

## ORIGINAL ARTICLE

# KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) SURVEY ON DENGUE FEVER IN AN URBAN MALAY RESIDENTIAL AREA IN KUALA LUMPUR

Wan Rozita WM<sup>1</sup>, Yap BW<sup>3</sup>, Veronica S<sup>3</sup>, Muhammad AK<sup>2</sup>, Lim KH<sup>1</sup>, Sumarni MG<sup>1</sup>

<sup>1</sup> Epidemiology and Biostatistics Unit,

<sup>2</sup> Environmental Health Research Center,

Institute for Medical Research, Jalan Pahang, 50588 Kuala Lumpur, Malaysia

<sup>3</sup> Faculty of Information Technology & Quantitative Sciences,  
University Technology MARA, Shah Alam

## ABSTRACT

A cross sectional survey was conducted in Kampung Datuk Keramat, an urbanized residential area in Kuala Lumpur from August to November 2005 to assess knowledge, attitude and preventive practices on dengue among its residents. A two stage sampling strategy was used to select survey household. An adult aged at least 21 years old was identified from each selected household and interviewed using a standardized questionnaire. Data was collected on demographics, dengue related KAP and house-types. Knowledge, attitude and practice were assessed using a scoring system. Each appropriate answer was given a point and the points for each section of the questionnaire were totalled. Knowledge was assessed as 'good' or 'moderate to poor' based on arbitrary cut-off point. Out of 133 respondents interviewed, 78.2% were able to identify at least one clinical sign of dengue, 73% knew that dengue fever was caused by the bite of dengue infected *Aedes* mosquitoes, 71 % correctly identified breeding sites, 69.2% correctly identified the *Aedes* mosquito and 42% correctly reported biting times of the mosquito vector. Overall, knowledge was categorized as poor, attitude was good and dengue control and prevention practices was moderately poor. There was a weak but significant positive correlation between knowledge and practice ( $r=0.271$ ,  $p=0.002$ ) but there was no significant correlation between attitude with practice and between attitude with knowledge ( $p>0.05$ ). The results suggested that inspite of good attitude on dengue fever, it did not correlate with good practices and good knowledge in dengue prevention. We conclude that there is a need to increase health promotion activities to increase knowledge which forms the basis for preventive practices as part of the strategy to control dengue. Preventive strategies are the only means of controlling the disease.

**Key words:** dengue, survey, KAP, urban Malay residential, Kuala Lumpur.

## INTRODUCTION

Dengue Fever/Dengue Haemorrhagic Fever (DF/DHF) is a disease caused by the dengue virus. There are 4 serotypes of dengue virus: DEN-1, DEN-2, DEN-3 and DEN-4, and they belong to the Flaviridae family. The virus is transmitted to man by the bite of infected mosquitoes. The mosquito vectors are *Aedes aegypti* and *Aedes albopictus*. They lay their eggs in stagnating water in containers in and around the house. *Aedes aegypti* is normally found in urban areas while *Aedes albopictus* predominates in the rural setting. The principal symptoms of dengue are high fever, severe headache, backache, joint pains, nausea and vomiting, eye pain, and rash<sup>1</sup>. In addition to these, haemorrhagic manifestations and shock occurs with DHF. High fatality follows DHF. DF/DHF is a major health problem in Malaysia. It is associated with urbanisation and is highly endemic with sporadic outbreaks in Kuala Lumpur. In particular, dengue outbreaks is a recurring problem in Kampung Datuk

Keramat. In 2005 a total of 8,273 cases of DF and 360 cases of DHF with 38 fatalities were reported in Kuala Lumpur<sup>2</sup>.

Primary prevention in the form of health education and community participation is important as part of the strategy to combat dengue. Hence there is a need to assess community understanding and behaviour in Kampung Datuk Keramat with regards to dengue fever. Knowledge, attitude and practice (KAP) surveys provide a suitable format to evaluate existing health programs.

A cross-sectional KAP survey was conducted to assess the level of knowledge, attitude and practices concerning dengue prevention and its vector the *Aedes* mosquito, among residents in Kampong Datuk Keramat which is an urbanised residential area within Kuala Lumpur and resided by 50,000 people. Most of its residents are Malays. Although dengue control activities come directly under the jurisdiction of City Hall Kuala Lumpur, Ministry of

Health Malaysia collaborates closely to keep dengue under control.

## METHODOLOGY

### Study design

Kampung Datuk Keramat is divided into 3 equal sections (Table 1). Residents from these sections were selected as respondents for the KAP study. In order to obtain a representative sample, a two-stage sampling strategy was used. In the first stage, stratified random sampling was applied to select main roads in Kampung Datuk Keramat from the three sections. Subsequently, from each main road, random sampling was applied to choose the alleys. From each alley selected, houses were then selected using systematic sampling. Household representative was then identified and directly interviewed using standardized structured questionnaire.

household representatives who were 18 years old and above. Each respondent which represents each household were informed about the nature of the survey and their consent obtained. For the purpose of this study, both dengue and DHF were treated as one entity and referred to as dengue.

### Statistical analysis

Data was entered using Statistical Software Package for Social Science (SPSS) version 11.5. Each question was analysed individually. Knowledge, attitude and practice were assessed using a scoring system. Each appropriate answer was given a point and the points for each section of the questionnaire were totalled. Knowledge was assessed as 'good' or 'moderate to poor' based on arbitrary cut-off point. Respondents who achieved more than 75% score for the knowledge will be considered 'good' while others were category as 'moderate to poor'. The same principle was applied to the sections on attitude and practice.

Table 1. Section A, B and C of Kampung Datuk Keramat

Section A	Section B	Section C
Lorong Keramat 1 to Lorong Keramat 22	Lorong Bukit Keramat 3 to Lorong Bukit Keramat 5, Lorong Keramat Dalam 1 to Lorong Keramat Dalam 6, Jalan Bukit Keramat, Jalan Keramat Dalam, Jalan Keramat Tepi, Jalan Keramat Hujung	Jalan Keramat, Lorong Kiri 1 to Lorong Kiri 20

A sample size of 118 was calculated by using the Cochran's (1977) formula for estimating prevalence<sup>3,4</sup>. The  $\alpha$  level was set at 0.05 and the standard deviation in the population assumed to be 0.833 due to the 5 point scale that were used in the questionnaire and divided by 6, which is the number of standard deviation that include almost all of the possible values in the range. The acceptable margin error was decided to be 0.03. The sample size also took into account a 20% refusal rate. The total sample size regard for this study was 142 respondents.

### Study instrument

The questionnaire was designed for direct face-to-face interview. Pre-testing of the questionnaire was conducted in a nearby residential area in order to improve clarity of question stems and response options. Minimal changes were made after pre-testing the questionnaire. The survey instrument was developed and it consisted of three sections. Section I, covers questions regarding DF/DHF in relation to the mosquito vector, disease signs and symptoms and preventive measures. In section II, respondents are required to state their opinion on five statements regarding DF/DHF prevention. Section III collects information on reported practices in relation to DF/DHF prevention and source of information regarding dengue fever. The interview was administered by two trained interviewers. Direct interviews in the national language Bahasa Malaysia were conducted among adult

## RESULTS

A total of 142 questionnaires were distributed to residents in Kg. Datuk Keramat and 133 respondents (94%) agreed to participate in the KAP study. Table 2 summarised some demographic information of the respondents. Female respondents comprised 68% of the sample and the remaining 32% were males. In terms of age, respondents aged 36 to 45 years old were the largest group (27%) followed by respondents aged 55 years old and above (21%). Nearly 40% of the respondents had only primary or no formal education at all. Malaysian respondents comprised 80% of the sample, whereas the rest were Indonesians. In terms of household income, 41% of them had less than RM1000 per month. Twenty percent (20%) of the respondents had experienced encountered with dengue fever, either they themselves had dengue before or one of their household members had dengue.

### Knowledge of dengue fever

This study found that almost all (98.5%) survey respondents had heard of dengue. Eighty five percent of the respondents reported that television was the main source of information on dengue. Only seventy-three percent of survey respondents were aware that dengue was transmitted by the bite of Aedes mosquito. The majority (78.2%) of survey respondents were able to identify correctly at least one clinical sign or symptom of dengue

**Table 2. Demographic characteristics of respondents**

Characteristics	Number (%)
a) Gender	
Female	90 (67.7 %)
Male	43 (32.3 %)
b) Age (years)	
Less than 25	22 (16.5 %)
26 - 35	20 (15.0 %)
36 - 45	35 (26.3 %)
46 - 55	27 (20.3 %)
More than 55	29 (21.8 %)
b) Education level	
No formal education	11 (8.3 %)
Primary	41 (30.8 %)
Secondary	73 (54.9 %)
Tertiary	8 (6.0%)
c) Nationality	
Malaysian	106 (79.7 %)
Indonesian	27 (20.3 %)
d) Household income	
Less than RM1000	55 (41.4 %)
RM1000 - RM1999	46 (34.6 %)
RM2000 and above	32 (24.1 %)
e) Dengue History	
Yes	27 (20.3 %)
No	106 (79.7 %)

**Table 3. Percentage of respondents with 'Good' and 'Moderate to Poor' score in knowledge, attitude and practice**

Score	Knowledge	Attitude	Practice
Good	14.3%	75.2%	49.6%
Moderate to Poor	85.7%	24.8%	50.4%

fever and the clinical presentation most recognized is sudden onset fever. However, only 42% of the survey respondents were able to report correctly the biting times of the Aedes mosquito that was at dawn and dusk. Only 35% of the respondents correctly answered that both preventing mosquito bites and breeding as the effective measures against dengue fever. Seventy one percent of the respondents identified clogged drains as the most possible place for the mosquito to breed followed by inner lining of tyres, opened coconut shells, receptacles of broken glasses, water storage systems, flower vases and banana/caladium trees. A high percentage of the respondents (69.2%) correctly identified Aedes mosquito with its black and white striped legs.

**Attitudes towards dengue fever control**

The majority of respondents (90% and above) agreed that mosquito bites were dangerous and the consequences of mosquito bites were also serious. It was also noted that

94.7% agreed that preventive measures were needed to prevent dengue fever and 96.2% were willing to cooperate with any activities organised by the health authorities such as fogging to eradicate Aedes mosquito. A slightly lower agreement (72.9%) was shown when they were asked whether penalty should be given to those who breed mosquito in their area.

**Practices to avoid dengue fever**

Preventive methods against mosquito bites include aerosol spray, mosquito coils and bed nets were used. Despite knowing that mosquito breeding may occur in storage water, the practice of storing water in pails, pool and tank for domestic usage was widespread. This was because of the possibility of erratic piped water supply. No abate was used in storage water.

Fifty three percent of the respondents cleaned their water storage daily and a very low percentage (5.3%) did not clean it at all. Eighty-eight percent of them preferred to use aerosol compared to mosquito coil. The main reason was because they didn't like the smoke and felt unsafe that the coil posed a potential fire hazard. Almost 80% kept their place clean by avoiding shrubby areas whereas more than half kept drains free from blockage. It was found that only 25% of the respondents had all water containers tightly covered, 13% applied mosquito repellents to expose body parts and only 10% used mosquito net. Sixty eight percent of the respondents refused to wear long sleeved clothing because of the hot weather. For respondents who had plants to be watered, more than 75% of them did take dengue preventive measure such as removed stagnant water under plant container and changed water for the plants at least once a week.

Based on the scoring system described in the methodology, it was found that despite the high percentage of good attitude among the respondents on dengue fever, majority of the respondents only obtained a 'moderate to poor' knowledge and practice score on dengue fever (Table 3).

**Comparison of Knowledge, Attitude, and Practices Mean Scores**

Table 4 display the descriptive statistics for the knowledge, attitude and practice scores by gender, ownership of the house, dengue history and education level. The knowledge and practice scores were higher in female residents compare to male but not in the attitude scores. Residents who owned the house showed a consistently higher score in knowledge, attitude and practice compare to those who rented the house. Meanwhile, the residents who had experienced having had dengue fever, showed a higher scores in knowledge, attitude and practice compare to those residents who had never experienced dengue. Residents with secondary/ tertiary education had better knowledge and attitude towards dengue fever due to the higher scores in knowledge and attitude.

Although the p-values for the test of normality using the Kolmogorov Smirnov test were less than the 5% level of significance, all the scores value for knowledge, attitude

**Table 4. Descriptive statistics for knowledge, attitude and practice score by gender, house ownership, dengue history and education level**

Score	Mean ± standard deviation							
	Gender		House Ownership		Dengue History		Education Level	
	Male (n=43)	Female (n=90)	Owned (n=55)	Rent (n=78)	With dengue history (n=27)	No dengue history (n=106)	No formal education (n=52)	Secondary /Tertiary (n=81)
Knowledge	43.837 ± 22.787	46.056 ± 21.011	45.364 ± 20.858	45.321 ± 22.132	53.889 ± 20.817	43.160 ± 21.262	35.481 ± 21.834	51.667 ± 18.908
Attitude	85.302 ± 9.901	81.244 ± 11.308	83.564 ± 10.796	81.846 ± 11.160	82.815 ± 10.572	82.491 ± 11.157	78.615 ± 11.115	82.491 ± 11.157
Practice	73.438 ± 7.424	75.319 ± 8.939	77.822 ± 8.699	72.516 ± 7.674	76.792 ± 8.620	74.181 ± 8.424	75.108 ± 9.903	74.456 ± 7.512

**Table 5. Comparison on the mean score for knowledge, attitude, and practices of dengue by using Student t-test and ANOVA**

Socio-demographic characteristics	t -statistic value		
	Knowledge	Attitude	Practice
<b>Statistical test (Student t-test)</b>			
Gender (Male: Female)	-0.554	2.012*	-0.439
House ownership (Owned: Rent)	0.011	0.886	3.934*
Dengue history (Yes:No)	-2.350*	-0.136	-0.826
Education level (No formal/primary education :Secondary/tertiary education)	-4.532*	-3.443	0.611
<b>Statistical test (One-way ANOVA)</b>			
Section (area)(A:B:C)	2.186	2.638	6.513*

\* p. value < 0.05

and practice were assumed approximately normal based on the skewness and kurtosis values which were very small. Therefore, further analysis such as Student t-test will be applied to compare the difference of mean scores in knowledge, attitude and practice in gender, ownership of the house, dengue history and education level whereas one-way ANOVA was used to compare mean scores among the three sections which represents the different locations of the houses of the residents (there were no violation of normality and homogeneity of variance assumptions).

Table 5 presents the Student t-test and ANOVA statistical results. There was significant difference in the mean scores of knowledge between residents who had experienced dengue fever compared to residents who had never experienced dengue fever. There was also significant difference in the mean scores of knowledge and attitude among the residents with no formal to primary education level with the secondary to tertiary education level. In terms of attitude scores, gender showed a statistically significant difference between male and female residents. The results also showed that the mean scores of practices were found to be statistically different between residents

who owned the house and residents who rented the house. The ANOVA results showed that residents in all the sections (A, B and C) were significantly different in their mean practices scores. By applying the pos-hoc analysis, section C was found to be statistically different in the mean scores of practices compared to section A and B.

**Correlation Analysis**

There was a weak significant positive correlation between knowledge and practice (r=0.271, p=0.002) but there was no significant correlation between attitude and practice and between attitude with knowledge (p>0.05).

**DISCUSSION**

In this study, 98.5% of the respondents had heard about dengue fever. Anita A *et al* reported that in her study, 90% of the respondents in Delhi, India were aware of the dengue<sup>5</sup>. In Brazil, only 78% respondents knew about dengue whereas in Thailand, dengue was only known by 67% of the respondents<sup>6,7</sup>. In this present study, television was the most important source of information and this is similar with the study by Hairi *et al*<sup>1</sup>. This shows that

mass media such as television was a very important source to disseminate information and this could be used to generate better awareness among the public with regards to dengue prevention and control<sup>1,6</sup>.

Residents who owned the house in which they are residing showed a consistently higher score in the knowledge, attitude and practice compared to residents who rented the house. Among those residents who owned the house, 64% had household income more than RM1000 and 55% with secondary to tertiary education level. This indicated that ownership of place of residence reflect upon socioeconomic status (SES) as factor that facilitates residential premises to be free from mosquito breeding. Those who are able to own home has a better economic status and possibly have a better access to education and presumably a better sense of responsibility.

Residents who had encountered dengue either directly as a case or had family members with dengue showed a consistently higher scores in the knowledge, attitude and practice compared to residents who never had dengue in their life. This is consistent with the fact that personal experience is the best teacher and it creates a strong realisation factor in understanding the disease. This is similar with the findings from Uma DA *et al*<sup>8</sup>. Although its use as a preventive factor is limited as disease has already occurred, but mobilising such people to relate their sufferings may be use effectively in creating better public health awareness during health promotion campaigns.

The significant difference in the mean scores of knowledge and attitude among the residents with no formal to primary education level with the secondary to tertiary education level that were found in this study was inconsistent with what had been achieved by Hairi *et al*<sup>1</sup>. A gap was seen between knowledge and practices towards attitude. 85.7% of the respondents are considered as not very knowledgeable in dengue fever. Even 50.4% of them too do not practice good habit in preventing dengue fever. This might be due to the education level of the respondents. Only 6% of the respondents are from tertiary level of education. Low knowledge in dengue fever leads to poor practices in avoiding dengue. Good attitude shows that they are willing to cooperate in any preventive measures done by the government. The results that were obtained in the correlation analysis which showed that there was a weak significant positive correlation between knowledge and practice but there was no significant correlation between attitude and practice and between attitude with knowledge were found to be consistent with the findings by Constantianus J *et al*<sup>9</sup>. The results suggested also that inspite of good attitude on dengue fever it did not lead to correlate with good practices and good knowledge in dengue prevention, based on the scoring analysis.

The picture emerge from the results of this survey seems to show that the residents knew and deeply concerned about dengue fever, but not too well knowledgeable on

the dengue fever, and doing nothing to prevent the occurrence and spread of dengue fever in their place. This is similar with what had been reported by JG Dobbins *et al*<sup>9</sup>. His study was also done in an urban Malay village in Kuala Lumpur.

The results of this study were discussed bearing in mind of certain errors and limitations. Firstly, there might be errors in the interviewing stage. Different interviewers tend to phrase questions differently, which might influence the response. Interviewers might be forced to explain and rephrase in different way, thus this action might indirectly give clues to the respondents. Secondly, due to the hospitality of Malays, interviewers were regarded as guests. Therefore, respondents may tend to agree with the interviewers when asked attitudinal questions in order to please the interviewer.

## CONCLUSIONS AND RECOMMENDATIONS

We conclude that there is a need to increase health promotion activities to increase knowledge which forms the basis for preventive practices as part of the strategy to control dengue. More emphasis should also be put on practical ways to prevent dengue in educational campaigns, especially on how to get rid of development sites and increase the knowledge on the vector and control measures. Preventive strategies are the only means of controlling the disease. The following recommendations are designed to counteract the contradiction between knowledge and practices with attitude.

1. Emphasize the used television as the mass media information campaign because it is the primary source of information.
2. Increase description of the habits of *Aedes* mosquitoes, focusing on the usual time biting and possible breeding sites of the *Aedes* mosquitoes.
3. Storing water is obviously widespread and might be difficult to eradicate. It might be a good idea to emphasize methods of protecting store water from mosquitoes by covering it, changing it frequently or adding abate.
4. Cooperative community action could also be emphasize as a control program that uses young people rather than adults within the community. This similar type of program had been applied in Trengganu in a campaign to build latrines and was found to be highly successful<sup>10</sup>.
5. Health education by health personnel played an important role in disseminating DF/DHF information and prevention methods<sup>10</sup>. Series of briefing and talks between health personnel and people can increase more cooperation in the implementation of the prevention programmes.

Although these recommendations were based on the experience in Kampong Datuk Keramat, they could probably be generalized beyond this model.

## ACKNOWLEDGEMENTS

We wish to gratefully acknowledge our appreciation to the Director, Institute for Medical Research (IMR) for her support and permission to publish this paper. We also wish to thank Dr Hanjeet Kaur for giving the permission to conduct this study and Dr Amal Nasir Mustafa for support on publishing this paper. We wish to extend our thanks to Mr Mohd Hadzriq from Epidemiology and Biostatistics Unit, IMR and Miss Siti Salmah from UiTM for their support in making the study a success.

## REFERENCES

1. Hairi F, Ong CH, Suhaimi A, Tsung TW, bin Anis Ahmad MA, Sundaraj C, Soe MM. A knowledge, attitude and practices (KAP) study on dengue among selected rural communities in the Kuala Kangsar district. *Asia Pac J Public Health* 2003; 15(1): 37-43.
2. Vector Borne Disease Control Section. Available at [http://www.dph.gov.my/vektor/eng/kes\\_dd\\_tahunan.htm](http://www.dph.gov.my/vektor/eng/kes_dd_tahunan.htm) as on 29th Sept 2006
3. Cochran WG. *Sampling Techniques* (3rd ed.). New York: John Wiley & Sons (1977)
4. James EB II, Joe WK, Chadwick CH. Organizational Research: Determining appropriate sample size in survey research. *Information Technol, Learning Performance J* 2001; 19(1): 43-50.
5. Anita A, 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* 2005; 42: 122-127
6. Swaddiwudhipong W, Lerdlukanavongse 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. *Southeast Asian J Trop Med Public Health* 1992, 23: 207-211.
7. Degallier N, Vilarinhos PT, deCarvalho MS, Knox MB, Caetano J Jr. People's knowledge and practice about dengue, its vectors and control means in Brasilia (DF), Brazil: its relevance with entomological factors. *J Am Mosq Contr Assoc* 2000; 16(2): 114-23.
8. Uma Deavi Ayyamani, Gan Chong Ying, Ooi Guat San. A knowledge, attitude and practice (KAP) study on dengue/dengue haemorrhagic fever and the aedes mosquitoes. *Med J Malaysia* 1986 Jun; 41(2):108-15.
9. JG Dobbins, JG Else. Knowledge, attitudes and practices related to control of dengue haemorrhagic fever in an urban Malay kampong. *Southeast Asian J Trop Med Pub Hlth* 1975; 6(1): 120-126.
10. Tan BL. A latrine building campaign in Trengganu. 1973. *Sihat*; 59-62.