



## Knowledge and Attitude Regarding Dengue Fever among the Outdoor Patients of the Teaching Hospital Peradeniya, Sri Lanka

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### ABSTRACT

**Background:** Dengue is a mosquito born flavivirus infection which has been endemic in Sri Lanka since late 19th century. Since there is no effective vaccination to prevent this deadly disease, knowledge of early recognition and appropriate management of the disease and practice of effective vector control are mandatory to control the disease. **Method:** Hospital based descriptive cross-sectional study was conducted on patients attending the outpatient department (OPD) of the Teaching hospital Peradeniya (THP) from 26th to 31st of January 2015. Data were collected using a standard questionnaire and entered in to a password protected excel worksheet. Statistical analysis was done using SPSS 20. **Results:** Data from 500 participants (146 males, 354 females) was used for primary analysis. Only 46.4% of the sample had above average knowledge on dengue fever and its vector. Knowledge had a significant association with education level ( $p < 0.01$ ). Overall attitude towards dengue and its prevention was at a higher level. **Conclusion:** Although the attitude towards dengue was good, knowledge was poor. Hence current health educational programs regarding dengue should be reviewed and also better and effective educational programs should be implemented.

**Keywords:** Dengue, knowledge, Attitude, Sri Lanka, Outpatients

**Abbreviations:** DHF: Dengue Hemorrhagic Fever; DF: Dengue Fever; DSS: Dengue Shock Syndrome; MS: Microsoft; OPD: Out Patient Department; SPSS: Statistical Package for Social Sciences; THP: Teaching Hospital Peradeniya; WHO: World Health Organization

### INTRODUCTION

Dengue viruses, single stranded RNA viruses of the family Flaviviridae, are the most common cause of arboviral disease in the world [1]. There are four distinct serotypes, namely DENV1, DENV2, DENV3 and DENV4, causing dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). Infection with a one serotype of dengue virus causes life time immunity to that particular serotype but no cross protective immunity [2]. The virus is transmitted by Aedes mosquito, mainly *Aedes aegypti* [3].

Dengue is one of the major health problems in Sri Lanka. First seropositive dengue fever was reported in 1962 and since then there is a gradual rise and after 1990, the severe forms of DF, DHF and DSS have been on the rise [4]. From 2010 to 2014 there were 34105, 28140, 44456, 32063 and 47246 cases reported in Sri Lanka. Case fatality ratios from 2010 to 2014 were 0.4, 1.0, 0.7, 0.6 and 0.4 respectively [4].

The pathogenesis of dengue is poorly understood and currently there is no specific treatment nor any antiviral therapy or effective vaccination against dengue [5] but there are promising results regarding vaccination, emerging from a phase 3, randomized, observer-masked, placebo-controlled trial done in Asia-Pacific region [6]. The best alternative method is prevention of the disease spread by vector control and prevention of mosquito bites. Early recognition and meticulous management is needed for low morbidity and mortality due to DF, DHF and DSS. Thus, knowledge and attitude of dengue provides a better outcome.

The purpose of this study is to identify cognition of general population regarding dengue and to identify targets and evaluate dengue prevention and control programs.

### MATERIALS AND METHODS

This hospital based descriptive cross-sectional study was conducted on patients attending the outpatient department (OPD) of the Teaching hospital Peradeniya (THP) after obtaining ethical approval by the Ethical review committee of Faculty of medicine, University of Peradeniya. The study was conducted from 26th to 31st of January 2015 by senior medical officers working at the outpatient department of the THP.

Data collection was done using a self-administered pretested data collection form (questionnaire) which composed of standard questions to assess knowledge and attitude on dengue fever as well as its prevention. The questionnaire was in both Sinhala and Tamil languages. The questionnaire was divided into five sections; 1) Basic information of the participant, 2) Knowledge about dengue fever, 3) Transmission of dengue, 4) Prevention of dengue, 5) Attitude on dengue.

Marks were allocated to questions regarding knowledge of dengue as follows. One mark (01) was given for a correct answer and zero (00) for an incorrect answer. Total of 38 marks were allocated and 28/38 (70%) was considered as the cut off for good knowledge, 18/38 (50%) was considered the cut off for average knowledge and below 18 was considered as poor knowledge.

Patients between 20-70 years of age attending the OPD were included while patients who were mentally subnormal or who needed immediate hospital admission were excluded. Every 12th patient who was eligible for the study was recruited for the questionnaire survey after obtaining the informed written consent.

Sample size was calculated by using sample size calculator which was 500. Data was entered to a password protected computer by using Microsoft (MS) Excel 2007 and analyzed by using statistical package for social science (SPSS 20). Each question was analyzed individually. Mono-variable analysis was done by using table and charts and compared according to the percentages and central tendencies. Bivariable analysis was done to see the association by using two by two table and significance was analyzed.

### RESULTS

#### Socio Demographic Characteristics

Among those 500 subjects, 29.2% (146) were males and 70.8% (354) were females. Majority of subjects who revealed their age were in the age category 20-29 years of age (47.3%). Nearly half of the (56.6%) study population has been educated up to Advanced Level (G.C.E A/L) or beyond (Table 1).

Table 1 Socio-demographic characteristics

Socio-demographic characteristics	Number (N=500)	Percentage (%)
<b>Age (Years)</b>		
20-29	233	46.6
30-39	114	22.8
40-49	103	20.6
50-59	30	6
60-70	13	2.6
Not mentioned	7	1.4
<b>Gender</b>		
Male	146	29.2

Female	354	70.8
<b>Ethnicity</b>		
Sinhala	477	95.4
Muslim	12	2.4
Tamil	9	1.8
Others	2	0.4
<b>Level of education</b>		
Up to grade 5	36	7.2
Up to O/L	165	33
Up to A/L	221	44.2
Tertiary	62	12.4
Not mentioned	16	3.2

### Knowledge Regarding Dengue Fever

Majority of participants (95.4%) believed that dengue is a severe disease condition and 90.8% (454) individuals responded that it is treatable. Among given responses to symptoms, half said (53.4%) that all the responses are true in terms of symptomatology of dengue fever. Majority of the responders (73%) of the study population said that dengue is a recurrent illness (Table 2).

**Table 2 Knowledge regarding dengue fever**

Questions	Number (N=500)	Percentage (%)
<b>Symptoms of dengue fever</b>		
Fever	190	38
Headache	110	22
Bleeding	34	6.8
Myalgia	120	24
Nausea and vomiting	66	13.2
All above	267	53.4
<b>Severity of dengue fever</b>		
Severe	477	95.4
Not sever	10	2
Don't know	11	2.2
Not answered	2	0.4
<b>Treatability of dengue fever</b>		
Treatable	454	90.8
Not treatable	19	3.8
Don't know	25	5
Not answered	2	0.4
<b>Recurrence of dengue fever</b>		
Recurrent	365	73
Non-recurrent	35	7
Do not know	100	20

Only 24.2% and 27.6% knew that they should avoid aspirin and dark colored drinks such as coffee, cola, etc. and 28.4% believed that they should avoid paracetamol during dengue fever. As the treatment option most of the responders (83.2%) said that they would consult a doctor during the initial stage. A small percentage (5.2%) said that they would seek Ayurvedic treatment. Response rate for treatment against dengue is 32.6% for antibiotics, 24.2% for antipyretics, 5% for analgesics and 13.4% papaw juice/leaves.

### Knowledge Regarding Dengue Transmission

Four hundred and fifty-one subjects (90.2%) knew dengue is transmitted by mosquito bites. Of them 28.8% said humans are bitten during day time. Only 182 subjects (36.4) knew it is transmitted by genus Aedes. Majority (442) responded that stagnant clear water is the breeding site of dengue mosquito (Table 3).

Table 3 Knowledge regarding dengue transmission

Transmission is occurred by	Number (N=500)	Percentage (%)
Mosquito bites	451	90.2
Sharing food with infected people	10	2
Fly bites	4	0.8
Unhygienic food	4	0.8
Don't know	29	5.8
<b>Mosquito vectors of dengue fever</b>		
Aedes	182	36.4
Anopheles	156	31.2
Culex	41	8.2
Other	16	3.2
Do not know	134	26.8
<b>Breeding sites of mosquitoes</b>		
Stagnant clear water	442	88.4
Ponds / streams	42	8.4
Forests	95	19
Drainages	60	12
Sewage	49	9.8
<b>Biting time of mosquito</b>		
Dawn	49	9.8
Morning	151	30.2
Daytime	144	28.8
Night	42	8.4
Anytime	189	37.8
<b>What is needed for the transmission of dengue virus?</b>		
Female mosquito	229	45.8
Male mosquito	40	8
Dengue infected person	90	18
Recovered person from dengue fever	26	5.2
Do not know	140	28

### Knowledge Regarding Disease Prevention

Nearly half of the responders (55.6%) answered that usage of mosquito nets during day time to prevent dengue fever and 239 (47.8%) said fumigation to prevent dengue. Regarding the prevention of mosquito bites, 267 were in the favor of use of mosquito nets and number of responders for mosquito repellents, insecticides and mosquito coils were 203, 161 and 148 respectively. Most subjects (419) (83.8%) said cleaning the environment at least once a week to eliminate water collecting areas was a method to be taken to prevent dengue fever during day to day life. Other responses were breeding larvicidal fish in mosquito breeding spots, cleaning rain gutters at least once a week, cleaning the water collecting plate in the refrigerator and adding salt to flower vase/ ant traps by 221, 259, 240 and 232 subjects respectively. One third (35.2%) of the subjects said that there is a vaccine against dengue fever (Table 4).

Table 4 Knowledge regarding disease prevention

Way to prevent dengue fever/ minimize breeding sites	Number (N=500)	Percentage (%)
Addition of insecticides	152	30.4
Covering water containers	104	20.8
Using mosquito nets in day time	278	55.6
Changing water frequently	58	11.6
Fumigation	239	47.8
<b>What measures do you take to prevent mosquito bites?</b>		
Use mosquito coils	148	29.6
Use mosquito nets	267	53.4
Spray insecticides/ fumigation	161	32.2

Use repellents	203	40.6
Other	18	3.6
<b>Actions to be taken to prevent dengue fever during day to day life</b>		
Cleaning the environment at least once a week to eliminate water collecting areas	419	83.8
Breeding larvicidal fish in ponds etc.: at the home garden	221	44.2
Clean rain gutters at least once a week	259	51.8
Clean the water collecting plate in the refrigerator, once in a week	240	48
Add salt into flower vase/ ant traps	232	46.4
<b>Measures which could be taken to minimize mosquito bites outside</b>		
During dengue epidemics, children, pregnant mothers and elderly people should stay outside minimally	182	36.4
Small children and elderly people should cover the body with cloths, when they stay outside	141	28.2
Tires, coconut husks and cashew husks can be burnt to repel mosquitoes	180	36
Fumigation must be done in regular periods	246	49.2
<b>Is there a vaccine against dengue?</b>		
Yes	176	35.2
No	132	26.4
Don't know	9	1.8
Not answered	183	36.6

In our study population, majority had poor knowledge (53.6%), 38.6% had an average knowledge and rest (7.8%) had good knowledge. There was a significant association between the educational level and the knowledge of dengue fever ( $p < 0.001$ ). But there was no significant association between age ( $p = 0.369$ ) nor gender ( $p = 0.091$ ) and knowledge score. The mean score was 18.29, minimum and maximum was 7 and 33 respectively. The standard deviation was 5.45.

#### Attitude Towards Dengue Fever

More than half the subjects strongly agreed that dengue is a serious illness (58.2%). A minority of responders disagreed that dengue is a serious illness. Majority (94.4%) either agreed or strongly agreed that they are at risk of acquiring dengue fever. Of 500 subjects 330 (66%) believed that the government and public both should be responsible for taking action regarding dengue prevention. Only 11 (2.2%) thought it was purely the responsibility of the government (Table 5).

**Table 5 Attitudes towards dengue fever**

Dengue is a serious illness	Frequency (N=500)	Percent (%)
Strongly agree	291	58.2
Agree	130	26
Disagree	13	2.6
Strongly disagree	17	3.4
Don't know	2	0.4
Not Answered	47	9.4
<b>You are at a risk of getting dengue</b>		
Strongly agree	236	47.2
Agree	206	41.2
Disagree	11	2.2
Strongly disagree	13	2.6
Don't know	2	0.4
Not Answered	32	6.4
<b>Dengue can be prevented</b>		
Strongly agree	232	46.4
Agree	161	32.2
Disagree	23	4.6
Strongly disagree	4	0.8

Not answered	80	16
<b>What do you think about dengue patients?</b>		
Always look after at home	50	10
Admitting to a hospital for western medicine is a must	448	89.6
Can be treated with ritual methods	10	2
No need of special attention	5	1
<b>Who should be responsible for taking action regarding dengue prevention?</b>		
Government	11	2.2
Public	150	30
Both	330	66
Don't know	1	0.2
Not answered	8	1.6

### DISCUSSION

Our purpose of this study was to assess the public knowledge and attitude related to dengue fever in Kandy district, Sri Lanka. The knowledge of means of dengue transmission was very high in our study population. Majority new about the vector cycle and biting habits though there was lack of knowledge about the necessity of infected host to transmit dengue. A good knowledge about the life cycle of the virus is equally important as the knowledge about the life cycle of the vector. The cause for the lack of knowledge about the virus could be due to lack of emphasis given to the virus compared to the vector even through media. Hence bridging this gap in knowledge is essential to minimize the incidence of dengue.

Most of the candidates were aware of measures to be taken to protect themselves against mosquito bites. But there is a practical implication in using mosquito nets in which the most popular means to prevent dengue fever, as the mosquito bites occur during day time. So, there is a discrepancy between the population's knowledge of biting habits of the mosquito and the practice to prevent it bites.

A Knowledge, attitude and practice (KAP) study done in Nepal also revealed 98% of the responders said that they would use mosquito nets to prevent mosquito bites [7] and 49% responded as using mosquito nets for preventing DF in a study conducted in Pakistan [8].

Higher percentage (83.8%) of our study population believes, cleaning the environment at least once a week to eliminate water collecting areas may prevent dengue which could be a direct impact from the health education through media. By the time of the study there was no promising discussion of Dengue vaccination. Strangely 73.6% of the study population believed that there could be a dengue vaccine.

The knowledge level on symptoms of dengue fever reported in this study is comparable to findings in similar studies conducted in Sri Lanka, Pakistan and Laos [9-11]. Majority have a good knowledge regarding symptoms of dengue, could be due effectiveness of the media, both electronic and non-electronic media, for giving the basic information at a community level. This is important as early recognition of symptoms of dengue will promote the community to seek early medical attention.

Only one fourth knew that what should avoid during dengue to minimize the complications and to avoid confusion with signs of complications such as blood in stool, hematemesis, etc. A similar study done by Gunasekara, et al. revealed that 42% of their study population knew to avoid aspirin during dengue fever. One third (32.6%) of our study population responded antibiotics as a medication for DF. In a study conducted in Pakistan, response for the same question was 5.6%. Of the same study, 22.8% responded antipyretic as a medication which is more or less similar in our population (24.2%). The belief in antibiotics as a medication for DF may be due to the fact that Sri Lankan usage of antibiotics in febrile condition is higher than the WHO recommended values [9].

Even though the study population was fairly educated 53.6% had a subpar knowledge regarding dengue which could be a reason for frequent outbreaks and increased mortality.

Majority of our study population believed that dengue is a severe condition (95.4%) but it is preventable (90.8%). This is compatible with a similar study done in Nepal in which the percentages were more or less similar (91% and

95% respectively). Knowing that dengue is a serious disease, only 66% of population claimed that it is both public and government responsibility to adhere to the prevention protocols. Interestingly, 57% of the Malaysian participants of a similar study conducted in Malaysia stated that it is the sole responsibility of public to adhere the prevention strategies [12]. It is a fascinating fact, because with that kind of attitude it would be much easier to control dengue epidemic in a country, than with a community who believes that it's the government who is responsible for control of dengue.

It should be noted that there might be certain errors in the results of the study. Although there was a prior training there could be some bias in conducting the questionnaire survey. The responders may have misunderstood the questions or there could be some influence on answering the questions when they were being further explained by the interviewers.

### CONCLUSION AND RECOMMENDATIONS

Overall our study group had a subpar knowledge and good attitudes regarding dengue fever. There was a significant association with the level of education and the knowledge of dengue. However, the study population had a good knowledge regarding some aspects of dengue fever. We believe the reason for overall below average knowledge for dengue fever might be due to lack of information sources available to the public. They mainly use electronic media namely television and radio channels. But the air time regarding dengue information might not be during peak hour television air time, such as 7 p.m. to 10 p.m. Hence there should proper allocation of air time for public awareness programs regarding dengue fever. And also, there should be community based programs, such as poster display, leaflets and seminars to inform the public regarding dengue. We would also like to suggest more formal ways of knowledge such as intergrading knowledge about dengue to school curriculum. After implementation of such programs, we would suggest a re-survey to assess the improvement of the knowledge and the attitude of the public.

### DECLARATIONS

#### Ethical Approval

Ethical approval for the research work has been obtained from the Institutional Ethical Review Committee (IERC) of the Faculty of Medicine, University of Peradeniya, Sri Lanka.

#### Competing Interest

The authors declare that they have no competing interests.

#### Authors' Contributions

WATAJ's concept, responsible for the study design, did literature survey, statistical analysis, and writing of the manuscript and supervised the whole process. SK, UKAD, RSWMATKW and MMCR carried out the data collection process. KDT did data processing, statistical analysis, literature survey, writing of the manuscript under the supervision and help of WATAJ. LPMP and UR guided KDT and helped with the final editing process. Submission to journal is done by UR. All authors critically evaluated the manuscript for intellectual content and agreed to be accountable for all aspects of the work.

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