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Original Article

Knowledge and Preventive Practices of Dengue Fever among Adolescents in a Terai District of Nepal: A Cross- Sectional Study

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Abstract

Introduction: Dengue fever spreads by mosquito bites. Preventive measures are the most effective way to decrease the incidence of dengue. This study aims to find out the knowledge and preventive practices of dengue fever among adolescents in Nepal.

Methods: This descriptive cross-sectional study was conducted among 453 students studying in grades 9 and 10 of selected community and private schools in the Dhanusha district of Nepal. The total enumeration method was used with self-administered semi-structured questionnaires for data collections.

Results: Among 453 respondents, the mean age of the students was 16 ± 1.72 years. Regarding awareness of dengue, (420) 92.7% responded to restlessness as the symptoms of dengue while only 84 (18.5%) attributed bleeding from the gums or nose to the disease. Regarding preventive practices, 424 (93.6%) participants acknowledged the importance of covering the water tank, while 175 (38.6%) considered spraying insecticide as a useful preventive measure. Education alone is significantly associated with the levels of knowledge (p - value = 0.046) and preventive practice (p-value = 0.000). The correlation analysis between knowledge and practice scores revealed a weak positive correlation (r = 0.20, p - value < 0.001).

Conclusion: The study revealed inadequate knowledge and insufficient preventive practices concerning the prevention of dengue fever among adolescents residing in Terai district of Nepal.

Introduction

Dengue fever is a viral infection spread to humans by infected Aedes aegypti mosquito bites. This disease has no specific treatment. Dengue fever has become a worldwide public health issue. Dengue fever's global prevalence has risen dramatically.[1] Every year, an estimated 100 - 400 million infections occur, with over 80% of them being mild and asymptomatic. Dengue fever is endemic in Nepal, where the most recent data showed 51243 cases and 20 confirmed deaths in 2023.[2] Proactive and long-term efforts are required to instill behavioral change in communities in order to combat dengue outbreaks in endemic areas.[3] There is a need for effective and long-term public health education, strengthened vector surveillance, and expanded laboratory capacity for better diagnosis of dengue cases in order to better predict disease burden and seasonality in the country also there is a strong need for implementing preventive strategies.[4]

The significance of behavioral change by educational and health awareness

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programs is important to obtain a significant impact on dengue fever prevention practices as supported by a study published from Indonesia.[5-8] Limited attention, awareness and non-systematized health education programs are considered contributary factors for an increase in dengue incidence at schools.[9]

There are limited studies on the knowledge, attitude, and practice among school students regarding dengue fever in Nepal. However, the results of these studies are inconsistent; some indicate high levels of knowledge and attitudes.[9] This study aims find out the knowledge and preventive practices of dengue fever among adolescents in a low land district of Nepal.

Methods

This is a descriptive cross-sectional study, including 453 adolescents (students in grade 9 and 10) from all the community and private schools in Dhanushadham-07, Dhanusa district, Nepal. All (453) students present on the day of data collection were included in the study. The study area was selected purposively as it is part of Terai region and known for susceptibility to dengue. The research utilized a self-developed pre-tested semi-structured Nepali translated questionnaire, including demographic information, knowledge about symptoms, and practices on preventive measures. A self-administered method was used for data collection. Data collection commenced after obtaining ethical approval from Institutional Review Committee of Institute of Medicine, and permission from respective school authorities. Each respondent provided written informed consent after receiving a clear explanation of the study objectives. The collected data was analyzed using IBM SPSS statistics for windows, version 26 (IBM Corp., Armonk, N.Y., USA, 2019). Frequency, percentage, mean, median, interquartile range, standard deviation, Chi-square test and Fisher's exact test were applied to assess the association of knowledge level and preventive practice level were used for statistical analysis as appropriate. The study also aimed to assess the level of knowledge of dengue prevention. There was a total of 31 items for the knowledge part and 16 for the preventive practice part. Each right response in the knowledge and the practice section scored as one. Knowledge is labeled as adequate and inadequate, and practice is categorized as sufficient and insufficient. The cutoff point for both the knowledge and practice was below 80% and above.[10]

Results

Table 1 illustrates, among 453 respondents, 55.8% (were male, 58.5% (N = 265) of them were of grade nine. The majority (57.0%) (N = 258), were between age group 16 - 17 years and only 9.9% (N = 45) were of the age 18 years and above. The mean age of the respondents was 16 ± 1.7 years. Additionally, 99.1% (N = 449) reported no history of dengue fever infection.

Table 1: Respondents' sociodemographic characteristics N = 453

Variables	Frequency	Percentage
Sex		
Male	253	55.8
Female	200	44.2
Age (In completed years)		
13 - 15	150	33.1
16 - 17	258	57.0
18 and above Mean ± SD = 16 ± 1.72, Range (13 - 21)	45	9.9
Education		
Class 9	265	58.5
Class 10	188	41.5
Had dengue fever ever? (Graph)		
Yes	4	0.9
No	449	99.1

Table 2: Respondent's knowledge on dengue

Knowledge on dengue	Yes N (%)	No N (%)
Dengue is caused by a virus	175 (38.6)	278 (61.4)
Aedes aegypti and Aedes albopictus are main vectors for dengue	269 (59.4)	184 (40.6)
Aedes mosquito prefers to breed in clean water	142 (31.3)	311 (68.7)
Eggs can survive in dry condition up to 6 months	129 (28.5)	324 (71.5)
Mosquito likes to bite early in the morning and late evening	398 (87.9)	55 (12.1)
Dengue fever can cause death	334 (73.7)	119 (26.3)
You and your family members are at risk of dengue	160 (35.5)	293 (64.7)
The same person can be infected with dengue more than once	384 (84.8)	69 (15.2)

Table 2. shows that 84.8% (384) of the total respondents stated that the same person can be infected with dengue more than once. Likewise, 71.5% (324) of the respondents didn't agree that eggs can survive in dry condition up to six months. High proportion of the respondents agreed that mosquito likes to bite early in the morning and late evening while only 38.6% (175) of them agreed that dengue is caused by virus.

Table 3: Respondent's knowledge regarding symptoms and methods of dengue fever prevention

Symptoms of dengue	Frequency	%
Restlessness	420	92.7
High grade fever	419	92.5
Headache	417	91.1
Muscle pain	304	67.1
Pain behind the eye ball	280	61.8
Rashes	274	60.5
Joint Pain	193	42.6
Persistent vomiting or diarrhea	242	53.4
Rapid breathing	221	48.8
Severe abdominal Pain	152	33.6
Bleeding from nose or gums	84	18.5
Methods of preventing dengue		
Use of mosquito net	444	98.0
Clean surroundings	434	95.8
Avoid dirty and stagnant water	409	90.3
Cover water tank	401	88.5
Prevention of mosquito bite	399	88.1
Cover water container	385	85.0
Change water of flower pot	373	82.3
Remove stagnant water	366	80.8
Cut or trim bushes	364	80.4
Vaccination	364	80.4
Use of mosquito repellant	361	79.7
Use of coil / mat / liquid	343	75.7
Spray insecticides	312	68.9
Wear long sleeves	275	60.7
Screen door and window	254	56.1
Use of kerosene oil	166	36.7

*Only yes responses are tabulated

Regarding symptoms of dengue, 92.7% (420) responded "Yes" to the restlessness (92.7%), high grade fever (92.5%) and headache (91.1%) followed by muscle pain and pain behind eyeball with 67% (304) and 61.8% (280) respectively. Despite this, nearly 81.8% (369) responded "No" to bleeding from nose or gums as the symptom of dengue. The proportion of "Yes" and "No" was almost equal in persistent vomiting or diarrhea and rapid breathing as symptoms of dengue.

About the knowledge of dengue prevention, 98% (444) stated that use of mosquito net is one of the most important methods of preventing dengue fever followed by clean surroundings and avoiding dirty and stagnant water with 95.8% (434) and 90.3% (409) respectively. Similarly, 56.1% (224) of the respondents stated that screen door and window is also the method of preventing dengue fever.

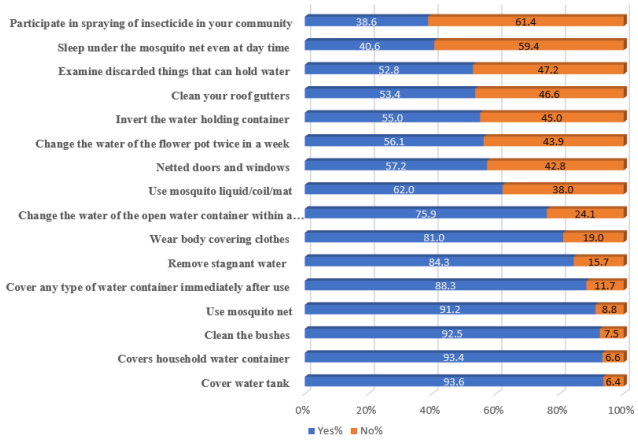

Figure 1: Respondents' practice of preventing dengue

In regard to "Yes" response, majority of the respondents (93.6%) covered the water tank and only 38.6% participated in spraying of insecticide in own community. In regards of "No" response 61.4% said they didn't participate in spraying of insecticides in their community, a very few (6.4%) stated that they don't cover the water tank (figure 1).

Table 4: Respondents' level of knowledge and preventive practice regarding dengue fever

Level of Knowledge	n (%)	Level of Practice	n (%)	Correlation coefficient	p-value
Inadequate	436 (96.2)	Insufficient	326 (72.0)	0.20	<0.001
Adequate	17 (3.8)	Sufficient	127 (28.0)		

Mean knowledge score; 19.89 ± 2.87, Mean practice score; 11.15 ± 2.43

This finding reveals that 96.2% (436) of the study participants had inadequate knowledge about dengue fever and its prevention, only 3.8% (17) having adequate knowledge. In terms of prevention practices, 72% (326) demonstrated insufficient prevention practices while 28% (127) exhibited sufficient preventive practices. Moreover, the correlation analysis between knowledge and practice scores revealed a weak positive correlation ($r = 0.20$, p-value < 0.001). This

suggests a statistically significant but modest relationship between the participants knowledge regarding dengue fever and their corresponding preventive practices.

that a virus causes dengue. This result contrasts with that of a study which found that 384 (85.2%) students knew that dengue is a viral disease.[14]

Table 5: Association of knowledge level and preventive practices with selected variables

Variables	Knowledge level		P-value	Practice level		P-value
Age (Years)	Inadequate (%)	Adequate (%)		Insufficient (%)	Sufficient (%)	
15 years and below	141 (94.0)	9 (6.0)	0.077	100 (66.7)	50 (33.3)	0.077
16 years and above	295 (97.4)	8 (2.6)		226 (74.6)	77 (25.4)	
Sex						
Male	246 (97.2)	7 (2.8)	0.214	183 (72.3)	70 (27.7)	0.845
Female	190 (95.0)	10 (5.0)		143 (71.5)	57 (28.5)	
Education						
Class 9	251 (94.7)	14 (5.3)	0.046*	174 (65.7)	91 (34.3)	0.000*
Class 10	185 (98.4)	3 (1.6)		326 (80.9)	127 (19.1)	

*Sign indicates significant association between the variables.

In table 5, Chi-square test and Fisher's exact test were applied to assess the association of knowledge level and preventive practice level with age, sex and education of the respondents. The education is only found significantly associated with knowledge level (p-value = 0.046) and preventive practice level (p-value = 0.000).

Discussion

This was a questionnaire survey regarding the knowledge and preventive practices among school going adolescents regarding dengue fever from Nepal. The majority of study participants were male (55.8%) with the mean age of 16 ± 1.72 years. Regarding dengue fever infection almost all (99.1%) of the respondents were never infected with dengue. According to our findings, 253 (55.8%) of the 450 respondents were males, while 200 (44.2%) were females. There were 258 respondents (57.0%) between the ages of 16 and 17, with only 45 (9.9%) between the ages of 18 and above. In contrast to this result, in the study conducted by Khan et al, 51.04% were females and 48.6% were males among 625 participants.[11] Similarly, in another study the proportion of female participants were 64.7%.[6] This study result is in contrast to another study where male numbers were higher than the females.[12]

Regarding dengue fever infection almost all (99.1%) of the respondents were never infected with dengue and only four (0.9%) were reported as infected. This outcome is consistent with research done among school-aged children in Thailand, which found that 84.4% of the respondents overall had no history of the disease.[13]

Our survey found that about 60%, respondents did not know

The study findings revealed that around 59.4% had answered Aedes aegypti and Aedes albopictus are main vector for dengue, 71.5% said "NO" on the statement "Aedes Mosquito prefers to breed in clean water". This result is similar to the study which depicted that even though the majority of respondents (93.8%) had heard of dengue, they continued to hold false beliefs about the breeding grounds for aedes.[15]

The majority of survey participants had the false impression that aedes can reproduce in contaminated water, and 43.1% were aware that aedes mosquitoes often bite between sunrise and sunset. Similarly, regarding main vector of dengue our finding was supported by the study which showed that majority of the respondents were aware about the causative agents of dengue.[8] In contrast, another study revealed that about 51.1% of those interrogated were aware that the dengue mosquito breeds in clean standing water.[11]

Most of the respondents answered correctly regarding symptoms of dengue. It shows that respondents were aware about the symptoms of dengue. This study finding is in contrast with the studies which stated that respondents were unaware and had low knowledge about symptoms of dengue fever.[16,17]

About (87.9%) of the respondents answered correctly on the statement "Mosquito likes to bite early in the morning and late evening". But this result is in contrast with the study which stated that around 43.1% were aware that aedes mosquitoes often bite between sunrise and sunset.[15] Our finding is supported by the studies which revealed that most of the people knew that the mosquito usually bites either at sunset / dusk (57.5%) or at sunrise / dawn (44%).[11]

Regarding practices, most of the respondents answered correctly regarding methods of preventing dengue fever from that we can say that they were aware on different methods of preventing dengue fever. In contrast to this result, although it was discovered that the majority of participants had a better grasp of dengue vectors, their participation in terms of using preventive measures was very insufficient.[12] With regards to preventive response, majority of the respondents (61.4%) said they didn't participate in spraying of insecticides in their community which is similar to previous study on the knowledge and practice of dengue control which stated that the majority of the respondents (73.8%) haven't participated in spraying of insecticides in their community. In regards to the "Yes response" majority of the respondents (93.6%) covered the water tank which is supported by the study conducted by Rahman et al.[12]

Likewise, 71.5% of the respondents said "Yes" on the statement "Dengue fever can cause death" and 84.8% of the respondents answered that same person can be infected with dengue more than once which showed that our respondents were quite aware about dengue and its outcomes. This finding is supported by the study which stated that respondents were aware and had positive attitude towards knowledge and symptoms of dengue as well as dengue fever. On the other hand, 293 respondents, (64.7%) disagreed with the claim that "You and your family members are at risk." It reveals that respondents thought that by taking precautions, they would be protected from the dengue virus; as a result, appropriate dengue awareness initiatives must be provided which is supported by the study which revealed that awareness need to be done regarding dengue virus prevention.[18] Several studies which found that health education and awareness programs are beneficial to raising the level of awareness of diseases like dengue, supported these findings.[19-21] Therefore, it is appropriate to suggest educational programs centered in schools and social mobilizations to increase community involvement in dengue control.

The study findings revealed that almost all (96.2%) of the study participants had inadequate knowledge regarding prevention of dengue which was supported by the studies which stated that there were very low to medium level of knowledge and insufficient as well as not effective preventive practices regarding prevention of dengue.[22-24] In contrast, other studies have stated that study participants had high level of knowledge regarding dengue prevention and adequate level of preventive practices.[25-28]

Present study stated a moderate but statistically significant correlation between the participants' knowledge of dengue fever and the appropriate preventive measures they took, but in contrast other studies have stated that there was no any co-relation between knowledge and preventive practices of dengue.-[29,30]

As this study was limited to a single district in Nepal, the findings cannot be generalized to the entire population. The current study recommends school-based health education and awareness programs by using social medias and integrating it into the school-based curriculum will be beneficial for health promotion activities regarding awareness and practices of Dengue Fever.

Conclusion

The study concluded that adolescents displayed insufficient knowledge and inadequate preventive practices regarding dengue fever. While being aware of preventive methods, they believed their family members were not at risk of dengue and were unaware of the virus causing sickness. Given adolescents' pivotal role as agents of change, educational interventions should prioritize enhancing their understanding of dengue fever mechanism.

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