

# Knowledge, attitudes and practices regarding dengue fever in a suburban community in Sri Lanka

Gunasekara TDCP<sup>1</sup>, Velathanthiri VGNS<sup>2</sup>, Weerasekara MM<sup>1</sup>, Fernando SSN<sup>1</sup>, Peelawattage M<sup>1</sup>, Guruge D<sup>1</sup>, Fernando S<sup>1</sup>

<sup>1</sup>Department of Microbiology, <sup>2</sup>Medical Laboratory Science Unit, Faculty of Medical Sciences, University of Sri Jayawardenapura, Gangodawila, Nugegoda, Sri Lanka

**Correspondence:** Dr. T.D.C.P. Gunasekara (tdcpgunasekara@gmail.com)

## ABSTRACT

Dengue is a major public health concern in Sri Lanka. In the recent dengue epidemics, majority of cases of dengue were reported from the Colombo district.

**Aims:** To determine the knowledge attitudes and practices (KAP) regarding dengue fever (DF) in a suburban population in the Colombo District.

**Methods:** The study was a prospective, cross sectional study and was conducted in 2005/2006 in a suburb of Colombo district. Data was collected using a pre-tested interviewer-administered questionnaire to assess the knowledge, attitudes and practices of 349 randomly selected residents in the Boralesgamuwa MOH area.

**Results:** Almost all the participants had heard of DF (98%), the media being the most quoted source of information. Based on the scoring system, only 58% had satisfactory knowledge on the symptoms, management and transmission of dengue. Furthermore, 37% of the participants demonstrated satisfactory attitudes and 85% claimed to have used good practices towards dengue.

**Conclusions:** The participants demonstrated gaps in knowledge and poor attitude which may affect the level and frequency of preventive practices. Our findings highlight the need for further information, education and communication programs in the community.

**Keywords:** Dengue Fever, Knowledge, Attitudes, Practices, Sri Lanka

## Introduction

Dengue fever (DF) is the most prevalent mosquito-borne infection that in recent decades has become a major international public health concern (1,2). Dengue infection is caused by four dengue virus serotypes DENV-1, DENV-2, DENV-3, and DENV-4 which are transmitted by *Aedes aegypti* and *Aedes albopictus* (1). A wide clinical spectrum has been classified by the World Health Organization (3) and it is possible for an individual to be infected with DF several times during his life time (4).

Sri Lanka experiences major epidemics of dengue each year. Several epidemics of dengue infection

occurred in the years 2004, 2009 and 2010. In the years 2004, 2009 and 2010, 15, 230, 35010 and 34 105 cases were reported respectively (5). Although recent epidemics have effected the whole island, the majority of cases of dengue are still reported from the Colombo district (23% in 2004) (6).

In the absence of a vaccine or specific antivirals to treat DF, vector control is one of the most important preventive measures in combating dengue. The recurrence of DF each year and the rising number of cases with each epidemic suggest that vector control efforts are probably ineffective and need to be improved. We carried out a study to determine the

knowledge attitudes and practices (KAP) on DF of a suburban population in Colombo. We were unable to trace any previous studies to determine knowledge attitudes and practices regarding dengue in this area.

## Methods

### Study setting

The study was conducted in 2005/2006 in a suburb of Colombo district, Boralesgamuwa, which is located in the Western province. Three hundred and forty nine randomly selected community members were included in the study. Boralesgamuwa has an area of 11.1 km<sup>2</sup>, and a population of 62767. In 2006, there were 222 dengue suspected cases in Boralesgamuwa. The protocol of the project was reviewed and the ethical approval was granted by the Ethical review committee, University of Sri Jayawardhanapura.

### Study instrument

Data was collected on the KAP of the residents regarding DF using a pretested interviewer-administered questionnaire. The participants who volunteered for the pretesting of the questionnaire were excluded from the main study, and minor changes were done after the pretesting. The questionnaire covered the following areas; (1) demographic information (area, gender, age, occupation, and education.), (2) attitude towards DF (3) knowledge about DF (symptoms, management, prevention,) (4) preventive practices and treatment for DF i.e. methods used to reduce breeding sites, reduce human mosquito contact (bed nets, repellents, and window screens), seeking treatment and home management of patients. The questionnaire comprised of both defined questions where the respondents could select the answer (yes / no questions) and open-ended questions.

### Study subjects

As shown in table 1, the 349 respondents were divided into 6 age groups, where 165 belonged to 35 - 46 age group. The male to female ratio was 47%. The level of education was considered as high, where >70% having received secondary education. Among the participants 7% had received only primary education whereas 18% had received tertiary

education. The proportion of employed persons in this study group was 36%, whereas the unemployed proportion was 59%.

**Table 1: Socio-demographic characteristics of study population**

	Number (N = 349)	Percent (%)
<b>Gender</b>		
Male	163	46.7
Female	186	53.2
<b>Age group</b>		
< 20	39	11.1
20 - 25	27	7.7
26 - 35	43	12.3
36 - 45	165	47.2
45 - 55	38	10.8
> 55	39	11.1
<b>Occupation</b>		
Employed	124	35.5
Unemployed	122	34.9
Retired	20	5.7
Student	83	23.7
<b>Level of Education</b>		
Primary Education	26	7.4
Secondary Education	246	70.4
Tertiary Education	62	17.7

### Statistical analysis

The data were analyzed using EXCEL version 2003 and each question was analyzed individually. KAPS were assessed using a scoring system. Responses to defined and open-ended questions were given one (1) and zero (0) (1 for yes/ correct answers and 0 for no/incorrect answers). These were added to arrive at a single value out of a possible total score of ten for knowledge, five for attitudes, and seven for practices. KAPS were assessed as satisfactory or unsatisfactory on an arbitrary cut-off point. Respondents who achieved more than 70% were considered as "satisfactory" for knowledge and practices and 75% for attitudes. Knowledge was assessed on ten questions which were grouped into symptoms, management and prevention. Similarly a positive attitude was assessed based on the ability of participants to give answers to several questions (Table 2).

**Table 2: Attitudes towards Dengue Fever**

<b>Questions</b>	<b>Number (N=349)</b>	<b>Percent (%)</b>
<b>I will treat a patient suspected of Dengue fever with home remedies</b>		
Yes	175	50.1
No	159	45.5
Not responded	15	4.2
<b>I must frequently check for mosquito breeding sites in my home and garden</b>		
	301	86.2
<b>I do not check my neighbourhood for mosquito breeding sites due to;</b>		
Lack of time	51	14.6
It is not required of me	25	7
It may lead to conflicts with neighbours	29	8
<b>I am satisfied with my knowledge of DF and prevention measures</b>		
Yes	210	60
No	149	40
<b>I am motivated to find more information about DF</b>		
Yes	118	33.8
No	231	66

Preventive practices were assessed based on nine questions grouped in to four categories such as (1) methods used to reduce breeding sites, (2) reduce human mosquito contact (3) seeking treatment and (4) home management of patients.

## Results

### Knowledge about DF

This study found that almost all (98%) had heard of dengue fever and the main source of information was television broadcasts (83%), while news papers (76%) and radio broadcasts (50%) also played an important role. They had received information also from health care officials (66%), family and friends (62%). Majority of the respondents had obtained information through multiple sources.

A high percentage of respondents were able to correctly identify symptoms of dengue such as high fever (94%), vomiting (69%), muscle pain (85%) and headache (72%). However, only 25% identified rash as a symptom. A low percentage identified stomach ache (22%) as a symptom of DF. Only 0.5% of the participants had listed low platelet count as symptom of DF.

### Knowledge and practices about complications and management of DF

When asked about the complications of DF, 46% said that dengue haemorrhagic fever (DHF) may occur. In the study group 15% were aware DF could be fatal. However, only 8% recognised shock as a complication and 32 % were unaware of any complications. Whereas 73% were aware of the hemorrhagic manifestations such as vomit with blood (26%), black stools (3%), haematuria (1%), rash (34%), bleeding from gums and other sites (13%). Some individuals (42%) knew the danger of taking aspirin as a treatment. Some would not take paracetamol (17%), or coriander (8%), only 3% were aware that coloured drinks should be avoided during DF as it may confuse medical personnel in determining the presence of gastrointestinal bleeding. Alarmingly, 29% respondents did not appear to have any idea of initial treatment of DF at home.

As shown in table 3 the majority of the participants (98%) said that they would take the patient to a doctor. When asked what medications they would give to the patients the responses were paracetamol (38%), aspirin (2%) and boiled coriander (10%) while 43% were unsure. Lesser percentage (< 2% each) were aware of the necessity of adequate rest, liquid intake and close observation of the patient which are very important practices. (Table 2 and Table 3).

**Table 3: Knowledge regarding Dengue Fever**

<b>Questions</b>	<b>Number (N=349)</b>	<b>Percent (%)</b>
<b>What are the symptoms of Dengue Fever ?</b>		
High Fever	329	94.27
Vomit	241	69.05
Myalgia	298	85.39
Headache	251	71.92
Stomach ache	78	22.35
Tiredness	149	42.69
Blood passing with stools	9	2.58
Rash	93	26.60
Low platelet counts	2	0.50
Diarrhoea	6	1.72
Cold	5	1.43
Cough	54	15.47
<b>What are the complications of DF ?</b>		
Dengue haemorrhagic fever	161	46.10
Shock	29	8.30
Death	53	15.10
Low platelet counts	2	0.50
Dehydration	3	0.85
Don't know	103	29.40
<b>What are the symptoms of DHF and DSS ?</b>		
Haemorrhagic manifestations	184	73.60
Vomit with blood	91	26
Melena	12	3.4
Haematuria	4	1.1
Rash	120	34.3
Bleeding from gums and other sites	46	13.00
Cough	38	10.8
<b>What medication should not be given to a patient suspected of DF ?</b>		
Aspirin	148	42.40
Paracetamol	60	17.10
Boiled coriander	28	8.00
Coloured drinks	11	3.15
Don't know	102	29.20
<b>How is DF transmitted ?</b>		
By mosquitoes	264	75.60
By water	58	16.60
By garbage	48	13.70
By air	6	1.70
By flies	9	2.50
<b>Where do the Dengue mosquitoes breed ?</b>		
Clean water	316	90.50
Dirty water	28	8.00
Don't know	5	1.40
<b>Can you identify the Dengue transmitting Mosquitoes ?</b>		
Yes	180	51.50
No	169	48.40
<b>What are the features of the Dengue transmitting mosquitoes ?</b>		
Spots on the body	141	40.4
Don't know	39	11.1
<b>At what time of the day do these mosquitoes bite ?</b>		
Day time	296	84.8
Night time	4	1.1
Don't know	38	10.8

### **Knowledge and practices about disease transmission and dengue vector**

Seventy six percent of the participants were aware that DF is transmitted by a mosquito vector. Among them 68% claimed that they could identify the dengue vector mosquito by detecting the spots (78%). On the other hand 24% believed that dengue was transmitted by other methods such as water (17%), garbage (14%), air (2%) and flies (2%). Some participants had given multiple responses (Table 3).

Majority of the participants were aware of the correct breeding site of the mosquito (clean water) (90%) and that they bite during the day (85%).

Regarding the measures to prevent contact with mosquitoes, many used mosquito nets (72%) and repellent oils (41%) as a preventive practice (Table 2). Equal percentages (27%) of respondents felt that mosquito coils, mats and repellent sprays were useful. Lesser percentage (< 10% total) used other available methods such as fans, fumigation (insecticides, burning of cashew nut / coconut husks) and covering the ventilation holes with nets.

More than half of the study population (53%) felt that it was necessary to remove or drain the standing water to reduce the mosquito breeding. Among them 43% said that they would bury the tyres and utensils which gather water, whereas 30% would burn garbage. Further 3% would fill up the tyres and containers with sand to prevent water accumulation. Only 2 % would add salt to ant traps and standing water.

As a practice 57% said that they would check mosquito breeding sites in their neighbourhood. Among them 44% would participate in community cleaning campaigns (Shramadana), 29% would request neighbours to clean their surroundings if necessary and 8% would inform the relevant health officers.

### **Attitudes regarding dengue fever**

Fifty percent were of the opinion that home remedies can be used for treatment of dengue, while 46% did not agree (Table 4). While most of the participants (86%) agreed that frequent checking of the mosquito breeding sites in their home and garden is required only 57% claimed to check for breeding sites in their neighbourhood. Among them 43% (n=150) said they were unable to check, due to lack of time (33%),

fear of conflicts with neighbours (18%) or because it was unnecessary (11%). When the respondents were asked to self assess their knowledge, 60% were confident that they had an adequate knowledge. (Table 4).

Based on the scoring system described in the methodology when the individual knowledge of each respondent was assessed, only 58 % had satisfactory knowledge on the symptoms, management and transmission of Dengue. Whereas 37% of the respondents demonstrated satisfactory attitudes and 85% claimed to have used good practices towards dengue. (Table 5).

### **Discussion**

Our study revealed that almost all respondents had heard about Dengue (98%), the television and news papers being the main source of information. Similarly high percentages of dengue awareness was reported from Malaysia (98.5%) (7), India (90%) (8) and Pakistan (9). Mass media is a powerful tool in generating better awareness in dengue prevention and control (10,11).

The scores for knowledge and attitudes of the respondents in our study were unsatisfactory whereas the scores for practices were high. High fever was the most quoted symptom comparable with similar studies done in Jamaica (12) and Laos (13), followed by myalgia, vomiting and headache, which may also be confused with the symptoms of common flu. This may imply a delay in seeking medical attention, and thus lead to complications. Only 0.5% recognized the importance of monitoring of low platelet counts, which is a key indicator of DF. However a better knowledge of the haemorrhagic manifestations of DHF could be seen as compared to Thailand and Pakistan (9,14). Although the respondents were conscious of the importance of visiting the doctor when DF is suspected, there is a delay in seeking treatment due to the initial nonspecific presentation of dengue.

Our study sample demonstrated a better knowledge with regard to avoiding aspirin in dengue patients (42%), when compared with a study conducted in Jamaica (12). Aspirin is a drug which is frequently used for reducing fever, and has the tendency to increase bleeding leading to complications in dengue patients.

Table 4: Practices towards Dengue Fever

Questions	Number (N=349)	Percent (%)
<b>Practices regarding home management of DF</b>		
I would treat the patient at home	3	0.8
I will take the patient to a doctor	341	97.7
Both	5	1.4
<b>It is safe to treat a DF patient with the following medications;</b>		
Aspirin	6	1.70
Paracetamol	133	38.10
Boiled corriander	36	10.30
Don't know	150	42.90
<b>Other</b>		
Adequate liquid intake	8	2.20
Rest	7	2.00
Close observation of patient for other symptoms	6	1.70
<b>I prevent mosquito bites by using the following methods ;</b>		
Mosquito nets	250	71.63324
Mosquito coils / mats	94	26.9341
Repellent oils	142	40.68768
Repellent ointments and sprays	93	26.64756
Other		
Fumigation with insecticides or burning of kadju husks etc.	7	2.005731
Use fans	12	3.438395
Cover ventilation holes with nets	2	0.573066
<b>Methods used to prevent mosquito breeding in my home and garden are;</b>		
Remove/drain stagnant water	185	53
Add salt to ant traps and standing water	8	2.2
Add fish to ponds	2	0.5
Add sand to fill up tyres and containers	10	2.8
Burn garbage	106	30.3
Bury tyres, containers, utensil etc. which can gather water	149	42.7
<b>I check for mosquito breeding sites in my neighbourhood.</b>		
Yes	199	57
No	150	43
<b>I will contribute to the control of mosquito breeding areas in my neighbourhood by: (N=199)</b>		
Participation in community campaigns (shramadana)	152	43.5
Inform the health officers	29	8.3
Inform the youth organizations	3	0.8
Inform the media	2	0.5
Request neighbours to keep their surroundings clean	83	23.7
<b>I receive information on DF by;</b>		
Newspapers	265	75.9
Radio	176	50.4
TV	288	82.5
Leaflets	234	67
MOH/PHI	230	65.9
Family and friends	218	62.4

**Table 5: Percentage of individuals with satisfactory and unsatisfactory score in knowledge attitude and practice**

Score	Knowledge	Attitude	Practice
Satisfactory	58	37	81
Unsatisfactory	42	62	19

As coffee coloured vomitus which is a symptom of DF only a minor population were aware of the need to avoid consumption of coloured drinks. Therefore the knowledge on home remedies which can be administered to a dengue patient need to be improved further. The knowledge on transmission was highly satisfactory, where majority knew that dengue is transmitted by day biting mosquitoes, who breeds in clean water. The importance of checking for mosquito breeding sites in their home and garden were acknowledged by most. This is a good trend in the community in preventing transmission. Among the participants 60% of the respondents thought that they had sufficient knowledge about dengue, and this was further confirmed by our scoring system used in the study to evaluate knowledge (58%).

Use of mosquito nets to prevent dengue was the most common practice, which may not be effective as mosquito nets are used at night whereas the dengue mosquitoes feed during day time. Use of mosquito repellent oils and ointments/sprays were also used commonly and are more effective as they can be applied on the body and the person can be ambulant. Some people also mentioned the use of smoke to drive away mosquitoes, by burning coconut husks or cashew nut shells as a traditional repellent in homes and work places. Although the community were aware of good practices regarding the elimination of mosquito breeding sites only a minor percentage would inform the relevant health authorities of unattended breeding sites in their community. Lack of communication between the community and relevant health authorities is a matter of concern and should be improved to prevent the current dengue outbreaks.

Our findings must be interpreted in the light of several potential limitations. The most apparent of which may be the fact that a cross sectional survey assesses relationships based on one point in time. As this was an interview based questionnaire it is possible that the participants may provide socially desirable responses specially regarding practices.

It was not possible to directly observe the practices in our study. However the majority of the participants were mature adults, who were active members of the community and therefore comprised a valid sample for assessment of KAPS. Unlike the other studies (15) where they had looked at only one or two aspects of the knowledge, we looked at the knowledge on dengue in three aspects i.e. knowledge on disease, treatment and prevention measures, which gave a robust picture on the disease.

In conclusion, although good practices were followed, there were gaps in knowledge and poor attitude among the participants which may affect the level and frequency of preventive practices. In spite of our study limitations our findings highlight the need for further information, education and communication programs in the community.

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