector and viruses [6].

The first confirmed epidemic of dengue fever was recorded in the Philippines in 1953-1954. Since then, several strategies had been formulated to contain the spread and increasing incidence of dengue [7]. In the recent years, significant numbers of dengue cases were recorded by the Department of Health. The National Epidemiology Center of the Philippines' Department of Health reports a total of 132,046 dengue cases from January to 13 October 2012. This is 24.92% higher compared to the same time period in 2011. Of the total cases, 20.42% came from the National Capital Region (NCR), with highest contributors from Quezon City (7 754 cases), Manila (4 379 cases) and Caloocan City (2 967 cases). Next to NCR, Region III and Region IV-A registered the highest number of cases, which are 15.79% and 15.66% respectively, to the overall figure [8];[9].

The World Health Organization and Centers for Disease Control and Prevention (CDCP) recommends extensive community educational campaigns that emphasize reducing vector breeding sites as an effective way of dengue prevention [10];[11]. This recommendation is supported by various researches showing that community education can be more effective in reducing dengue vector breeding sites than chemicals alone [12]. Several studies suggest that better knowledge of dengue and dengue vector prevention practices among people was one of the predictors of better practices of dengue prevention [13]-[16]. Van Benthem (2002) claimed that people with higher knowledge on dengue reported a significantly higher use of prevention measure than people with low knowledge [13]. Meanwhile, Chusongsang (2005) reported that household leaders with high level of knowledge had better dengue prevention practices [14]. Itrat and Colleagues, (2008) also found that preventive practices regarding dengue were consistent with the knowledge about these practices [15]. However, this assumption was refuted in other studies conducted [17];[18];[19]. Although effectiveness of educational campaigns have shown to increase awareness and knowledge on dengue as suggested by previous studies, it remains not clear as to what degree this knowledge when put into practice could actually reduces mosquitoes and prevent dengue.

In the Philippines, despite of the extensive campaign of the government against dengue, there are evidences of increasing rates of dengue morbidity in the recent year [8]. Moreover, as to authors' knowledge, no empirical data investigating knowledge and practices on dengue prevention within the locality exists. It is in light that the investigators were motivated to conduct this investigation. The knowledge that could be gained in this investigation would guide public administrators to plan, design and initiate initiatives, programs, and policies relative to dengue prevention which could be used to address the ever growing problems on dengue fever infection.

2. RESEARCH METHOD

This investigation was undertaken to evaluate the knowledge and practices regarding dengue infections among rural residents in Samar Province, Philippines.

Design

A cross sectional study was adopted for this investigation among the different types of descriptive studies. This study design is appropriate as the main objective of this investigation was to assess the knowledge and practices regarding dengue infections among rural residents.

Participants

Data were collected over a period of three (3) months from September to February, 2012. A convenience sample of six hundred forty six (646) residents aged 18 years or above who were visiting the rural health units in different municipalities of Samar, Philippines were all provided the opportunity to be participants in the investigation.

Measures

To gather data, the investigators utilized the questionnaires developed by Shuaib et al [17] with modifications. Questions were based on causes, signs and symptoms of dengue, transmission modes, attitude towards dengue; and dengue preventive practices covering 25 items, with possible responses of 'yes' and 'no'. 'Yes' is given a value of 1 point, and 'no' with 0 points; the maximum possible score is 10. The higher the score, the greater the assumed knowledge about dengue and dengue prevention the participant has. Result

of test was interpreted as follows; 21 – 25 as "Excellent Knowledge", 16 – 20 as "Good Knowledge", 11 – 15 as "Moderate Knowledge", 6 – 10 as "Fair Knowledge", and 0 – 5 as "Poor Knowledge".

Part II of the questionnaire was used to evaluate the dengue prevention practices. There are 12 indicators with a scale of 0–4 points: 0 = never, 1 = seldom, 2 = sometimes, 3 = usually, and 4 = always, giving a score range of 0–48. In determining the extent of practice, the following scaling was used; for Very Great Extent = 4.51-5.00, Great Extent = 3.51-4.50, Moderately Extent = 2.51-3.50, Limited Extent = 1.51-2.50, and Not at all = 1.00-1.50. The higher the mean score, the better that person carries out the dengue prevention practices.

The questionnaire was validated for its reliability resulting in statistical value of 0.90 (Cronbach's alpha). The questionnaire and was drafted in a structured format and was pilot tested before distributed to the respondents enrolled in this investigation. Refinement and modifications were done on the basis of pretest results. Furthermore, questionnaires were validated through expert validation by five experts in the field of infectious diseases. The questionnaires were handed out by the investigators at the site personally, and collected on the spot once they had been completed individually and anonymously by the respondents.

Ethical Considerations

The study protocol was reviewed and approved by the Health Ethics Committee of Samar State University, Philippines. All the participants were fully informed about the purpose of the study. Confidentiality and anonymity of the respondents were maintained by only a code number on the questionnaire.

Data Analysis

The data from the questionnaire were coded and entered into a computerized data base and analyzed using SPSS, version 19. Frequencies and percentages were used for analyzing the selected socio-demographic data while mean and median were used to assess responses of the respondents on the questionnaire. Pearson's correlation coefficient was utilized to test the relationships between knowledge and dengue preventive practices, while Fisher's t test was utilized to determine significance of correlations. A p-value of equal to or less than 0.05 was considered statistically significant.

3. RESULTS AND ANALYSIS

A total of six hundred forty six (646) respondents were recruited to participate in the investigation consisting of 319 (49.38%) male and 327 (50.62%) female. Majority of the respondents belong to the age group of 18 to 23 years old (n = 394, 60.99%) and not married (n = 458, 70.89%). As to education, about half of the respondents were college undergraduate (n = 331, 51.24%) and have a family monthly income of less than Php 5,000.00/month (n = 447, 69.19%).

Table 1. Demographic Characteristics of the Respondents

Characteristics		Frequency	Percentage
Gender	Male	327	50.62
	Female	319	49.38
Age (in years)	18 - 23	394	60.99
	24 - 29	84	13.00
	30 - 35	34	5.26
	36 - 41	33	5.11
	42 - 47	31	4.79
	48 - 53	36	5.57
	54 - 59	16	2.47
	60 and Above	18	2.78
Marital Status	Single	458	70.89
	Married	160	24.76
	Widowed/Widower	15	2.32
	Separated	13	2.01
Education	College Graduate	135	20.89
	College Undergraduate	331	51.24
	High School Graduate	99	15.32
	High School Undergraduate	53	8.20
	Elementary Graduate	12	1.86
	Elementary Undergraduate	16	2.48
Monthly Income	PhP 30,001 and above	15	2.32
	PhP 25,001 – PhP 30,000	43	6.65
	PhP 20,001 – PhP 25,000	15	2.32
	PhP 15,001 – PhP 20,000	24	3.71
	PhP 10,001 – PhP 15,000	33	2.32
	PhP 5,001 – PhP 10,000	69	10.68
	PhP 5,000 and below	447	69.19

Vast majority of the respondents knew that dengue is caused by a mosquito bite (n = 600, 92.87%) and they are more likely feed/bite in the afternoon (n = 451, 69.81%). As to symptoms, most of the respondents agreed that a person with dengue infections may develop typical symptoms like fever, headache, joint pains, muscle pain, rashes, and abdominal pain. Only 39.16% or 253 of the respondents knew that pain behind the eyes is a symptom of dengue infections. With regards to dengue transmission, 80.34% or 519 believed that *aedes mosquito* transmits dengue infection; however, a significant number of respondents claimed that flies, ticks, and all types of mosquitoes also transmit dengue infections. About one fourth of the respondents believed that dengue infection may be transmitted by blood transmission (n = 490, 75.85%) and needle stick injury (n = 463, 71.67%) while 32.5% or 210 respondents claimed that it can be transmitted through sexual intercourse. As to knowledge on dengue prevention, greater proportion of the respondents cited the use of window screen, bed nets, insecticide sprays, covering of water, removal of standing water, cutting down bushes, and pouring chemicals in standing water as measures to reduce mosquitoes and dengue. (Table 2)

Table 2. Responses to Knowledge on Dengue Infections Questionnaire

Statements	Yes	%	No	%
Knowledge on the cause				
1. Dengue is caused by a mosquito bite.	600	92.87	46	7.12
2. Dengue mosquitoes likely to feed/bite in the afternoon.	451	69.81	195	30.18
Knowledge of symptoms				
3. Fever is a symptom of dengue.	606	93.8	40	6.19
4. Headache is a symptom of dengue fever.	564	87.3	82	12.69
5. Joint pains are symptoms of dengue fever.	525	81.26	121	18.73
6. Muscle pain is a symptom of dengue fever.	462	71.51	184	28.48
7. Pain behind the eyes is a symptom of dengue fever	253	39.16	393	60.83
8. Rashes are symptom of dengue fever.	524	81.11	122	18.88
9. Abdominal pain is a symptom of dengue fever.	531	82.19	115	17.8
Knowledge of transmission				
10. Flies transmit Dengue fever.	234	36.22	412	63.77
11. Ticks transmit Dengue fever.	340	52.63	306	47.36
12. All types of mosquitoes transmit Dengue fever.	310	47.98	336	52.02
13. *Aedes* mosquito transmits Dengue Fever.	519	80.34	127	19.65
14. Person to person contact transmits Dengue fever.	291	45.04	355	54.95
15. Dengue fever can be transmitted by a blood transfusion.	490	75.85	156	24.14
16. Dengue fever can be transmitted by a needle stick.	463	71.67	183	28.32
17. Dengue fever can be transmitted by sexual intercourse.	210	32.5	436	67.49
Knowledge on Dengue Prevention				
18. Mosquitoes breed in standing water.	398	61.6	248	38.39
19. Window screens and bed nets reduce mosquitoes	556	86.06	90	13.93
20. Insecticide sprays reduce mosquitoes and prevent dengue	609	94.27	37	5.72
21. Covering water containers reduce mosquitoes	623	96.43	23	3.56
22. Removal of standing water can prevent mosquito breeding	583	90.24	63	9.75
23. Mosquito repellants prevent mosquitoes	601	93.03	45	6.96
24. Cutting down bushes can reduce mosquitoes and dengue	553	85.6	93	1.43
25. Pouring chemicals in standing water can kill mosquito larvae	558	86.37	88	13.62

Table 3 reflects the cumulative scores of the respondents on the questionnaires on dengue infections. More than half (61.45%) of the respondents scored within the score range of 16 to 20 which is interpreted as "Good Knowledge", while 30.18% scored within the score range of 21 to 25 which is interpreted as " Very Good Knowledge". In general, respondents possess "Good Knowledge" on dengue infections with a weighted mean score of 19.01.

Table 3. Respondents Knowledge on Dengue Infection

Score Range	Frequency	Percentage (%)
21 - 25	195	30.18
16 - 20	397	61.45
11 - 15	54	8.36
6 - 10	0	0
0 - 5	0	0
Average Score	**19.01**	

Table 4 portrays participants' self-reported practice towards dengue infections prevention and control. As gleaned on the table, most of the respondents undertook measures to reduce mosquitoes and prevent dengue. For instance, more than half of the respondents used fans (n = 340, 52.63%) , mosquito coil (n = 458, 70.90%), and bed nets (n = 387, 59.91%) to reduce mosquitoes while only about one third utilized insecticides sprays (n = 204, 31.58%) and screen windows (n = 233, 36.07%). Only a little portion of the

respondents used professional pest control (n = 146, 22.60%) as means to reduce mosquitoes however, more than half of them employed environmental control measures such as eliminating standing water around house (n = 357, 55.26%), cutting down of bushes in the yard (n = 468, 72.45%) , covering of water containers at home (n = 404, 62.54%), and cleaning water filled containers around house (n = 414, 64.09%). In general, respondents practiced dengue prevention to a "greater extent" with a grand mean of 3.02.

Table 4. Responses to Dengue Prevention Practices Questionnaire

Statements	Extent of Practice										
	Always (n)	*%*	*Usually (n)*	*%*	*Sometimes (n)*	*%*	*Seldom (n)*	*%*	*Never (n)*	*%*	*WM*
1. Uses insecticide sprays to reduce mosquitoes.	204	31.58	121	18.73	175	27.09	62	9.60	84	13.00	2.45
2. Uses professional pest control to reduce mosquitoes.	146	22.60	123	19.04	138	21.36	95	14.71	144	22.29	2.05
3. Uses screen windows to reduce mosquitoes.	233	36.07	115	17.80	106	16.41	82	12.69	110	17.03	3.08
4. Uses fans to reduce mosquitoes.	340	52.63	125	19.35	101	15.63	32	4.95	48	7.43	3.04
5. Uses bed nets to reduce mosquitoes.	387	59.91	105	16.25	66	10.22	33	5.11	55	8.51	3.14
6. Eliminates standing water around the house to reduce mosquitoes.	357	55.26	112	17.34	69	10.68	50	7.74	58	8.98	3.02
7. Cuts down bushes in the yard to reduce mosquitoes.	468	72.45	82	12.69	49	7.59	27	4.18	20	3.10	3.46
8. Uses mosquito coils to reduce mosquitoes.	458	70.90	86	13.31	60	9.29	25	3.87	17	2.63	3.46
9. Covers water containers in the home.	404	62.54	101	15.63	57	8.82	42	6.50	42	6.50	3.21
10. Cleans water filled containers and ditches around the house.	414	64.09	99	15.33	56	8.67	43	6.66	34	5.26	3.26
Grand Mean							**3.02**				

Table 5 demonstrates participants' sources of information about dengue. Majority of the respondents or 73.37% cited Television/Radio as the main source of information on dengue infections. In addition, few participants obtained such information from health workers and schools.

Table 5. Sources of Information Relative to Dengue Infections

Sources of Information	Frequency	Percentage
TV/Radio	474	73.37
School	32	4.95
Health workers	33	5.11
Health Centers	18	2.78
Hospitals	19	2.94
Neighbors	21	3.25
Brochures	1	0.15
Newspaper	2	0.31
Others	5	0.77

Table 6 depicts the relationship between respondents' knowledge and practices towards dengue infections. As seen gleaned on the table, the relationship respondents' dengue knowledge and dengue preventive practices posted an r-value of 0.0121 with a computed p-value of 0.7571.

Table 6. Correlations between Dengue Knowledge and Practices on Dengue Infections

Variables	Dengue Preventive Practices	
	r	*p*
Dengue Knowledge	0.0121	0.7571

p>0.05

Discussion

This study evaluated the knowledge and preventive practices regarding dengue infections among rural residents in Samar Province, Philippines. The results of this investigation have demonstrated that respondents were knowledgeable of the concepts of dengue. This result is comparably high compared to previous studies conducted in Pakistan [15], Jamaica [17], Saudi [20], and Sri Lanka [21]. However, the

same result was obtained in Brazil [18], Thailand [22], and India [23]. This may be due to intensified dengue awareness campaign efforts of the Philippine government to raise the people's level of awareness of dengue, and encourage them to fight the disease in their communities.

It is essential to note that while majority of the respondents were highly informed of the causes, symptoms, and dengue preventive measures, still quite significant proportion of the respondents hold wrong notions about dengue transmissions. For instance, most of the respondents were aware that dengue is caused by mosquito bite and a person with dengue may manifests symptoms like fever, headache, joint and muscle pains, rashes, and abdominal pain. However, about half of the respondents believed that flies, ticks, and all types of mosquitoes transmit dengue while only one fourth of the respondents knew that pain behind is also a symptom of dengue. In a Jamaican study, most participants were aware that flies and ticks do not transmit dengue fever (66.5% and 71.8% respectively) [17]. Good knowledge on the mosquito vector and signs and symptoms of dengue is essential in identifying the disease and in seeking early and appropriate medical treatment to save lives.

Surprisingly, about 30.18% of respondents were unaware that dengue mosquito are more likely to bite in the afternoon. According to World Health Organization (WHO), *Aedes mosquito* usually bites during day [1]. Moreover, 38.39% were unaware that dengue mosquitoes breed in standing water. Bridging this gap in knowledge is important in planning and designing programs and activities to educate rural residents on preventive measures to combat dengue.

Findings also indicated that radio/television were the most cited sources of information on dengue infection relating with data gathered in from Pakistan [15], Malaysia [16], Jamaica [17], Thailand [22], India [23], and Sri Lanka [21]. Interestingly, only a few proportion of the respondents cited schools and health centers as sources of dengue information. In other countries, public health education programs have clearly proven its efficacy in increasing the knowledge and awareness of the disease. Thus, government can maximize the potential use of these medium by providing adequate support like information, education and communication (IECs) materials and other visual aids that may effectively communicate dengue preventive measures.

Another important finding of this investigation was the high utilization of dengue preventive measures such as the use of fans, bed nets, mosquito coils and other control measures. However, only a little portion of the respondents utilizes insecticide sprays, professional pest control, and screen windows as ways to reduce mosquito and prevent dengue. These strategies may be considered as costly considering that most of the respondents have limited financial capabilities. This suggests that governments' educational campaigns should give more emphasis on cost effective ways of preventing dengue such as environmental measures and control.

Key finding of this investigation was the insignificant relationship between knowledge about dengue and preventive practices. Knowledge about dengue fever did not necessarily translate to improved preventive measures. This result is inconsistent with previous studies conducted in Thailand [13], Pakistan [15], and Malaysia [16] suggesting that knowledge alone is not a predictor of good practice. However, similar result was obtained in Jamaica [17], Brazil [18], and Thailand [19]. Better knowledge does not necessarily lead to better practice, presumably because educating public is a long-term process to achieve human behavioural change, and thus should be carried out on a continuous basis.

While these data are important as it is the first analysis conducted in the locality, nevertheless it has some limitations. The sampling design may have potentially limited the generalizability of the result since they were recruited based of researchers' convenience only and no rigid sampling was done. This investigation was conducted among residents in selected municipalities only. Exclusion of residents from other municipalities may have affected also affected the generalizability of the result.

Despite of some limitations posed by this investigation, the results provided useful inputs and knowledge that would guide government officials in planning, designing and initiating programs, and activities relative to dengue prevention which could be used to address the ever growing problems on dengue fever.

4. CONCLUSION

It could be inferred from this investigation that the level of knowledge about dengue and preventive practices among the study population is rather high. However, they face challenges such as greater access to correct information on dengue. In view of this result, government agencies and other non-government organizations should strengthen its programs on massive educational campaign to effectively communicate ways of reducing mosquito and preventing dengue by providing a range of information, skills and support relative to dengue prevention to rural residents. Information, education and communication (IECs) materials maybe provided in areas like schools and health centers making it more accessible for the residents to obtain. Knowledge of dengue, the vectors and transmission of disease may be incorporated into the school

curriculum especially in areas where dengue is highly prevalent. Intersectoral coordination meetings should be conducted to identify possible partners for public education dengue control campaigns to help finance the program/activities. Reorientation training of community health workers should be conducted regularly to improve their technical skills and capability, and their ability to supervise prevention and control activities.

ACKNOWLEDGEMENTS

Investigators would like to thank all the participants for their time and effort in responding to the questionnaires.

CONFLICT OF INTEREST

The author(s) declare that they have no competing interests.

REFERENCES

[1] Heymann DL. "Control of communicable disease manua", *Eighteenth ed. Washington, DC: American Public Association*. Pp. 146-52, 2004.
[2] World Health Organization (2009) "Dengue Guidelines for Diagnosis, Treatment, Prevention, and Control", New Edition. Genev, Author, 2004.
[3] http://www.cdc.gov/dengue/epidemiology/index.html Accessed: February 25, 2013
[4] World Health Organization. "Dengue and dengue haemorrhagic fever", Geneva, World Health Organization, 2008 (http://www.who.int/mediacentre/factsheets/fs117/en/).
[5] Guzman MG, Kouri G. "Dengue and dengue hemorrhagic fever in the Americas: lessons and challenges", *Journal of Clinical Virology*, Vol. 27. Pp. 1-13, 2003.
[6] Egger JR, Ooi EE, Kelly DW,Woolhouse ME, Daviesa CR, ColemanaPG. "Reconstructing historical changes in the force of infection of dengue fever in Singapore: implications for surveillance and control", *Bulletin of the World Health Organization*, Vol. 86. Pp. 187-96, 2008.
[7] Gubler DJ. "Dengue and dengue haemorrhagic fever", *Clinical Microbiology Reviews,* Vol. 11. Pp. 480-496, 1998.
[8] Department of Health. 'National Epidemiology Center Public Health Surveillance and Informatics Division Disease Surveillance Report'. Retrieved September 2, 2012. nec.doh.gov.ph.
[9] http://www.wpro.who.int/philippines/areas/communicable_diseases/dengue/en/. Accessed: February 25, 2013
[10] Center for Disease Control. Dengue fever. Colorado: CDC; 2005. [updated January 13, 2005; cited October 18, 2008]; Available from: http://www.cdc.gov/ncidod/dvbid/dengue/dengue-qa.htm
[11] World Health Organization. "Comprehensive Guidelines for Prevention and Control of Dengue and Dengue Hemorrhagic Fever". Revised and Expanded Edition. Regional Office for South East Asia. 2011. (http://203.90.70.117/PDS_DOCS/B4751.pdf)
[12] Espinoza-Gómez F, Hernández-Suárez C, Coll-Cárdenas R. "Educational campaign versus malathion spraying for the control of Aedes aegypti in Colima, Mexico", *Journal of Epidemiology and Community Health*, Vol/Issue: 56(2). Pp. 148–52, 2002. [PubMed: 11812816]
[13] Van Benthem BH, Khantikul N, Kessels PJ, Somboon P, and Oskam L. "Knowlegde and use of prevention measures related to dengue in North Thailand", *Tropical Medicine of Int. Health,* Vol/Issue: 7(11). Pp. 993-1000, 2002.
[14] Chusongsung P. 'Factors affecting dengue hemorrhagic fever prevention and control behaviors of household leaders and primary school teachers in Kuan Khanun District, Phatthalung Province', *Masters Thesis*, Faculty of Graduate studies, Chulalongkorn University, 2005.
[15] Itrat A, Khan A, Javaid S, Kamal M, Khan H, Javed S, et al. "Knowledge, awareness and practices regarding dengue fever among the adult population of dengue hit cosmopolitan", *PLoS One*, Vol/Issue: 9(3). Pp. 2620, 2008.
[16] Hairi F, Ong CH, Suhaimi A, Tsung TW, bin Anis Ahmad MA, Sundaraj C, et al. "A knowledge, attitude and practices (KAP) study on dengue among selected rural communities in the Kuala Kangsar district", *Asia-Pacific Journal of Public Health*, Vol. 15. Pp. 37-43, 2003.
[17] Shuaib F, Todd D, Campbell-Stennett D, Ehiri J, Jolly P. "Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica", *West Indian Med J,* Vol/Issue: 59(2). Pp. 139-146, 2012.
[18] Lenita Barreto Lorena Claro, Hélia Kawa, Luciana Tricai Cavalini and Maria Luiza Garcia Rosa. "Community Participation in Dengue Control in Brazil", *Dengue Bulletin,* Volume 30. Pp. 214-222, 2006.

[19] Koenraadt CJ, Tuiten W, Sithiprasasna R, Kijchalao U, Jones JW, Scott TW. "Dengue knowledge and practices and their impact on Aedes aegypti populations in Kamphaeng Phet, Thailand", *The American Journal of Tropical Medicine and Hygiene* Vol. 74. Pp. 692-700, 2006.

[20] Nahla Khamis Ragab Ibrahim∗, Adnan Al-Bar, Mohamed Kordey, Ali Al-Fakeeh. "Knowledge, attitudes, and practices relating to Dengue fever among females in Jeddah high Schools", *Journal of Infection and Public Health*, Vol. 2. Pp. 30-40, 2009.

[21] Gunasekara, T. D. C. P., Velathanthiri, V. G. N. S., Weerasekara, M. M., Fernando, S. S. N., Peelawattage, M., Guruge, D., & Fernando, S. "Knowledge, attitudes and practices regarding dengue fever in a suburban community in Sri Lanka", *Galle Medical Journal*, Vol/Issue: 17(1). Pp. 10, 2012.

[22] Swaddiwudhipong W, Lerdlukanavonge P, Khumklam P, Koonchote S, Nguntra P, Chaovakiratipong C. "A survey of knowledge, attitude and practice of the prevention of dengue hemorrhagic fever in an urban community of Thailand", *The Southeast Asian Journal of Tropical Medicine and Public Health.* Vol/Issue: 23(207). Pp. 11, 1992.

[23] Anita Acharya, K. Goswami, S. Srinath & A. Goswami. "Awareness about dengue syndrome and related preventive practices amongst residents of an urban resettlement colony of south Delhi", *J Vect Borne Dis 42*. Pp. 122–127, 2005.