

# Awareness and Preventive Practices regarding Dengue among Community Adults: A Cross-sectional Study

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## ABSTRACT

Dengue viruses spread to people through the bites of an infected *Aedes* mosquito (*A. aegypti* or *A. albopictus*). Almost half the world's population, about 4 billion people, lives in areas at risk of dengue. This study aimed to assess the awareness and practices regarding dengue among adult people in a selected community of Jhapa, Nepal. A descriptive cross-sectional study was used. A total of 101 samples were selected using the non-probability convenience sampling technique. A self-developed structured interview schedule was used to collect data. Data analyses were done in Statistical Package of Social Science version 20. Descriptive and inferential statistics namely the Chi-square test were used to analyze the data. The majority of respondents i.e., 63.4% were aware of dengue while more than half of the respondents i.e. 54.5% had poor practices on dengue prevention. There was a significant association between age, ethnicity, and occupation with awareness of dengue. Likewise, ethnicity and occupation had a significant association with practices of dengue prevention among respondents. The study highlights the importance of improving dengue prevention practices and awareness, emphasizing the need for targeted efforts based on age, ethnicity, and occupation.

## KEYWORDS

Awareness, community adults, dengue, preventive practices

## INTRODUCTION

Dengue is a mosquito-borne viral infection. The global incidence of dengue has risen dramatically over the last two decades, presenting a significant public health challenge. Between 2000 and 2019, reported cases surged tenfold, rising from 500,000 to 5.2 million, according to the World Health Organization [WHO]. The WHO ranked dengue fever as the most common mosquito-borne viral disease (WHO, 2023). It represents a significant public health issue globally, with its incidence showing considerable variation across different regions. However, the overall burden of dengue continues to raise worldwide (Zeng et al., 2021). The global dengue cases increased significantly from 23.3 million in 1990 to 104.8 million in 2017, while dengue-related deaths rose from 16,957 to 40,467 during the same period (Zeng et al., 2021).

Dengue is endemic in ten of the eleven Member States in the WHO Southeast Asia region. Notable outbreaks were observed in Nepal and Bangladesh during 2022 and 2023, with a concerning spread beyond traditional hotspots. In Nepal, dengue cases have expanded from the Kathmandu Valley in 2022 to the highlands of Gandaki Province and the southeastern Terai region in 2023 (WHO, 2023). By July 4, 2024, dengue had spread to 73 districts in Nepal, with Kathmandu, Jhapa, and Chitwan reporting the highest incidence. Listed as one of 52 infectious diseases under the Public Health Service Act, 2075, dengue requires heightened preventive efforts. The Ministry of Health has issued a warning about increased mosquito breeding following heavy monsoon rains, which may exacerbate infections (Sen, 2024).

Dengue outbreaks typically occur every 3-4 years, and factors such as the spread of *Aedes* mosquitoes, climate change, stagnant water (Sen, 2024), fragile health systems during the COVID-19 pandemic, and political instability increase the risk of further outbreaks. These challenges complicate epidemic responses and facilitate the spread to new areas. Weak surveillance in many affected countries has led to delayed responses and worsened outcomes. The WHO has classified the global risk of dengue as high due to rising cases and deaths (WHO, 2023). Poor awareness of preventive measures and insufficient practices to eliminate mosquito breeding sites exacerbate the issue. Targeted educational initiatives can address gaps in knowledge and prevention practices (Nguyen et al., 2019).

Socio-demographic variables play a significant role in awareness and preventive practices for dengue. Various socio-demographic variables were found to be associated with awareness of dengue and its preventive practices. Age was associated with dengue knowledge (Khanal, Thapa & Khanal, 2021), while gender and type of family showed a significant association in a study by Poudel et al. (2023). Additionally, educational level and caste/ethnicity were significantly associated with both knowledge and practice of dengue prevention in studies by Khanal, Thapa & Khanal (2021) and Poudel et al. (2023).

Over the past two years, Koshi Province of Nepal has reported a total of 1,065 dengue infections. This highlights the growing impact of the disease in the region, where an increase in cases has been linked to factors such as the monsoon season, climate change, and public health challenges (Republica, 2024). There is a poor waste disposal system in the Terai region may contribute to the persistence of breeding sites for *Aedes* mosquitoes (Pathak et al., 2020). Due to its health impact in the Terai region, the researcher was interested in understanding the level of awareness and practices regarding dengue so the educational program would be conducted based on local data which may help to prevent the dengue infection. Thus, the objective of this study was (1) to assess the awareness and practices regarding dengue among the adult people in a selected community of the Jhapa district and (2) to find out the association between socio-demographic variables and the level of awareness and practice of dengue prevention.

## METHOD

The descriptive cross-sectional study was conducted in a selected community in Jhapa District, Nepal. The study population was all population aged group from 15-49 years residential in a selected one of the wards. The total population of aged group 15-49 years of Damak Municipality, Jhapa ward number nine is 9750 according to data of date 2079-05-15. The sample size was calculated by using the Cochran (1977) formula. By assuming the p-value as 30.9%, the total calculated sample size was 101. Non-probability purposive sampling technique was used to select area and convenience sampling technique was used to recruit the sample for the study. All male and female age groups from 15 to 49 years were

available during data collection and were able to comprehend the researchers' instruction, were included in this study. There was no attrition rate in this study.

The instruments were developed based on previous research and consulting with subject experts. The instruments included a total of 36 questions divided into three parts. The first part included nine questions on sociodemographic variables, the second part included 15 questions related to dengue awareness, and the third part included 12 questions related to dengue prevention practices. All questions were closed-ended, except for one semi-structured question (way of disposing waste) related to dengue prevention practices. Face validity was ensured. Pretesting was done among 10.0% of the total samples of one of the selected community in Damak, Jhapa. The reliability of the Cronbach's alpha ( $\alpha = 0.78$ ) was deemed acceptable based on the Polit and Beck (2021) reference. The researcher collected data of 10 to 15 respondents per day. The average time duration for each respondent was 15 to 20 minutes. The duration of data collection was two weeks. The structured face-to-face interview schedule was used to collect data. A self-developed structured questionnaire was used. Data were collected after getting administrative approval from Damak Municipality and after receiving ethical approval from the concerned authority. Informed written consent from each respondent was obtained before the data collection. Other ethical considerations, such as ensuring confidentiality and respecting participants' privacy, were upheld throughout the study.

Data were analyzed by using Statistical Package for Social Sciences (SPSS) version 20 (IBM AI and Data Science Community, 2018). Descriptive statistics like frequency, percentage, mean and standard deviation were used to assess the level of knowledge and practice of dengue prevention. Further, inferential statistics i.e., the Chi-square test were used to show the association between the selected demographic variables and the level of knowledge and practice of dengue prevention. The significance level of the p-value  $< 0.05$  was considered.

## RESULTS

The majority (30.7%) of respondents were aged between 26 and 35 years, as well as 36 and 45 years. More than half of the respondents (54.5%) were female. Similarly, the majority of respondents (85.1%) followed Hindu religion and 50.2% of respondents were Brahmin/Chhetri. Most of the respondents (94.1%) were literate. Regarding occupation, the majority (30.7%) of the respondents were farmers i.e., agriculture (Table 1).

**Table 1: Respondents' Sociodemographic Characteristics**

Variables	Frequency (n)	Percent (%)
<b>Age group(in years)</b>		
15-25	28	27.7%
26-35	31	30.7%
36-45	31	30.7%
46-49	11	10.9%
Mean ± SD (33.88±9.351)		
<b>Sex</b>		
Male	46	45.5%
Female	55	54.5%
<b>Ethnicity</b>		
Janajati	34	33.7%
Madheshi	6	5.9%
Dalit	10	9.9%
Brahmins /Chhetri	51	50.5%
<b>Religion</b>		
Hindu	86	85.1%
Buddhist	13	12.9%
Christian	2	2.0%
Muslim	0	0
<b>Education</b>		
Illiterate	6	5.9%
Basic education (1-8)	21	20.8%
Secondary education (9-12)	62	61.4%
Universal level (bachelor and above)	12	11.9%
<b>Occupation</b>		
Housemaker	30	29.7%
Agriculture	31	30.7%
Business	17	16.8%
Service	11	10.9%
Others	12	11.9%

The majority (50.5%) of the respondents were aware that dengue is a communicable disease and is transmitted through mosquitoes (98.0%). Common areas for dengue outbreaks were identified as tropical and subtropical regions (86.1%). The majority (97.0%) of respondents recognized that dengue mosquitoes bite predominantly during sunset and night. Most of the respondents were aware that man-mosquito-man (76.2%) is the most common mode of transmission route for dengue and occurs more frequently in the spring season (51.4%). Almost all (99.0%) of respondents answered that mosquitoes get infected with dengue virus after sucking the blood from an infected person. Nearly half of the respondents (49.5%) answered that mosquitoes reproduce in clean containers, and as well as in stagnant dirty water and garbage. According to respondents, immobility (15.3%), bleeding from the nose or gums vomiting blood (18.5%), and the common cold (38.6%) were the common symptoms of dengue (Table 2).

Most of the respondents (95.0%) were aware that dengue is a preventable disease. All the respondents answered that cleanliness of the homestead (37.3%) is the measure that is

taken to prevent mosquito bites followed by using mosquito coil/net/ repellents (26.2%). Similarly, most of the respondents i.e., 73.3% answered that rest and drinking plenty of fluids are the interventions that are essential for caring for infected people with dengue, and 79.2% responded that they had used traditional medicine to treat dengue in the first stage. Similarly, 74.3% and 75.2% of respondents believed that individuals and government are responsible for mosquito control and shock is a complication of dengue fever, respectively (Table 2). This study showed that the majority of their respondents (63.4%) were overall aware of the dengue (Table 3).

**Table 2: Respondents' Awareness Regarding Dengue**

*n=101*

Variable	Frequency (n)	Percent(%)
<b>Meaning of dengue</b>		
Communicable disease	51	50.5%
Non-communicable disease	50	49.5%
<b>Vector for dengue</b>		
Sand-fly	2	2.0%
Mosquito	99	98.0%
<b>Most common area for dengue outbreak</b>		
Himalayan area	2	2.0%
Hilly area	6	5.9%
Tropical and subtropical area	87	86.1%
Desert area	6	5.9%
<b>Time of biting of dengue mosquito</b>		
Sunset	56	55.4%
Night	42	41.6%
Afternoon	2	2.0%
Morning	1	1.0%
<b>The mode of transmission route for dengue</b>		
Man-mosquito-man	77	76.2%
Animal to person	23	22.8%
Person to person	1	1.0%
<b>Dengue fever is common</b>		
Spring season	52	51.4%
Summer season	2	2.0%
Autumn season	2	2.0%
Rainfall	45	44.6%
<b>Mosquito gets infected with dengue virus after</b>		
Sucking the blood from an infected person	100	99.0%
Contact with human sweat	1	1.0%
<b>Place for mosquito breed</b>		
Clean container	50	49.5%
Stagnant dirty water and garbage	50	49.5%
Damp	1	1.0%
<b>Symptoms of mild dengue<sup>b</sup></b>		
Immobility	29	15.3%
Common cold	73	38.6%
Bleeding from nose or gums, vomiting blood	35	18.5%
Restlessness	27	14.3%
Severe abdominal pain	25	13.2%
<b>Is the dengue Preventable?</b>		
Yes	96	95.0%

<b>Measure to prevent mosquito bite<sup>b</sup></b>		
Cleanliness of the homestead	101	37.3%
Instill screen on windows and doors	31	11.4%
Wear light-colored and long-sleeved clothing	68	25.1%
Use mosquito coil/ net/ repellents	71	26.2%
<b>Intervention for caring of people with dengue</b>		
Rest and drink plenty of fluids	74	73.3%
Sanitation	19	18.8%
Proper disposal of waste	8	7.9%
<b>Treatment in first stage of dengue</b>		
Treat yourself at home	14	13.9%
Take traditional medicine	7	6.9%
See a doctor	80	79.2%
<b>Responsible for mosquito control</b>		
Your self	26	25.7%
Both Government and self	75	74.3%
<b>Complication of dengue fever</b>		
Fracture	17	16.8%
Cancer	8	7.9%
Shock	76	75.2%

Note: <sup>b</sup> = Multiple response items

**Table 3: Respondents' Level of Awareness Regarding Dengue**

*n=101*

Level of Awareness	Frequency (n)	Percent (%)	Mean ± SD
Aware (Mean >50%)	64	63.4%	30 ± 3.090
Unaware (Mean <50%)	37	36.6%	

The study results showed that 6.9% of the respondents had suffered from dengue, while 25.7% reported cases of dengue among their family members. Preventive measures were widely adopted, with 97.0% of the respondents using the net in their homes, primarily ordinary net (98.0%). Waste disposal was commonly done by burning (86.1%), while 35.9% of respondents were engaged in proper household garbage disposal. A significant portion of respondents (72.3%) reported dampness near their homes during the rainy season, and 95.0% regularly changed stored water. Additionally, 99.0% covered water containers. Practices such as wearing long-sleeved clothes (94.1%) and minimizing water retention through proper disposal of rainwater-collecting items (31.2%) were also observed. These efforts reflect a strong emphasis on preventive measures for dengue (Table 4). This study highlighted that 54.5% of the respondents had good practices in dengue prevention (Table 5).

**Table 4: Respondents' Practices Regarding Dengue**

Variable	Frequency (n)	Percent (%)
<i>n=101</i>		
<b>Have you ever suffered from Dengue?<sup>a</sup></b>		
Yes	7	6.9%
<b>Any family member suffered from Dengue<sup>a</sup></b>		
Yes	26	25.7%
<b>Use net in-house<sup>a</sup></b>		
Yes	98	97.0%
<b>Type of net use</b>		
Ordinary	99	98.0%
Insecticide-treated nets	2	2.0%
<b>Dispose of wastes</b>		
Dumping	14	13.9%
Composting	0	0
Dispose by burning	87	86.1%
<b>Types of clothes to wear while going outdoor</b>		
Wear long-sleeved clothes	95	94.1%
No idea	6	5.9%
<b>Available of net in doors and window</b>		
All	40	39.6%
Some	50	49.5%
None	11	10.9%
<b>Any dampness near your house during rainy season<sup>a</sup></b>		
Yes	73	72.3%
<b>Change stored water i.e water tank?<sup>a</sup></b>		
Yes	96	95.0%
<b>Cover all water containers used for storing water in or outside the house<sup>a</sup></b>		
Yes	100	99.0%
<b>Ways of cleaning surrounding house area<sup>b</sup></b>		
Proper disposal of household garbage	99	35.9%
Cutting trees/ vegetation	28	10.1%
Clear items frequently that can collect rainwater	86	31.2%
Proper disposal of items that can retain water	63	22.8%

Note: <sup>a</sup> = Dichotomous response items where "no response" was not showed in the table.

<sup>b</sup> = Multiple response items

**Table 5. Respondents Level of Practices Regarding Dengue**

Level of Awareness	Frequency (n)	Percent (%)	Mean ± SD
Good Practice (Mean > 50%)	46	45.5%	15.63 ± 2.17
Poor Practice (Mean < 50%)	55	54.5%	

The study showed a highly significant association between age and awareness ( $p < 0.001$ ) regarding dengue, indicating that awareness increases significantly with age, with younger individuals being less aware than older age groups. Similarly, ethnicity had a significant association ( $p = 0.046$ ), indicating that different ethnic groups experience varying levels of awareness. Occupation also showed a highly significant relationship with awareness ( $p <$

0.001), highlighting that certain professions or employment status, such as housemakers versus those engaged in agriculture, business, or services, play a crucial role in shaping awareness. Regarding, practice on prevention of dengue, ethnicity demonstrates a significant association ( $p = 0.041$ ), indicating differences in practices between Brahmins/Chhetri and other ethnic groups, such as Janajati, Madheshi, and Dalit. Similarly, occupation shows a significant relationship ( $p = 0.031$ ), with housemakers engaging more in dengue prevention practices compared to those involved in agriculture, business, or foreign employment.

**Table 6: Respondents' Association between Socio-Demographic Characteristics and Level of Awareness Regarding Dengue**

*n=101*

Variables	Aware	Unaware	Chi <sup>2</sup> value	p-value
<b>Age in Years</b>				
15-35	53	6	411.178	<0.001***
36-49	33	9		
<b>Gender</b>				
Male	40	6	17.198	0.334
Female	46	9		
<b>Ethnicity</b>				
Brahmins /Chhetri	43	8	44.28	0.046*
Other (Janajati/Madheshi/Dalit)	43	7		
<b>Religion</b>				
Hindu	73	13	20.111	0.561
Other(Buddhist/Christian/Muslim)	13	2		
<b>Education</b>				
Illiterate	5	1	8.908	0.866
Literate (Basic Education/ Secondary education/ Universal level/ bachelor and above)	67	28		
<b>Occupation</b>				
Housemaker	26	4	81.306	<0.001***
Other (Agriculture/Business/Service/ Foreign employment/Others)	60	11		

Note: \* =  $p$ -value  $\leq 0.05$  is statistically significant, \*\*\* =  $p$ -value  $\leq 0.001$  is statistically significant



**Table 7: Respondents' Association between Socio-Demographic Characteristics and Level of Practices Regarding Dengue**

*n=101*

Variables	Good Practice	Poor Practice	Chi <sup>2</sup> value	p-value
<b>Age in Years</b>				
15-35	31	28	196.983	0.222
36-45	17	25		
<b>Gender</b>				
Male	25	21	10.773	0.625
Female	22	33		
<b>Ethnicity</b>				
Brahmins /Chhetri	20	31	35.554	0.041*
Others(Janajati/Madheshi/Dalit)	27	23		
<b>Religion</b>				
Hindu	42	44	11.397	0.42
Other(Buddhist/Christian/Muslim)	11	4		
<b>Education</b>				
Illiterate	3	3	4.041	0.865
Literate (Basic Education/Secondary education/ Universal level (bachelor and above)	88	7		
<b>Occupation</b>				
Housemaker	10	20	33.985	0.031*
Other(Agriculture/Business/ Service/Foreign Employment/ Others)	37	34		

Note: \* = p-value  $\leq 0.05$  is statistically significant

## DISCUSSION

The study result reveals that the majority of respondents (63.4%) were aware of dengue. There is a significant association between age group and ethnicity and awareness regarding dengue. A similar finding was reported in Nepal, where 58.3% of respondents had good knowledge of dengue (Khanal, Thapa & Khanal, 2021). Another, study conducted in Lalitpur, Nepal also indicated a good knowledge of dengue among respondents (KC & Nepali, 2024). In contrast, a study in Nepal found that the overall knowledge about dengue was only 30.9% (Poudel et al., 2023). Similarly, a study in Nawalparasi, Nepal reported that 39.7% of respondents had good knowledge of dengue (Mahatto et al., 2022). The current study further revealed that nearly half of the respondents were aware that dengue is a communicable disease. This finding that contrasts with Poudel et al. (2023), who reported that 98.9% of respondents recognized dengue as a communicable disease.

This study highlighted that 54.5% of respondents had poor practices regarding dengue prevention measures. A similar finding was reported in a study conducted in Nepal by Mahatto et al. (2022), which demonstrated that 52.0% of respondents practiced good prevention measures against dengue. Another, study by KC and Nepali (2024) also supports the finding. In contrast, a study in Nepal found that 62.0% of respondents had good practices for dengue prevention (Khanal, Thapa & Khanal, 2021). Additionally, the current study

finding is slightly dissimilar from a study in Nepal, which reported that 38.1% of the respondents exhibited good dengue prevention practices (Poudel et al., 2023).

This study demonstrated that there was a significant association between age, ethnicity, and occupation with the level of awareness regarding dengue, however, there was no association between education, gender, or religion and level of knowledge on dengue. This finding is similar to a study by Poudel et al. (2023) which showed that caste/ethnicity was associated with overall knowledge of dengue. Similar results were observed in studies by KC and Nepali (2024) and Khanal, Thapa & Khanal (2021), where age had a significant association with knowledge. On the other hand, studies including Khanal, Thapa & Khanal (2021) and KC & Nepali (2024) found significant associations between gender and educational level with dengue knowledge. A study conducted in Bangladesh also reported an association between educational status and knowledge of dengue (Hossain et al., 2021). Likewise, other studies in Bangladesh and Nepal found that sex (Hossain et al., 2021), religion, occupation (Hossain et al., 2021), and ethnicity were not associated with the level of knowledge of dengue (Khanal, Thapa & Khanal, 2021). Additionally, Hossain et al. (2021) indicated no association between age and level of knowledge. Factors such as living areas (Hossain et al., 2021) and sources of receiving health-related information (Khanal, Thapa & Khanal, 2021) played significant roles in shaping awareness of dengue. The variation in results observed in this study may be influenced by differences in exposure to health information and regional differences which were not studied. In addition, cultural, and social, could also contribute to inconsistent knowledge, leading to non-significant associations for some variables.

This study revealed that there was a significant association between ethnicity and occupation with the level of practices regarding dengue prevention. The finding is similar to a study by Poudel et al. (2023) Caste/ethnicity was associated with overall practice on dengue prevention measures. The current study also highlighted that there was no significant association between education, gender, and religion and overall practices of its prevention, which is congruent with a study by Poudel et al. (2023) revealed that age and sex were not associated with the practice of dengue prevention. Despite this, the study found that there was a significant association between educational status and the level of practice of dengue prevention measures (Poudel et al., 2023). Likewise, another study in Nepal found that age, sex, education, religion, and occupation, were not associated with the level of practice of dengue prevention (Khanal, Thapa & Khanal, 2021). The varying results in this study may be influenced by cultural diversity, access to health information related to dengue prevention, socioeconomic disparities, and regional health system challenges in Nepal, which, although not explicitly studied, may play a significant role in shaping practices despite awareness.

## LIMITATIONS

Although the findings could apply to dengue management at the community level, it is important to acknowledge the study's limitations, such as relying on convenience sampling and being restricted to a single ward in one district. Response bias may have occurred due to face-to-face interviews. Furthermore, as a cross-sectional study, it captures data from only a single point in time, restricting its capacity to establish definitive cause-and-effect relationships.

## CONCLUSIONS

The majority of respondents were aware of dengue. There is a significant association between age group, ethnicity, and occupation with awareness regarding dengue. More than half of the respondents had poor practices. There is a significant association between ethnicity and occupation with the level of practices regarding dengue. This study showed that although the majority of respondents were aware, more than half of respondents had poor practices in dengue management. Mosquito prevention programs, including practice training and targeted interventions supported by local leaders, should be implemented to enhance dengue prevention in the community, while considering cultural and occupational factors.

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## COMPETING INTEREST

The authors confirm that they have no competing interests to declare.

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