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## Knowledge and prevention measures against dengue in southern Nepal

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### PEER REVIEW

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#### Comments

This is a simple KAP report but from an interesting area with limited reports. The work is a good representative data from the specific information limited rural area. The work can be good information for recording in public health database.

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### ABSTRACT

**Objective:** To ascertain the knowledge and prevention measures against dengue among selected adult population in southern Nepal.

**Methods:** A cross sectional study was conducted in Rapti Zonal Hospital, Dang and Bharatpur Hospital, Chitwan during August–November, 2011. A total of 212 patients were interviewed regarding their knowledge and practices about dengue fever. Serum samples were collected and investigated for the presence of anti-dengue IgM antibodies by IgM-ELISA.

**Results:** Data from 156 patients greater than 15 years were analyzed. Among them, 21 samples were found to possess anti-dengue IgM antibodies by ELISA. Females, economically active people, farmers, unemployed and housewives were more frequently affected by dengue. Of the total, 118 (76%) were reported to know the disease dengue. Fever, headache and myalgia were the most known symptoms and house drains and kitchen garden were known as the most common breeding sites of mosquitoes. Garbage disposal, use of mosquito nets and covering water containers were the best known preventive measures.

**Conclusions:** The overall knowledge of dengue was high, but females, old persons, unemployed and housewives had relatively little knowledge of dengue. Therefore, these groups may need special attention in future dengue education programs. Persons with knowledge of the disease more frequently reported the use of preventive measures, indicating the value of education programs as a tool in dengue prevention.

### KEYWORDS

Dengue, Knowledge, Practices, Prevention

## 1. Introduction

Dengue is an arthropod borne viral illness that causes significant morbidity and mortality. The major causes of the transmission are the two species of mosquitoes namely, *Aedes aegyptii* (principal vector) and *Aedes albopictus* in the tropical and subtropical areas. There are four distinct serotypes of dengue virus 1–4 within the genus *Flavivirus* which are responsible for two main forms of the disease, dengue fever and severe dengue<sup>[1]</sup>. The clinical manifestations of the infection may include asymptomatic infection, mild flu-like symptoms, and the more severe cases in which patients

may further deteriorate, developing hypothermia and circulatory shock, a condition known as dengue shock syndrome<sup>[2]</sup>. If untreated, this syndrome can cause 40%–50% fatality but if properly treated, it can be reduced to 5% or less<sup>[3]</sup>. Due to the lack of vaccine, treatment for dengue heavily relies on supportive therapy; hence great emphasis is placed on control and preventive measures.

Southeast Asia, the Americas, Africa and the Caribbean Islands have been the most affected areas by dengue fever. The southern lowlands of Nepal during the post-monsoon period provide a climate with elevated levels of rainfall and temperatures that is favorable for breeding of the vector mosquitoes. Since the first case was

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reported in 2004<sup>[4]</sup>, the number of dengue infections are increasing in Nepal. Recent outbreak of dengue in Nepal during 2010 and the scarcity of relevant studies relating to the knowledge and behavior regarding dengue transmission and infection caused an interest in the development of the study. Due to the lack of effective surveillance programs for this emerging disease, we conducted this study to identify the major misconceptions that are prevailing in our society regarding dengue infection. Having a preliminary idea of the knowledge and attitudes of the people will help health professionals to better understand the obstacles prevailing in our society and help to improve dengue prevention programs.

## 2. Materials and methods

A cross sectional study was conducted in the patients seeking care in Rapti Zonal Hospital (RZH), Dang and Bharatpur Hospital (BH), Chitwan during post monsoon period from August to November, 2011. Dengue suspected patients were defined as those with the presence of fever and any two of the following: myalgia, headache, arthralgia, skin rash, retro-orbital pain, hemorrhagic manifestation(s), or leucopenia. A standardized questionnaire was used to collect information from dengue suspected patients about demographic details, their knowledge about dengue symptoms, breeding places of mosquitoes and prevention measures of dengue.

Blood samples (5 mL) were collected from each dengue suspected patients on the day of admission and allowed to clot at room temperature. The blood was centrifuged at 3000 r/min (Eppendorf North America, Inc., USA) for 5 min. Serum samples were then transferred to Everest International Clinic and Research Centre, Kathmandu maintaining the reverse cold chain for further serological tests by IgM antibody capture enzyme linked immunosorbent assay (MAC-ELISA) for dengue virus (Standard Diagnostics Inc., Korea).

Data was analyzed using SPSS Version 17.0. Descriptive statistics for the collected data were recorded. Associations were assessed using *Chi*-square test. The value of significance for all statistical tests was  $P$ -value<0.05.

## 3. Results

A total of 212 patients were involved in the study. Among them, 156 (74%) were in the age group 15 years or older. Different questions related to the knowledge of dengue were asked to the patients. Higher number of females took part in the study than the males. The distribution of age, sex and profession was different among the two study sites (Table 1). Of the 156 dengue suspected patients, 21 were confirmed to possess anti-dengue IgM antibodies by ELISA. The number of dengue cases was more among the females

(12) and 15–50 years olds (14). The profession distribution revealed that the number of dengue cases was more among the farmers, unemployed and the housewives (Table 1).

**Table 1**

Socio-demographic characteristics of dengue fever and non dengue fever cases in two districts of the dengue study.

Socio-demographic characteristics	RZH		BH		Total n (%)	P-value	
	DF	Non DF	DF	Non DF			
Sex	Male	1	28	8	33	70 (45)	0.840
	Female	2	37	10	37	86 (55)	
Age (in years)	15–50	2	33	12	45	92 (59)	0.440
	>50	1	32	6	25	64 (41)	
Profession	Farmer	2	19	6	13	40 (26)	0.680
	Business	0	6	1	11	18 (12)	
	Housewife	0	12	3	12	27 (17)	
	Student	0	11	2	11	25 (16)	
	Employed	0	6	2	11	18 (12)	
	Unemployed	1	8	3	8	20 (13)	
	Others	0	3	1	4	8 (5)	
Knowledge of dengue	Yes	1	45	8	64	118 (76)	0.000*
	No	2	20	10	6	38 (24)	
	Total	3	65	18	70	156	

DF: Dengue fever\*;  $P$ <0.05.

Among the 156 patients aged 15 years or over, 118 (76%) were reported to know the disease dengue. Of these, 92% knew that mosquitoes were involved in the transmission of dengue and 43% mentioned that those vectors were active during daytime. Almost all of the patients with knowledge of dengue mentioned fever as disease symptom. The other most frequently mentioned symptoms were headache and myalgia (Table 2). House drains and kitchen garden were the most commonly replied breeding places of mosquitoes. Garbage disposal, use of mosquito nets and covering water containers were the best known preventive measures (Table 2).

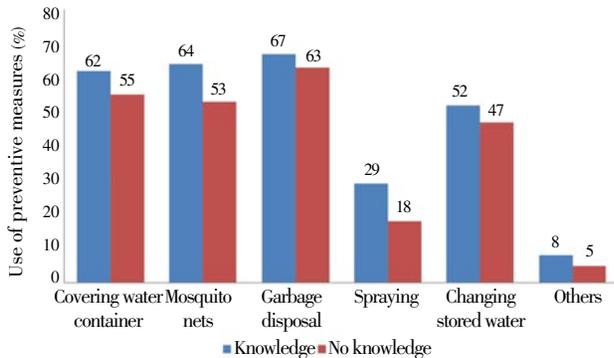
**Table 2**

Knowledge of dengue symptoms, mosquito breeding places and prevention measures among the people with knowledge of dengue.

Knowledge of dengue	RZH		BH		Total n (%)	P-value		
	DF	Non DF	DF	Non DF				
Disease symptoms	Fever	1	44	8	59	112 (95)	0.470	
	Headache	1	40	4	58	103 (87)		0.001*
	Retro orbital pain/rash/bleeding	1	2	2	2	7 (6)		
	Myalgia	0	42	3	51	96 (81)		
	Abdominal problem	0	37	2	54	93 (79)		
Breeding places	Water jars	0	16	4	23	43 (36)	0.644	
	House drains	1	33	6	47	87 (74)		0.744
	Kitchen garden	1	27	3	53	84 (71)		
	Domestic wastes	1	31	5	42	79 (67)		0.985
	Flower pots/ vases	0	18	3	21	42 (36)		
	Others	1	31	5	36	73 (62)		
	Prevention measures	Covering water containers	1	31	5	36		73 (62)
Mosquito nets		0	27	2	46	75 (64)	0.007*	
Garbage disposal		1	35	4	39	79 (67)		
Spraying		0	12	3	19	34 (29)	0.755	
Changing stored water		0	24	4	33	61 (52)		
Others		1	5	2	2	10 (8)		
Total		1	45	8	64	118		

DF: Dengue fever\*;  $P$ <0.05.

The differences in the use of preventive measures between people with and without knowledge of dengue was compared to study if the increased knowledge had helped them to use the preventive measures (Figure 1). People mentioned to know dengue reported the use of all the preventive measures more frequently than those lacking education.



**Figure 1.** Use of preventive measures among people with and without knowledge of dengue.

#### 4. Discussion

The study was conducted in two hospitals in the southern lowlands of Nepal where dengue cases have been reported frequently due to more rainfall, relatively higher temperature, natural and social conditions favorable for mosquito growth, reproduction and transmission of dengue. In this study, 76% of the respondents had knowledge of dengue. The groups of people with relatively low knowledge of dengue were old persons, housewives and unemployed people. They are more commonly involved in household works and hence could be at a higher risk of contacting the vector mosquitoes residing within the household areas. Therefore, they should be focused by the dengue related programs as a special target group for prevention. In a previous study in Chitwan, majority of the respondents (44.1%) had poor level of knowledge[5].

Fever, an obvious symptom, was the clinical feature known to most of the respondents. Headache and myalgia were the other more known features. Knowledge of dengue symptoms was found to be statistically related to the disease. However, other symptoms of dengue were not known to most of the respondents. In a previous study conducted in India too, fever was the most frequently recalled symptom[6]. Most of the respondents rejected retro orbital pain, rash and bleeding as a dengue symptom. This gap in the knowledge of the spectrum of symptoms associated with dengue results in the confusion with most other causes of fever such as malaria, Japanese encephalitis, typhoid, flu, etc. resulting a delay in visiting

the clinic until complications arise. This is an area which needs special attention because the identification and timely management of severe cases is important for the modification of health seeking behavior.

The *Aedes aegypti* mosquito is known to bite mostly during several hours after dawn and before dusk[7]. In this study, less than half (43%) of the respondents were aware of this unique behavior of the vector, though most of the respondents were aware that dengue is transmitted through mosquito bite. Bridging this gap in knowledge is essential for future programs to ensure personal protection against mosquitoes. Most respondents were aware that house drains, kitchen garden and domestic wastes were the breeding places of mosquitoes and they needed to keep their surrounding clean. They were aware of measures to protect themselves against contact with mosquitoes through garbage disposal, using mosquito nets and covering water containers. Yet, a smaller proportion considered spraying as a prevention measure. The bearing of extra cost to purchase these repellents might be responsible for their low use. Most of the respondents, gaining or lacking knowledge of dengue, mentioned the use of mosquito nets as a preventive measure most frequently. But, *Aedes* mosquitoes are active in biting mainly during daytime, and hence this measure is not effective to prevent dengue infection. This is actually effective to prevent other vector-borne diseases which are transmitted by night biting vectors. However, mosquito net is an important preventive measure for dengue infection in case of small children who sleep during the daytime. A study in Pakistan identified house drains, garbage, water jars and animal drinking containers as the most important breeding places for the mosquitoes and people were generally aware of spraying, mosquito nets, repellents and disposal of garbage[8]. In a previous study in Brazil, a gap was found between knowledge and practices about vector prevention[9]. Another study from Northeast Thailand identified several barriers in dengue control including insufficient control agents and inadequate knowledge of control methods[10].

Besides the relevancy of the study, it had some limitations too. Since the survey was interviewer based use of questionnaires, it is possible that some participants would provide socially desirable responses to some questions[11]. Small sample size and short study period were the other major limitations. In spite of these limitations, this study leads to a better understanding of the knowledge of dengue prevailing in our society. The results of this study suggest that the reason behind the persistent emergence of dengue in southern Nepal is due to the gap in knowledge, attitude and practices among people

in the vulnerable areas, hence further education programs should be conducted to identify those barriers and to help people translate their knowledge into preventive practices to reduce the transmission of disease. We, therefore, recommend that future campaigns should involve more aggressive health education that can lead to good practices against dengue.

### Conflict of interest statement

We declare that we have no conflict of interest.

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### Comments

#### Background

This article “Knowledge and prevention measures against dengue in southern Nepal” is a simple knowledge, attitude and practice (KAP) type study. Although the technique is simple the setting is very interesting since it is a rural area that is under reported.

#### Research frontiers

The work reflects a public health issue. It focuses on an important mosquito borne infection, dengue. This work is a good piece in rural infectious medicine.

#### Related reports

There are many reports on KAP for dengue but those are not from this interesting area, where the report is extremely limited.

#### Innovations and breakthroughs

This is a good report in rural medicine and infectious disease.

#### Applications

This work provides good data and can be locally useful

for adjustment of public health system.

#### Peer review

This is a simple KAP report but from an interesting area with limited reports. The work is a good representative data from the specific information limited rural area. The work can be good information for recording in public health database.

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