Orginal Article

Assessing Knowledge, Attitudes, and Practices towards Dengue Prevention among Residents of Dakshinkali Municipality, Kathmandu: A Community-Based Approach

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Abstract

Introduction: Dengue fever, a mosquito-borne disease, was first reported in Nepal in 2005 and has since spread from the lowland areas to highland regions like Kathmandu (1400 meters). This expansion is linked to rising temperatures, making dengue a growing public health threat. Periodic outbreaks occurred in 2006 and 2010, but the worst outbreak happened in 2022, with over 50,000 cases and more than 50 deaths reported nationwide. Kathmandu, the capital city, had the highest number of cases. Despite this, no studies have been conducted at the household level in areas connecting the lowland (Hetauda) and highland (Kathmandu) regions. This study aims to assess the knowledge, attitudes, and practices regarding dengue prevention to inform future control measures.

Methods: A community-based cross-sectional survey was conducted in wards 7, 8, and 9 of Dakshinkali Municipality, Kathmandu, from February 13-27, 2024. A complete census survey was carried out using a structured questionnaire to collect data on knowledge, attitudes, and practices regarding dengue prevention. Chi-square tests and logistic regression analysis were used to determine associations with demographic factors at a 5% significance level.

Results: A total of 1,190 households were surveyed. Seventy-two percent had heard of dengue, with television (50.5%), radio (35.3%), and health workers (34.2%) as the main sources of information. Only 3.7% had good knowledge, while 68.4% had average knowledge. Despite low knowledge, 87.4% had a positive attitude, and 75.4% practiced dengue prevention. Ethnicity, marital status, occupation, education, family type, and religion were significantly associated with knowledge, attitudes, and practices ($p<0.05$).

Conclusion: Despite extensive dengue prevention efforts, knowledge remains low, especially among the Tamang and Newar ethnic groups. Special awareness programs targeting these groups are essential before the next dengue outbreak. Although attitudes and practices were satisfactory, further improvement is needed.

Keywords: Attitude, dengue fever, knowledge, Nepal, practice, prevention

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Introduction

Dengue is a viral infection transmitted to humans through the bite of infected mosquitoes and is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas. The primary vectors that transmit the disease are Aedes aegypti mosquitoes and, to a lesser extent, Aedes albopictus.[1]

The magnitude of the dengue problem has increased dramatically and has extended geographically to many previously unaffected areas. Now it has become a global public health concern and has increased more than 30-fold over the last 50 years.[2] According to recent study, more than 390 million dengue virus infection (DENV) are estimated to occur per year.[3] Till date no specific treatment as well as no such vaccine are not available in the market against DF. Thus control and prevention is only the method of causing dengue fever from vectors.[1,4] Over the last decade, the geographical distribution of DF has included new countries and more rural areas, making it the most rapidly expanding of this viral disease in the world.[2]

Dengue has become a rapidly growing concern in Nepal. Nepal has a historical record of all types of dengue in 2022. In that same year, Nepal reported 54,784 dengue cases and 88 deaths, marking the highest number ever recorded in the country. This figure was more than three times the number of cases reported in 2019. As of 10th August, 2023 a total of 12,499 dengue cases have been identified from 74 districts, with Koshi province reporting highest number (9655), followed by Bagmati province (1619), Gandaki Province (482) and Sudurpashchim Province (415).[5] This represents the largest dengue outbreak in Nepal with regard to the cumulative number of cases reported nationwide per year. Thus, in order to improve and design sustainable public health interventions for dengue in the community level, with people having different socio-cultural practices, it is required to assess the people's knowledge, attitude and practice (KAP) on dengue virus.[6–8] Whereas several KAP studies have been done in Nepal, these were limited to some specific area or focus on only dengue infected people.[7–9] Still, none of the previous studies were conducted among community people in comprehensive way to assess the knowledge, attitude, and practice to dengue fever, as this is an important effort in designing anti dengue intervention programs.

As they study areas are the entry point of low land area to high land aera. They have a gap of knowledge and understanding of the causes, transmission, and preventive practice of the dengue which impacts on health and combat readiness among community people. Therefore, this study was focused on knowledge, attitude, and practice and its associated factors toward dengue fever and the study helped to effective preventive intervention of community people related to dengue. The study is useful for the local as well as federal government to evaluate and plan to increase knowledge and perception related to dengue fever in terms of prevention and control of the disease.

Methods

A quantitative cross-sectional survey was carried out in wards 7, 8, and 9 of Dakshinkali Municipality, Kathmandu district, Nepal, from February 13 to February 27, 2024. The survey aimed to assess the community's knowledge, attitudes, and practices regarding the prevention of dengue fever using a structured questionnaire. The study utilized a complete census approach within the selected wards to gather information and interviewed 1190 households. The structured questionnaire was divided into three sections. Section A focused on assessing knowledge about dengue, while Sections B and C examined attitudes and practices related to dengue, respectively. The study's independent variables included sociodemographic factors, while the dependent variables encompassed knowledge related to symptoms, transmission, and preventive measures of dengue. Additionally, attitude was assessed based on perceptions, beliefs, and opinions concerning dengue. The third dependent variable, practice, encompassed behaviors related to prevention and adherence to health guidelines. Inform consent from the respondents were taken before collection of data. Descriptive statistics including mean, standard deviation, frequency tables, and diagrams were used to summarize the data. For inferential statistics, chi-square tests and logistic regression analyses were conducted to identify associated factors, with significance level set at 5%. Ethical consideration was taken before conducting the data collection. The reference no. of ethical approval is 2080/081/68.

Results

The educational distribution shows a significant portion with basic education (351 individuals, 29.5%), followed closely by secondary education (343 individuals, 28.8%), and illiterate (246 individuals, 20.7%). A smaller percentage has graduated or pursued post-graduate education (128 individuals, 10.8%). The largest ethnic group is Tamang (533 individuals, 44.8%), followed by Brahmin (259 individuals, 21.8%), Chhetri (148 individuals, 12.4%), and Newar (119 individuals, 10.0%). Most belong to nuclear families (801 individuals, 67.3%), followed by joint families (280 individuals, 23.5%), and a smaller portion to extended families (109 individuals, 9.2%). The majority adhere to Hinduism (801 individuals, 67.3%), followed by Buddhism (305 individuals, 25.6%), and smaller proportions follow Islam (59 individuals, 5.0%) and Christianity (25 individuals, 2.1%).

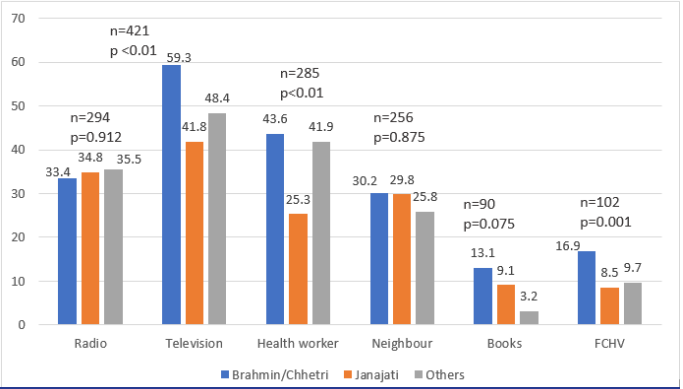


Figure 1. Comparison of source of information about dengue fever by ethnicity (n=841)

Among the 841 respondents surveyed, nearly half (421, 50.5%) received information about dengue from television, followed by radio (294, 35.3%), health workers (285, 34.2%), neighbors (256, 30.7%), FCHV (102, 12.2%), and books (90, 10.8%). When comparing the sources of information about dengue across different ethnic groups, Brahmin/Chhetri respondents received information significantly more from television, health workers, and FCHV compared to other ethnic groups (P<0.05). (Figure1)

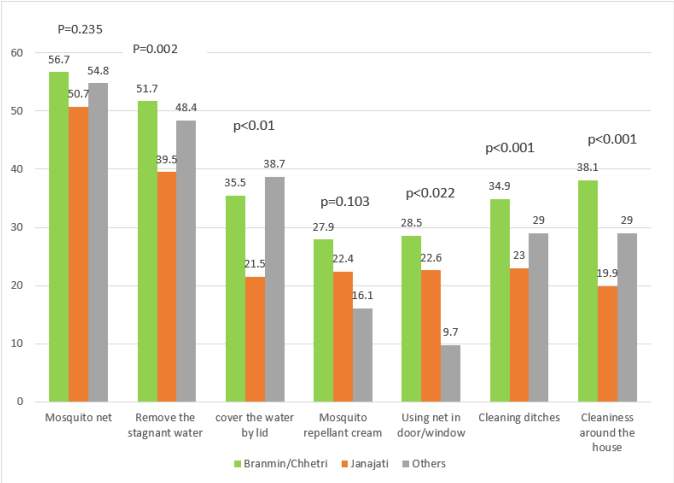


Figure 2. Comparison of knowledge on prevention of dengue by ethnicity (n=814)

Out of 814 respondents, more than half 457(56.1%) had answered that dengue can be prevented using mosquito net and followed by removing the stagnant water from old tyres, plastic jars 384(47.2%). The other prevention methods such as cleaning ditches, covering the storage of water by lid and cleanliness around the house were reported by them constituting 240(29.5%), 238(29.25) and 236(29%) respectively. A significant association was found between Brahmin/Chhetri ethnicity and knowledge of mosquito prevention and control methods, such as removing stagnant water, using nets on doors and windows, cleaning ditches, and maintaining cleanliness around the house (p<0.05). However, other ethnic groups demonstrated a significant association(p<0.01) with preventive measures against mosquitoes, such as covering water storage containers with lids (Figure:2)

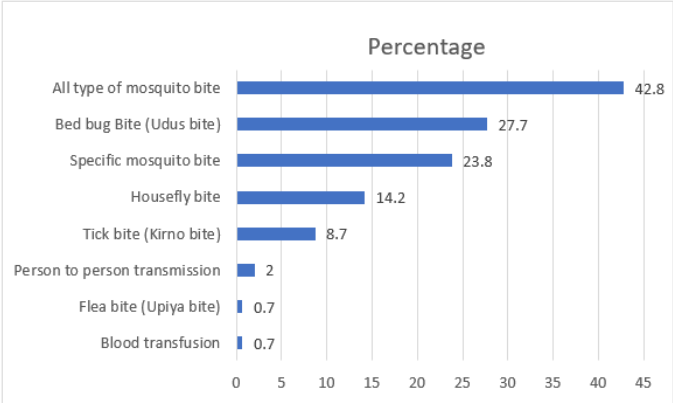


Figure 3. Transmission of Dengue Fever (DF)

Figure 3 shows that among the 808 respondents, the majority (42.8%) wrongly identified that dengue is transmitted through the bites of various types of mosquitoes. In contrast, approximately one-quarter (23.4%) accurately understood that dengue is specifically transmitted by the Aedes mosquito. However, there was a prevalent misconception, with some respondents erroneously believing that dengue could be transmitted by houseflies (14.2%), ticks (8.7%), fleas (0.7%), or bedbugs (0.7%).

This table 1 appears to present demographic data on various categories such as sex, marital status, occupation, education status, ethnicity, family type, and religion, along with the corresponding number of individuals and their percentages in the sample population. There are 519 males, constituting 43.6% of the sample, and 671 females, constituting 56.4%. The majority are married (920 individuals, 77.3%), followed by unmarried (188 individuals, 15.8%), divorced (14 individuals, 1.2%), and widowed (68 individuals, 5.7%). The largest occupational group is in agriculture (610 individuals, 51.3%), followed by students (151 individuals, 12.7%), service (121 individuals, 10.2%), and housewives (103 individuals, 8.7%).

Among 858 respondents, more than two third (606, 70.6%) had reported that high grade fever is the most prevalent sign and symptoms of dengue followed by headache 483 (56.3%), joint pain 293(34.1%) , rashes in the body 240(28.0%) Nausea and vomiting 192(22.4%), muscle ache 181(21.1%), and few of them had the knowledge of eyeball pain 120 (14.0%) , diarrhea 107 (12.5%) and Abdominal pain 95 (11.1%) as the sign and symptoms of dengue. The knowledge on sign and symptoms like high

grade fever, headache, nausea and vomiting, and eye-ball pain are significantly associated with ethnicity(P<0.05). The proportion of knowledge of Brahmin/ Chhetri on these symptoms are more than the other ethnicity. (Table 2)

Table 3 shows that the relationship between mosquito prevention activities and ethnicity, we observed significant associations for certain practices. Specifically, the use of bed nets (p=0.045), busing off around the house around the house (p<0.01), and the covering of water containers with lids (p=0.023) were all significantly associated with ethnicity. Conversely, other mosquito prevention practices did not show statistically significant association (p>0.05).

The data presented in the table indicate that approximately 72.1% of respondents were aware of dengue fever. Of those who were familiar with the disease, only 20.7% demonstrated a good knowledge regarding dengue fever. Despite the generally low level of knowledge, a significant majority (87.4%) exhibited a positive attitude towards dengue fever. Additionally, two-thirds (75.4%) of respondents reported engaging in preventive practices against dengue(Table 4).

Regarding KAP analysis, 20.3% of the participants achieved good knowledge, 87.4% obtained positive attitude and 75%.4 obtained good preventive practice of dengue fever. In the univariate analysis of the associations between KAP and socio-economic variables of the study population (Table 5).

It was found decreased odds of having good knowledge if the respondents were belonged Janajati ethnic groups as compared to the Brahmin and Chhetri (OR:0.47; 95% CI:0.34-0.67) and others religion as compared to Hindu (OR: 0.24;95%CI:0.09-0.65). Furthermore, a multivariate logistic regression analysis was performed to determine the predictors. The odds of knowledge of dengue fever having married respondents had more likely to increase than those who were unmarried (OR: 2.38; 95% CI: 1.11-5.09). But the respondents were others (Tamang and Newar) by ethnicity had decreased odds of knowledge on DF as compared to Brahmin and Chhetri (OR:0.38; 95% CI:0.2-0.61).

Regarding attitude towards dengue fever, ethnicity and religion were significantly associated with the attitude of the respondents (p<0.01). It is found increased odds of having a positive attitude if respondents were Janajati compared to Brahmin/Chhetri (OR: 5.88; 95% CI: 3.03–7.14). Similarly, it was found increased odds of having a positive attitude if they were Buddhist (OR: 5.11; 95% CI: 2.21-11.8). and other religion (OR: 2.5; 95% CI: 1.4–4.76) compared Hindu respectively. All the criteria of model fit like Hosmer Lemeshow test (chi square = 8.55, p=0.381), Chi square = 98.5 and p <0.01, Nagelkerke r2 = 0.091 and classification table = 80.3% were satisfied (Table 6).

Table 1: Demographic information

Variables	Variables	Number	Percentages
Sex	Male	519	43.6
	Female	671	56.4
Marital status	Married	920	77.3
	Unmarried	188	15.8
	Divorced	14	1.2
	Widow	68	5.7
Occupation	Agriculture	610	51.3
	Business	92	7.7
	Service	121	10.2
	Labour	31	2.6
	Student	151	12.7
	Housewife	103	8.7
	Unemployed	82	6.9
Education status	Illiterate	246	20.7
	Literate	122	10.3
	Basic education	351	29.5
	Secondary education	343	28.8
	Graduate and post graduate	128	10.8
Ethnicity	Brahmin	259	21.8
	Chhetri	148	12.4
	Newar	119	10.0
	Jjanajati	85	7.1
	Dalit	25	2.1
	Tamang	533	44.8
	Others	21	1.8
Family type	Nuclear	801	67.3
	Joint	280	23.5
	Extended	109	9.2
Religion	Hindu	801	67.3
	Buddhist	305	25.6
	Muslim	59	5.0
	Christian	25	2.1

Table 2: Knowledge on sign and symptoms of dengue fever(n=834)

Sign and symptoms	Brahmin/chhetri (n=344)	Janajati (n=483)	Others (n=31)	Total	P value
High grade fever	268(77.9%)	314(65.0%)	24(77.4%)	70.6%	<0.01
Headache	221(64.2%)	245(50.7%)	17(54.8%)	56.3%	0.001
Joint pain	132(38.4%)	149(30.8%)	12(38.7%)	34.1%	0.069
Rashes in the body	92(28.7%)	138(28.6%)	10(32.3%)	28.0%	0.737
Nausea and vomiting	101(29.4%)	84(17.4%)	7(22.6%)	22.4%	<0.01
Muscle ache	81(23.5%)	92(19%)	8(25.8%)	21.1%	0.238
Eyeball pain	62(18%)	54(11.2%)	4(12.9%)	14.0%	0.020
Diarrhoea	47(13.7%)	53(11%)	7(22.6%)	12.5%	0.114
Abdominal pain	44(12.8%)	47(9.7%)	4(12.9%)	11.1%	0.364

Table 3: Activities done by the respondents to control the mosquito (Practice)

Activities done	Brahmin/Chhetri (n=344)	Janajati (n=483)	Others (n=31)	P value
Using Pesticide	180 (52.3%)	231(47.8%)	17(54.8%)	0.379
Using screen door/windows	269(78.2%)	355(73.5%)	23(74.2%)	0.289
Using bed nets	269(78.2%)	406(84.1%)	28(90.3%)	0.045
Removal of stagnant water from tyres/ plastic jugs/buckets	297(86.3%)	393(81.4%)	28(90.3%)	0.097
Bushing off around the house	249(72.4%)	400(82.8%)	20(64.5%)	<0.01
Using mosquito coil/ mosquito gel)	258(75%)	377(78.1%)	19(61.3%)	0.082
Disposing water holding container	225(65.4%)	309(64%)	23(74.2%)	0.498
Use repellant/creams	203(59%)	301(62.3%)	15(48.4%)	0.236
Cover water container	211(61.3%)	255(52.8%)	21(67.7%)	0.023

Table 4: Knowledge and perception of dengue

Heard about dengue	Frequency	Percent
Yes	858	72.1
No	332	27.9
Total	1190	100.0
Level of knowledge		
Good Knowledge	174	20.3
Poor knowledge	684	79.7
Attitude		
Positive	750	87.4
Negative	108	12.6
Total	858	100.0
Practice		
Good	646	75.4
Low	211	24.6

Furthermore, it was found a significant association between preventive practices and the gender and religion of the participants (P<0.05). It is found decreased odds of having a preventive practice if respondents were male (OR: 0.66; 95% CI: 0.44–0.94) compared to female. Similarly, it was found increased odds of having a preventive practice if they were other religion (OR: 2.5; 95% CI: 1.1-5.5) compared Hindu respectively.

All the parameter like Hosmer Lemeshow test (chi square = 10.4, p=0.238), Omnibus chi square =25.9 98.5 and p <0.01, Nagelkerke r^2 = 0.05 and classification table = 75.6% were supported to the model fit(Table 7).

Table 5: Association between demographic variable with level of knowledge of dengue (n=858)

Variable	Categories	Level of knowledge		Univariate analysis		Multivariate analysis	
		Good (n,%)	P value Poor (n, %)	COR (95%CI)	P value	AOR (95% CI)	
Gender	Male(376)	86(22.9%)	290(77.1%)	0.095	1.3 (0.95,1.8)	0.577	1.11(0.76,1.63)
	Female(482)	88(18.3%)	394(81.7%)		Ref		
Age	≥50 years	45(21.1%)	168(78.9%)	0.72	Ref		
	<50 years	129(20.0%)	516(80.0%)		1.07(0.77,1.66)	0.546	1.15(0.72,1.85)
Marital status	Unmarried	17(14.2%)	103(85.8%)		Ref		
	Married	148(21.4%)	544(78.6%)	0.072	1.64(0.96,2.8)	0.025	2.38(1.11,5.09)
	Others	9(19.6%)	37(80.4%)	0.394	1.49(0.60,3.7)	0.342	1.78(0.54,5.9)
Ethnicity	Brahmin/Chhetri	94(27.3%)	250(72.7%)		Ref		
	Janajati	73(15.1%)	410(84.9%)	<0.01	0.47(0.34,0.67)	<0.01	0.38(0.23,0.61)
	Others	7(22.6%)	24(77.4%)	0.56	0.78(0.32,1.88)	0.066	0.71(0.28,1.76)
Religion	Hindu	129(21.2%)	479(78.8%)		Ref		
	Buddhist	40(22.7%)	136(77.3%)	0.608	1.09(0.73,1.6)	0.042	1.77(1.02,3.09)
	Others	5(6.8%)	69(93.2%)	0.005	0.24(0.09,0.65)	0.071	0.34(0.11,1.01)
Literacy status	Literate	149(20.8%)	560(79.2%)	0.36	0.8(0.5, 1.2)	0.909	1.03(0.59,1.78)
	Illiterate	25(17.5%)	118(82.5%)		Ref		
Occupation	Agriculture/ homemaker	104(19.5%)	430(80.5%)		Ref		
	Business	21(27.3%)	56(72.7%)	0.115	0.64(0.37,1.11)	0.193	1.46(0.82,2.61)
	Service/students	24(16.7%)	120(83.3%)	0.445	1.2(0.72,1.9)	0.623	0.87(0.51,1.49)
Family type	Nuclear	123(21.85)	442(78.2%)		Ref		
	Joint	31(16.2%)	160(83.8%)	0.102	1.4(0.9,2.2)	0.066	0.637(0.39,1.03)
	Extended	20(19.6%)	82(80.4%)	0.625	1.1(0.67,1.9)	0.684	1.14(0.59,2.19)

Table 6: Association between demographic variable with level of attitude of dengue (n=858)

	Categories	Positive	Negative	P value	UOR	P value	AOR
Gender	Male	336(89.4%)	40(10.6%)	0.128	0.72(0.47,1.09)	0.178	1.4(0.86,2.24)
	Female	414(85.9%)	68(14.1%)		Ref		
Age	<50 years	562(87.1%)	83(12.9%)	0.666	1.1(0.7,1.8)	0.459	1.26(0.684,2.32)
	≥50 years	188(88.3%)	25(11.7%)	ref			
Marital status	Unmarried	112(93.3%)	8(6.7%)	ref			
	Married	597(86.3%)	95(13.7%)	0.036	2.2(1.05,4.7)	0.136	0.52(0.22,1.22)
	Others	41(89.1%)	5(10.9%)	0.37	1.7(0.53,5.5)	0.58	0.65(0.14,3.02)
Ethnicity	Brahmin/Chhetri	327(91.1%)	17(4.9%)	Ref			
	Janajati	393(81.4%)	90(18.6%)	<0.01	4.4(2.5,7.5)	<0.01	5.88(3.03,7.14)
	Others	30(96.8%)	1(3.2%)	0.671	0.64(0.82,4.98)	0.643	1.63(0.20,13.08)
Religion	Hindu	541(89%)	67(11%)	Ref.			
	Buddhist	166(94.3%)	10(5.7%)	0.04	2.05(1.03,4.08)	<0.01	5.11(2.21,11.8)
	Others	43(58.1%)	31(41.9%)	<0.01	11.9(5.4,26.3)	0.002	2.5(1.4, 4.76))

Literacy status	Literate	630(88.1%)	85(11.9%)	0.167	1.4(0.86, 2.3)	0.939	0.97(0.52,1.83)
	Illiterate	120(83.9%)	23(16.1%)	Ref.			
Family type	Nuclear	500(88.5%)	65(11.5%)	Ref			
	Joint	172(90.1%)	19(9.9%)	0.55	0.85(0.49,1.45)	0.754	1.10(0.60,2.0)
	Extended	78(76.5%)	24(23.5%)	0.001	2.36(1.4,4.0)	0.186	1.51(0.82,2.77)
Occupation	Agriculture/ homemaker	400(75%)	133(25%)	Ref			
	Business	52(67.5%)	25(32.5%)	0.161	1.4(0.86,2.4)	0.248	0.64(0.30,1.350
	Service/students	118(81.9%)	26(18.1%)	0.085	0.66(0.41,1.05)	0.959	0.98(0.49,1.95)

Table 7: Association between demographic variable with level of practice towards dengue

Factors	Categories	Practice		Univariate analysis		Multivariate analysis	
		Good	Poor	P value	UOR	P value	AOR
Gender	Male	267(71.2%)	108(28.8%)	0.012	0.46(0.26,0.83)	0.021	0.66(0.44,0.94)
	Female	379(78.6%)	103(21.4%)	ref			
Age	<50 years	488(75.8%)	156(24.2%)	0.639	1.08(0.76,1.55)	0.654	0.90(0.58,1.4)
	≥50 years	156(74.2%)	55(25.8%)		Ref		
Marital status	Unmarried	94(78.3%)	26(21.7%)		Ref		
	Married	518(75%)	173(25%)	0.43	1.2(0.75,1.9)	0.525	0.82(0.45,1.5)
	Others	34(73.9%)	12(26.1%)	0.54	1.27(0.58,2.8)	0.805	0.88(0.31,2.4)
Ethnicity	Brahmin/Chhetri	253(73.8%)	90(26.2%)				<0.01
	Janajati	369(76.4%)	114(23.6%)	0.387	0.84(0.6,1.2)	0.94	0.98(.064,1.5)
	Others	24(77.4%)	7(22.6%)	0.657	0.657(0.3,2.0)	0.82	1.11(.45,2.7)
Religion	Hindu	453(74.6%)	154(25.4%)	Ref.			
	Buddhist	127(72.2%)	49(27.8%)	0.04	2.05(1.03,4.08)	0.323	0.78(0.48,1.26)
	Others	66(89.2%)	8(10.8%)	<0.01	11.9(5.4,26.3)	0.026	2.5(1.1,5.5)
Literacy status	Literate	542(75.9%)	172(24.1%)	0.42	0.84(0.56, 1.3)	0.65	1.11(0.69,1.81)
	Illiterate	104(72.7%)	39(27.3%)	Ref.			
Family type	Nuclear	415(73.6%)	149(26.4%)				
	Joint	144(75.4%)	47(24.6%)	0.622	0.90(0.62,1.3)	0.533	1.14(0.75,1.7)
	Extended	87(85.3%)	15(14.7%)	0.013	0.48(0.27,0.85)	0.137	1.61(0.85,3.0)
Occupation	Agriculture/ homemaker	400(75%)	133(25%)	Ref			
	Business	52(67.5%)	25(32.5%)	0.161	1.4(0.86,2.4)	0.253	0.73(0.42,1.25)
	Service/students	118(81.9%)	26(18.1%)	0.085	0.66(0.41,1.05)	0.094	1.5(0.92,2.54)

Discussion

The findings indicate that while a significant proportion of the population is aware of dengue and shows a positive attitude towards prevention, actual knowledge and practice levels are variable.

While 72.1% of participants reported awareness of dengue, only 20.3% demonstrated a good understanding of its transmission, symptoms, and prevention methods, indicating a significant gap between awareness and detailed knowledge. Despite this, a strong 87.4% of participants

exhibited a positive attitude towards dengue prevention, suggesting a favorable disposition towards health measures. Additionally, 75.4% engaged in good preventive practices, reflecting a substantial commitment to reducing dengue risk. Although dengue poses a major public health challenge in tropical and subtropical regions, including Nepal, similar studies have indicated that knowledge , attitudes and practice toward dengue prevention in these areas are often inadequate.[6–8,10]

Inadequate knowledge about dengue fever can be attributed to several factors, including cultural beliefs, lack of awareness, and ineffective communication strategies. Research indicates that many individuals are unaware of the signs and symptoms of dengue, its mode of transmission, and the importance of preventive measures, primarily due to insufficient health education and poor communication efforts.[6,8] However, dengue prevention practices were relatively high, influenced by the availability of preventive measures, fear of contracting the disease, and government and public health initiatives. Additionally, information disseminated through media channels such as television, radio, and mobile ringtones has contributed to this high level of prevention. The accessibility of preventive tools like mosquito repellents, bed nets, and insecticides has been instrumental in encouraging the adoption of dengue prevention strategies.

The awareness of dengue reported in the present study, at 72%, is consistent with the range of 76% to 98% observed in various other studies conducted across Nepal. This alignment suggests that, despite regional and methodological differences, awareness levels about dengue remain relatively high throughout the country. The slight variation between our findings and those of other studies may be attributed to local differences in public health education efforts or demographic factors. Future research should investigate these variations to better understand the factors influencing dengue awareness and to ensure that public health strategies are effectively tailored to diverse populations.[7,8,11–13]

The findings of the current study reveal an interesting pattern in the knowledge(20.35) , attitude(87.4%), and practice(75.4%) levels among participants. Specifically, the study shows that knowledge levels are relatively lower (58%), whereas attitudes are notably higher (46%), and practice levels are somewhat similar (75%).[14] This contrasts with other studies, such as one that reported a much lower level of knowledge (12%- 44.1%) but a similar findings of attitude level (735- 83%). However, this study found a much lower practice level (37%).[7,15] This discrepancy might by study population and variation socio demographic factors. In comparison, another study conducted in the Kapilvastu district of Nepal reported a higher knowledge level (30.9%) but a very low practice level (38.1%). This discrepancy highlights the variability in how different populations might manifest their knowledge and attitudes into practice. [13]

The study's findings indicate that the level of knowledge among participants is significantly lower compared to studies conducted in other countries, where knowledge levels range from 45% to 97.8%. This disparity suggests that the population in this study may have less access to, or engagement with, the relevant information compared to those in other settings. [16–22]

The study reveals that the attitude towards dengue fever among participants is comparatively higher than in most other studies, with reported attitude levels ranging from 32% to 89.28% in international research. This suggests that, relative to other studies, the participants in this study hold more favorable or informed attitudes about dengue fever.[16,17,20,22,23]

Regarding practices towards DF, the current study demonstrates a significantly higher level of practice compared to various other studies conducted in different countries, where practice levels range from 32% to 69.5% [16,17,19–23] The higher level of practice could be attributed to the increased exposure and awareness resulting from the dengue epidemic in Nepal in 2021. The epidemic likely intensified public health campaigns at both national and local levels, as well as educational efforts and mobile ringtone notifications, leading to improved practices among the population.

The majority of respondents identified the initial symptoms of dengue fever (DF) as follows: fever (70.6%), headache (56.3%), joint pain (34.1%), eyeball pain (14%), and rashes (28%). These findings are consistent with those reported in various studies. [24–26] However, the symptom prevalence in this study is lower compared to a study conducted in Malaysia in 2020, which reported higher rates of high-grade fever (93.15%), headache (92.55%), muscle pain (92.6%), joint pain (91%), abdominal pain (74.7%), and rashes (85.6%)[26] Another study conducted in Bangladesh and Ethiopia reported the higher proportion of sign and symptoms compared to this study. [22,23] This variation in reported symptoms may be attributed to differences in the study populations and settings. Additionally, the knowledge of respondents about signs and symptoms, such as high-grade fever, headache, eyeball pain, and nausea/vomiting are significantly associated with ethnicity ($p < 0.05$). The ethnicity has categorized into Brahmin/Chhetri (Upper caste), Janajati (Newer and Tamang) and Dalit (Scheduled caste).

Ae. aegypti and Ae. albopictus are the most common vectors responsible for transmitting DF to humans.[27] Participants in the study showed differing levels of understanding about DF/dengue transmission. Most of the participants in this study wrongly stated that dengue can be transmitted by bite

of bed bug, flies, ticks, flea, all types of mosquitoes and blood transfusion but unfortunately, very few participants (23.8%) could state the Aedes mosquitoes as the major, responsible vector to transmit DF. Similar findings were reported in another studies. [6,8,12,13] This finding contrasts with studies conducted in Vietnam (90.5%) and Pakistan (93.0%), where respondents identified mosquito bites as the cause. [24,25]

The majority of the respondents reported that they had received information about DF via television (49.1%), followed by radio (34.3%), health personnel (33.2%), neighbor (29.8%), and very few via books. Although the main sources of information are similar to the those in other study, the reported values are higher than in this study. [6,7] The source of information like television, health personnel and female community health volunteer (FCHV) significantly associated with ethnicity.

In this study, more than half of the respondents (457, 56.1%) demonstrated awareness that dengue can be prevented by using bed nets. This was followed by removing stagnant water (384, 47.2%), cleaning ditches (240,29.5%), covering the water container by lids (238,29.25%) and cleanliness around the house (236,29%) respectively. These findings are lower compared to studies conducted in Nepal.[12,13] This variation may be attributed to differences in the study population and area. However, similar findings were observed in studies conducted in Vietnam and Ethiopia.[23,24] Knowledge of dengue prevention methods, such as removing stagnant water, covering water containers tightly, using bed nets, cleaning ditches, using net in the doors and windows and maintaining cleanliness around the house, is significantly associated ($p<0.05$) with ethnicity. Higher knowledge was found in Upper caste (Brahmin/Chhetri) than the other Janajati and Dalit.

Regarding predictors of knowledge of DF, univariate analysis indicates that good knowledge is associated with Janajati and Buddhism as religion. However, multivariate logistic regression reveals that good knowledge is associated with respondents who are married, Janajati, and Buddhist. This finding is supported by the study done in Morang of Nepal.[28] But another study done in Chitwan district of Nepal did not support to this study.[29] This could be because upper caste (Brahmin/Chhetri) were more likely to be involved in education and thus have more information about dengue fever compared to Janajati and other groups.

The univariate analysis indicates that good practice is associated with Janajati ethnicity and Buddhism as a religion. However, further analysis using multivariate logistic regression reveals that good practice is also associated with two additional demographic variables: being married and having an extended family. Thus, marital status, ethnicity, religion, and family type were predictors of attitudes toward dengue. These findings are consistent with a study conducted in Vietnam.[26] However another study conducted in Indonesia did not support to these findings.[16] It might be due to differences in the level of education and previous exposure to dengue fever.

The level of practice towards dengue prevention was categorized as either poor or good, and a univariate logistic regression analysis was conducted to determine the predictors. Only gender, family type, and religion were associated with the practice. However, in the multivariate analysis, only gender and religion were associated with the practice. Similar findings, such as the insignificant association of gender, age, and education with practice, were reported in a study conducted in central Nepal.[6] However, contradictory result were found in the study done in Nepal.[13,16,29,30]

Conclusion

The study assessed the knowledge, attitudes, and practices (KAP) regarding dengue prevention among residents of Dakshinkali Municipality, Kathmandu. While most participants were aware of dengue, detailed knowledge was limited. However, the community showed positive attitudes and good preventive practices, demonstrating a willingness to fight the disease. Television, radio, and health workers, particularly Female Community Health Volunteers (FCHVs), were key information sources. Respondents were generally able to recognize symptoms like high-grade fever, headache, joint pain, nausea, vomiting, and rash. However, only a small percentage accurately identified the mosquito as the main transmitter of dengue, with many holding misconceptions about other potential vectors. Preventive practices varied by ethnicity, including the use of bed nets, removal of stagnant water, and covering water containers. Demographic factors, such as ethnicity, religion, and family type, significantly influenced knowledge, attitudes, and practices. These findings underline the importance of targeted public health interventions tailored to specific communities.

Implication

The findings of this study underscore the importance of enhancing detailed knowledge about dengue prevention among residents of Dakshinkali Municipality. While general awareness exists, misconceptions about transmission and limited understanding of the mosquito vector necessitate targeted educational initiatives. Tailored public health interventions should consider the demographic variations in attitudes and practices, particularly those related to ethnicity, to effectively address gaps in knowledge. Engaging community resources like Female Community Health Volunteers can amplify the reach and effectiveness of these interventions. Ultimately, strengthening knowledge

and correcting misconceptions will be vital for improving dengue prevention practices and reducing disease incidence in the community.

Limitations

This community-based cross-sectional study was conducted exclusively in three wards of Dakshinkali Municipality, which may limit the generalizability of findings to the broader population and introduce selection bias. Furthermore, the study focused solely on exploring knowledge, attitudes and practices related to DF within the community lacking to the intervention. Future research could employ longitudinal studies or intervention trials to explore causal relationships between factors identified in this study.

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Author Contributions

Conceptualization: Prem Prasad Panta; Methodology: Prem Prasad Panta, Srijana Pandey and Satish Kumar Sah ;Data collection : All authors; Data curation: Prem Prasad Panta; Formal analysis: Prem Prasad Panta; Writing of the original draft: Prem Prasad Patna; Review and editing: All authors.

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