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Original Article

Knowledge, Attitude and Preventive Practices of Dengue in Local Community People of Janakpurdham

Khushbu Yadav[1]*, Nagendra Yadav[1], Satyam Prakash[2], Basant Kumar Yadav[3]

Author's Affiliations

[1]Department of Microbiology, Janaki Medical College Teaching Hospital, Nepal
[2]Department of Biochemistry, Janaki Medical College Teaching Hospital, Nepal
[3]Janak Nandani Hospital, Janakpurdham, Nepal

Correspondence to:
Mrs. Khushbu Yadav
Assistant Professor
Department of Microbiology,
Janaki Medical College, Nepal
E-mail: meetkhushi20@gmail.com
ORCID: 0000-0001-5001-3983

ABSTRACT

Background & Objective: Dengue is an acute febrile disease, caused by dengue virus transmitted by the female aedes mosquito. The objective of this study was to access the knowledge, attitude, and preventive practices of local community people with regard to dengue viral infection.

Material and Methods: This descriptive cross-sectional study was conducted in the month of August 2022 in Janakpurdham, Nepal. A total of 363 participants were enrolled. Convenient non-random sampling method was applied by designing a standard structured questionnaire. Data was entered in SPSS 18 and p-value<0.05 was considered as statistically significant.

Results: The majority of study participants (98.63%) were aware of dengue infection. Overall, 79.62% of respondents were aware that an aedes mosquito bite can cause dengue. About 68.04% of the participants expressed fear of acquiring dengue, and 82.09% agreed that it is a serious illness. Only 25.06% of participants used a coil or electrical insect repellent. The usage of smoke and fans to ward off mosquitoes was significantly correlated with gender (p<0.05).

Conclusion: The study concludes that the community people's knowledge, attitude, and preventive activities were satisfactory. Various preventive management strategies as well as a public awareness campaign should be used on a regular basis to control the vector.

Keywords: Dengue, Epidemic, Fogging, Immune system, Vector

INTRODUCTION

Despite recent major progress in Dengue Fever (DF) vaccine research, vaccines are not yet accessible in Nepal and do not provide full protection against all DF serotypes [1,2]. The preliminary diagnosis of dengue is based on a combination of travel history and clinical symptoms because the laboratory-based dengue diagnosis is frequently unavailable at

the time of care. Polymerase-chain reaction (PCR), serological assays, or virus culture are used to make a conclusive diagnosis of a dengue virus (DENV) infection. Each test has its limitations, and the identification of DENV depends on certain virological indications, such as infectious viruses, vRNA, and DENV-specific antibodies [3].

Over the past few decades, epidemics of dengue fever (DF) and dengue hemorrhagic fever (DHF) have been reported in Bhutan, India, the Maldives, Bangladesh, and Pakistan [4]. Each year, it is anticipated that there may be up to 100 million instances of DF and 500,000 cases of DHF, along with a few thousand fatalities [5].The first dengue outbreak was documented in Nepal in 2004 [6], while it was initially reported from lowland areas in 2006 [4]. More than 17,000 dengue cases were reported in Nepal in 2019 from low-lying to high-lying areas [7,8]. 109 suspected and confirmed cases of dengue fever, including 38 confirmed deaths (overall CFR 0.13%), have been reported between January and September 2022 from all 77 districts in Nepal [9]. An increasing number of outbreaks have been reported annually in numerous Nepalese districts, including Kanchanpur, Kailali, Banke, Bardiya, Dang, Kapilbastu, Rupandehi, Parsa, Chitwan, Kaski, Rautahat, Sarlahi, Saptari, and Jhapa [10].

Dengue fever outbreaks are occurring more frequently, which weakens the immune system and suggests that the emergency measures taken to eliminate vectors were either ineffective or insufficient [11]. Involving the community could be a more cost-effective technique for reducing dengue over the long term [12]. Despite the fact that there have been numerous KAP research studies in Nepal, they have either been limited to specific dengue-endemic regions [13,14] or have only focused on dengue-infected patients [15]. Therefore, it is important to access the knowledge, attitude, and preventive practices (KAP) of local community people with regard to dengue viral infection.

MATERIAL AND METHODS

Study site and design

This descriptive cross-sectional study was carried out at Janakpurdham in the month of August 2022. Janakpurdham is a sub-metropolitan city located about 225km south-east of Kathmandu. It consists of 25 wards in Dhanusha district in Madhesh Province of Nepal. The selected sites for this study were the ward no. 4 and ward no. 7 in Janakpurdham, Nepal.

Data Collection and Sampling technique

A total of 363 study participants from the 370 targeted households were enrolled in the KAP study. Convenient non-random sampling method was applied. The data was collected using a modified standard structured self-administered questionnaire following review of literatures and expert opinions. Under the guidance of the supervisor, the final-year health assistant (HA) students of Mithila Techincal Academy (MTA), Janakpurdham conducted informal interviews with study participants throughout the data collection process.

The students were divided into two groups. One group visited ward no 4 and another group visited ward no 7 for the data collection. The objectives of the study were explained to local community people. Sufficient time was given to ask questions and it was stated that participation was voluntary

and they might quit any moment throughout the interview. For the convenience of the participants, the interview questions were explained in the local language.

Inclusion and Exclusion Criteria

One adult member was selected from each household. Healthy individuals aged above 15 years were included in the study whereas people suffering from chronic disease and febrile illness were excluded.

Statistical analysis

All completed questionnaires were double-checked and verified on the same day for completeness and consistency. Data was entered in SPSS 18 and p-value<0.05 was considered as statistically significant.

Ethical considerations

An approval letter to conduct this research was obtained from Mithila Technical Academy (MTA) (Ref. 135/078-079) affiliated to the Council for Technical Education and Vocational Training (CTEVT), Nepal. Verbal informed consent was obtained, and confidentiality was assured.

RESULTS

Altogether 363 study populations were enrolled. Of total, 60.34% were male and 39.66% were female. The majority of study participants (42.43%) were over the age of 40 and 55.64% were married. Most of the participants (55.64%) belonged to nuclear family and 98.99% were Hindu. More number of study participants (33.88%) had secondary knowledge. The results are shown in table 1.

Table 1 Socio-demographic pattern of study populations (N=363)

Socio-demographic pattern	No (%)
Genderwise	
Male	219 (60.34)
Female	144 (39.66)
Age group (yrs)	
<20	60 (16.53)
20-40	149(41.04)
>40	154 (42.43)
Marital status	
Married	202 (55.64)
Unmarried	161 (44.35)
Pattern of family	
Nuclear	209 (55.57)
Joint	154 (42.43)
Religion	
Hindu	359 (98.89)
Muslim	4 (1.11)
Educational status	
Illiterate	77 (21.22)
Primary education	97 (26.72)
Secondary education	123 (33.88)
Higher education	66 (18.18)
Occupation	
Farmer	55 (15.15)
Service holder	179 (49.32)
Students	67 (18.46)
Others	62 (17.07)
Pattern of income (per capita Nrs)	
<5000	23 (6.33)
5000-10000	138 (38.01)
>10000	202 (55.64)
Pattern of head of the family	
Father	206 (56.74)
Mother	104 (28.65)
Grand parents	53 (14.60)
Number of family members	
<5	127(34.99)
5-10	142(39.12)
11-15	94(25.89)
>15	0

**Others- Cobbler, Carpenter, Painter, Mazon, Electrician, Photographer*

Table 2. Pattern of knowledge regarding dengue infection (N=363)

S.No.	Parameters	No. (%)
1.	**Knows about dengue infection**	
	Yes	358(98.63)
	No	5(1.37)
2.	**Mosquito causes dengue infection**	
	Yes	296(81.54)
	No	67(18.46)
3.	**Aedes as the mosquito causing dengue**	
	Yes	289(79.62)
	No	8(2.20)
	Don't know	66(18.18)
4.	**Know about the stagnant water is the breeding place of mosquito**	
	Yes	282(77.69)
	No	6(1.65)
	Don't know	75(2.06)
5.	**Dengue causing mosquito bites during day time**	
	Yes	267(73.55)
	No	89(24.51)
	Don't know	8(2.20)
6.	**Incubation period of dengue infection is**	
	3-14 days	83(22.86)
	1-12 days	75(20.67)
	14-28 days	57(15.70)
	1 month	59(16.26)
	Don't know	89(24.51)
7.	**Feeding time of dengue mosquito is**	
	Morning	87(23.97)
	Afternoon	45(12.39)
	Evening	82(22.58)
	Night	76(20.94)
	Don't know	73(20.12)
8.	**Lifecycle of aedes mosquito is**	
	1-3 weeks	79(21.76)
	2-5 weeks	0 (0)
	3-7 weeks	86(23.69)
	1 months	107(29.48)
	Don't know	91(25.07)
9.	**Dengue fever affects all age groups**	
	Yes	256(70.53)
	No	63(17.35)
	Don't know	44(12.12)
10.	**Dengue epidemic starts during hot weather**	
	Yes	298(82.09)
	No	30(8.26)
	Don't know	35(9.65)
11.	**Dengue sometimes shows flu like illness**	
	Yes	273(75.20)
	No	60(16.52)
	Don't know	30(8.26)
12.	**Dengue fever transmits by direct contact**	
	Yes	265(73.00)
	No	72(19.84)
	Don't know	26(7.16)
13.	**Dengue transmission cycle is the "man- mosquito- man"**	
	Yes	169(46.56)
	No	98(26.99)
	Don't know	96(26.45)
14.	**Vaccine for dengue fever has been developed**	
	Yes	132(36.36)
	No	213(58.67)
	Don't know	18(4.96)
15.	**Dengue can be controlled by combating the breeding of mosquito**	
	Yes	283(77.97)
	No	67(18.45)
	Don't know	13(3.58)
16.	**Abate can be beneficial in killing mosquito's larvae**	
	Yes	234(64.46)
	No	58(15.98)
	Don't know	71(19.56)
17.	**Paracetamol is a suitable drug for dengue treatment**	
	Yes	90(24.79)
	No	188(51.79)
	Don't know	85(23.41)
18.	**Dengue is caused by lack of sanitation**	
	Yes	298(82.09)
	No	23(6.34)
	Don't know	42(11.57)
19.	**Which country is more affected by Dengue**	

	Nepal	230(63.36)
	India	63(17.36)
	Bangladesh	15(4.14)
	Pakistan	21(5.78)
	Don't know	34(9.36)
20.	**Diseases is caused by the collection of water around house**	
	Diarrhoea	80(22.03)
	Malaria	65(17.90)
	Cholera	89(24.52)
	Dengue	77(21.22)
	All	52(14.33)
21.	**The place is more vulnerable towards dengue in Nepal**	
	Pokhara	36(9.92)
	Kathmandu	45(12.39)
	Birgunj	89(24.52)
	Janakpur	78(21.48)
	Don't know	115(31.69)
22.	**Dengue is different from malaria**	
	Yes	247(68.04)
	No	82(22.59)
	Don't know	34(9.37)
23.	**Dengue invites death or not**	
	Yes	257(70.79)
	No	68(18.74)
	Don't know	38(10.47)
24.	**Prevention from dengue**	
	By mosquito coil / electric mat	97(26.72)
	Using bed nets and window screens	117(32.23)
	Using mosquito repellants	89(24.52)
	Removing stagnant water resources	21(5.78)
	Spraying insecticides	20(5.50)
	Proper garbage dumping	12(0.33)
	All	7(1.92)

Table 2 depicts that the majority of participants (98.63%) were aware of dengue infection, 79.62% knew that aedes was the dengue-causing mosquito, and 73.55% believed that dengue-causing mosquito bites occurred during the day. A higher proportion of participants (77.69%) stated that stagnant water is a mosquito breeding ground, and 22.86% responded that the incubation period for dengue fever is from 3 to 14 days.

Table 3.Knowlegde about sign and symptoms of dengue infection (N=363)

Sign and symptoms	Yes (%)	No (%)
Fever	363(100)	0 (0)
Joint pain	72(19.83)	291(80.16)
Headache	278(76.58)	85(23.41)
Skin rashes	298(82.09)	65(17.90)
Nausea/ vomiting	273(75.20)	90(24.79)
Fatigue	215(59.22)	148(40.77)
Stomach pain	70(19.28)	293(80.71)
Diarrhoea	128(35.26)	235(64.73)
Bleeding	166(45.73)	197(54.26)
Hypertension	150(41.32)	213(58.67)

Table 3 indicates that out of 363 study participants, maximum number of participants 100%, 76.58%, 82.09% believed that fever, headache, nausea/vomiting respectively, and least believed diarrhoea (35.26%), while approximately moderate of participants believed bleeding (45.73%) and hypertension (41.32%) are the common sign and symptoms of dengue infection. Table 4 depicts that the majority of participants (68.04%) expressed fear about dengue infection, and 82.09% concurred that it is a serious illness. And 60.05% stated that there is a danger of getting dengue. 75.20% responded that dengue is preventable.

Table 5 highlights that maximum of 73.55% participants swept their yards every day. Only 25.06% of participants responded using an electrical or coil mosquito repellent, bed nets (79.6%), and window screens (42.97%). Similarly, 79.02% utilized smoke and 80.16% used fans to fend off mosquitoes. The results are shown in table 5.

Table 4.Pattern of attitude towards dengue infection (N=363)

S. No.	Parameters	Agree (%)	Disagree (%)
1.	You are afraid of getting dengue	247(68.04)	116(31.95)
2.	Dengue infection is a serious illness	298(82.09)	65(17.90)
3.	There is always risk of getting dengue infection	218(60.05)	145(39.94)
4.	A doctor should be consulted for dengue infection	233(64.18)	130(35.81)
5.	Dengue is preventable	273(75.20)	90(24.79)
6.	Government should be responsible for controlling dengue	197(54.26)	166(45.73)
7.	We can individually contribute to prevent dengue	118(32.50)	245(67.49)
8.	It is necessary to seek immediate treatment for dengue as there is no cure for it.	302(83.19)	61(16.80)
9.	Public can play the most important role in dengue control	361(99.44)	2 (0.55)
10.	Chemical Fogging solely is enough for prevention of dengue	292(80.44)	71(19.55)
11.	Elimination of larvae at breeding site is completely necessary	285(78.51)	78(21.48)
12.	There is a high chance for dengue to spread in the future if it happens once	235(64.73)	128(35.26)

Table 5.Pattern of preventive practices towards prevention and control of dengue (N= 363)

S. No.	Parameter	No. (%)
1.	**Sweeping your yard**	
	Daily	267(73.55)
	Alternately	78(21.48)
	Weekly	15(4.13)
	Others	3(0.82)
2.	**What do you do to prevent from dengue infection?**	
a.	**Use of mosquito repellant equipment (electrical or coil) or creams**	
	Yes	91(25.06)
	No	272(74.93)
b.	**Use of bed nets**	
	Yes	289(79.61)
	No	74(20.38)
c.	**Use of window screen**	
	Yes	156(42.97)
	No	207 (57.02)
d.	**Use of fan to drive away mosquito**	
	Yes	291(80.16)
	No	72 (19.83)
e.	**Use of smoke to drive away mosquito**	
	Yes	287(79.02)
	No	76(20.93)
f.	**Covering body with clothes**	
	Yes	298 (82.09)
	No	65(17.90)
g.	**Cleaning of garbage**	
	Yes	278(76.58)
	No	85(23.41)
h.	**Disposing water holding containers (cups, boxes, bottles etc)**	
	Yes	271(74.65)
	No	92 (25.34)
i.	**Cover water container at home**	
	Yes	292(80.44)
	No	71(19.55)
j.	**Electronic media (i.e. TV, Radio,etc.)**	
	Yes	192(52.89)
	No	171(47.10)

Table 6 Association of preventive practices in relative to gender

Preventive practices	Gender		Total	p-value
	Male	Female		
Use of mosquito repellant equipment (electric or coil) or cream				
Yes	67	24	91	0.06
No	152	120	272	
Total	219	144	363	
Use of fan to drive away mosquito				
Yes	197	94	291	<0.00001
No	22	50	72	
Total	219	144	363	
Use of disposing water holding containers (cups, bottles, boxes etc)				
Yes	173	98	271	0.240
No	46	46	92	
Total	219	144	363	
Use to cover water containers at home				
Yes	192	100	292	0.0010
No	27	44	71	
Total	219	144	363	
Use of smoke to drive away mosquito				
Yes	189	98	287	0.0015
No	30	46	76	
Total	219	144	363	

There was the positive association of between the gender and use of fan and smoke to drive away mosquito and also of use of cover water containers at home. The obtained results was found to be statistically significant ($p<0.05$) shown in table 6.

DISCUSSION

In the past 30 years, dengue fever has significantly increased its geographic range and in many locations, reduced its epidemic cycle. Only symptomatic treatment is available for dengue, and the current vaccine has only moderate efficacy and does not offer equal protection against all four serotypes [16]. However, the stronghold of dengue prevention is vector control. The KAP level of local community people and factors associated are the main focus of the current study. The results of this study could help to create a proactive program to safeguard the community's most vulnerable populations' health.

In this study, altogether 363 study populations were enrolled. Of total, 60.34% were male and 39.66% were female. Maximum number of study participants was greater than 40 years age group of 42.43% and married (55.64%). Most of the participants belonged to nuclear family (55.64%) and were Hindu (98.89%). More number of study participants had secondary knowledge (33.88%). However, a comparable study carried out at a dengue hotspot in Malaysia showed that the study group was predominately made up of females (60.6%) and had a mean age of 36$\pm$11.62. The

majority of respondents (74.4%) were married and 62.1 % were Malay [17,18]. The differences in gender might be related to the dominance of males in the Nepalese society.

The majority of participants (81.54 %) believed that mosquito causes dengue infection and 79.62% were aware that an aedes mosquito bite during the day can result in dengue infection. In a related research, the majority of participants recognized that dengue is a viral illness (82.2%) and is spread by mosquito bites (97.2%) [19]. This might be due to the biting behavior of Aedes *aegypti*, as it is known to bite predominantly during the day. Although this species is most active two hours after sunrise and a few hours before sunset, it may still bite at night in well-lit places. This mosquito sneaks from behind and bites victims on the ankles and elbows so the victim won't notice. It prefers to attack humans; however it also bites dogs and other pets, especially mammals. Only females bite to obtain blood in order to lay eggs [20].

The higher percentage of the participants (77.69%) in this study reported that stagnant water is a mosquito breeding habitat. It is probable that they might be knowledgeable of the habitat of mosquitoes and multiple types of water that attract particular mosquito species. Because mosquito larvae and pupae grow in water with little to no flow, all mosquitoes prefer it. Flood water mosquitoes deposit their eggs in damp soil or in containers above the water line, while permanent mosquitoes often lay their eggs in permanent to semi-permanent bodies of water [21].

Only 22.86% of participants responded on 3-14 days incubation period of dengue infection. The findings suggested that participants were unaware of the extrinsic and intrinsic DENV infection incubation periods. These periods are important determinants of the temporal dynamics of DENV transmission and are therefore critical for clinical diagnosis, outbreak investigation, implementation of prevention and control programming, and mathematical modeling of DENV transmission [22]. Our findings on knowledge among participants are consistent with earlier cross-sectional studies in Malaysia [17, 23], Jamaica [24], Philippines [25], and Thailand [26]. But, it differs from some studies conducted in Nepal [27] and India [28]. The difference may be due to intensified education and awareness campaign in the endemic area which can be reflected in the communities' level of knowledge.

In this study, fever (100%), headache (76.58%), nausea/vomiting (82.09%), diarrhoea (35.26%), bleeding (45.73%), and hypertension (41.32%) were thought to be the most common symptoms of dengue infection by maximum participants. In accordance with this study, a different study found that high grade fever was the most frequently mentioned dengue symptom, followed by joint pain (91.0%), muscle pain (92.6%), and headache (92.5%).

Fewer persons, however, identified restlessness (71.1%) and rapid breathing (70.7%) as symptoms of dengue fever [19]. This suggests that they might be known towards the presenting features of dengue which may range from asymptomatic fever to dreaded complications such as hemorrhagic fever and shock. Acute-onset high fever, muscle and joint pain, myalgia, cutaneous rash, hemorrhagic episodes, and circulatory shock are the commonly seen symptoms. However, oral manifestations are rare in dengue infection; however, some cases may

have oral features as the only presenting manifestation [29].

Fever and headache were the most quoted symptoms from participants in our study which are comparable with similar studies conducted in Sri Lanka, India, Yemen, Vientiane, Australia and Malaysia [30-34]. This might be due to having a strong understanding of clinical manifestations and etiopathogenesis of dengue fever. The major clinical features reported during the 2016 DF outbreak in Nepal were fever (100%), headache (71.3%), rashes (11.3%), retro-orbital pain (23.5%), vomiting (23.4%), joint pain (32.1%), and thrombocytopenia (85.7%), and minor symptoms were comprised abdominal pain and a feeling of restlessness [35].

The present findings revealed that 68.04% of participants in total expressed fear of dengue infection. 82.09% of participants agreed that dengue is a dangerous illness. The majority of participants agreed that there was a 60.05% risk of getting dengue. This may be because the majority of households have a very high level of fear of getting dengue fever, but this concern is not supported by a high level of preventive measures.

In the current study, 80.44% of participants thought that chemical fogging alone was sufficient to prevent dengue, while 78.51% thought that larvae removal from breeding sites was absolutely important. The prospect is that they might assume that fogging is the most effective way to control dengue. Fogging, however, only kills the adult mosquito and not the larvae that serve as the breeding habitat. On the other hand, larvicide measures are regarded as a critical intervention to avert the extensive spread of dengue. In certain situations and under optimal settings, killing adult mosquitoes affords temporary control only [36].

But in contrast, in another similar study, half of study participants believe incorrectly that chemical fogging by public health officials is sufficient for dengue prevention. Only 78.0% of people would prefer to actively engage in breeding sites removal [19]. Similarly, Zaki et al. found that 32.7% of respondents thought restricting larvae from reproduction was a complete waste of time [17]. However, other Malaysian studies have provided income, employment status, marital status, and ethnicity, are believed to be associated to a favourable perspective on dengue prevention [37-41]. In Aceh, several regions have observed that a good attitude is related to socioeconomic level. Also, access to dengue information is improved by having a higher socioeconomic class [42,43].

This study revealed that maximum 73.55% participants swept their yards every day. Only 25.06%, 79.6%, 42.97% of participants accounted using an electrical or coil mosquito repellent, bed nets, and window screens respectively to prevent from dengue infection. Similarly, 80.16% employed fans and 79.02% used smoke to ward off mosquitoes. This might be due to the easy availability of these sources in local community. The practice of "smoking" rooms to avoid the annoyance of biting mosquitoes is common, and there is likely anecdotal evidence that smoke is an effective insect repellant [44].

Additionally, a variety of chemical molecules such as fatty acids like capric, oleic, and palmitic acids [45] are found in some plant smokes which have irritating, repulsive, or pesticide properties [46]. However, in a different study, people significantly preferred

using mosquito spray (94.5%) over the responses "search and destroy mosquito breeding sites" (95.0%). The eradication of mosquito breeding grounds (80.4%) was selected as the best self-defense technique, followed by the application of insect repellents (58.3%) [19]. Other studies have shown different levels of KAP from those previously reported [47-49], and a few others have cited effective dengue prevention methods in urban/sub-urban settings [50-52].

The usage of smoke and fans to ward off mosquitoes, as well as the use of covered water containers at home, were all positively correlated with gender. It was determined that the results were statistically significant ($p<0.05$). The results of our study must be considered with prudence in certain aspects as it was related to selected wards only due to time limitation and cannot be generalized to all the wards of Janakpurdham.

CONCLUSION

The current study concludes the knowledge, attitude and preventive practices among the local community people was satisfactory. The affirmative association was found between the genders and use of (fan and smoke) to drive away mosquito and also of use of cover water containers at home.

It is highly suggested to increase the use of mass media to provide frequent information about dengue infection, which may influence people's behavior, in order to effectively prevent future dengue epidemics. In order to create a chain of maintainable public awareness, it is additionally recommended to include health educational programs at various levels of community based organizations.

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Conflict of interest

The authors declare that they have no conflict of interest.

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Author's Contribution: *concept and design, data collection, statistical analysis and drafting of 1st draft-**KY, SP**; reviewed papers and checked the 2nd draft for editing-**SP,NPY,BKY;** checked final draft of a manuscript and approved final draft: **KY, NPY, SP, BKY***

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