

Original article

Knowledge, Awareness and Practices on Dengue Fever in Rural and Urban Communities

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Abstract:

In the recent years dengue fever has become global public health concern as there has a dramatic increase of cases of dengue in tropical and subtropical regions around the world, predominantly in urban and rural areas. A community based cross sectional study was conducted among purposively selected 347 participants to ascertain the knowledge, awareness and practices on dengue fever in rural (n=196) and urban (n=151) communities of the Sylhet division, Bangladesh. Mosquito bite as mode of spread (61.22%, 82.12%), Aedes mosquito as the vector (40.83%, 64.52%), day as biting time (40.83%, 64.52%), stagnant water as breeding place (58.16%, 74.83%) and removal of water stagnation as eliminations of breeding place (40.31%, 64.90%) was mainly reported by study participants respectively in rural and urban communities. Fever (53.7%, 68.27%) was identified as a leading symptom of dengue fever. Using of bed nets (61.73%) was a conjoint recognition in rural whereas window screen (40.40%) in urban as effective measures for controlling mosquito bite. Besides preventive measures like use of bed nets (47.96%, 27.81%), window screen (7.14%, 48.34%) and for control measures removal of water stagnation (31.12%, 58.94%) was mostly utilized method in both settings. The awareness on dengue fever found good in both rural and urban communities but knowledge and preventive practices were considerably low which is predominant in rural. It could be improved through increase community participation and educational campaigns.

Keywords: Dengue fever, knowledge, awareness, practices.

Introduction

Dengue fever is a systemic arboviral infectious disease caused by the dengue virus and transmitted by infected female Aedes mosquitoes, predominantly *Aedes aegypti* and *Aedes albopictus*.¹ Infections can also be transmitted through blood transfusion, organ transplantation and possibly vertically from mother to child.² There are four distinct serotypes of dengue virus, namely DEN-1, DEN-2, DEN-3 and DEN-4.³ The global incidence of dengue has grown dramatically in recent decades. About half of the world's population is now at risk. Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban areas and also in rural areas.⁴ Dengue infections may be asymptomatic or may cause classical dengue fever or its severe forms, namely dengue haemorrhagic fever and dengue shock syndrome.⁵

The prevalence of dengue, estimates that 3.9 billion people, in 128 countries, are at risk of infection with dengue viruses.⁶ A major outbreak of DEN-3 followed

by co-detection of DEN-2 & DEN-3 occurred in 2019 in Bangladesh⁷ and there were total 101,354 cases of DENV infections and 164 deaths reported (Figure 1).^{8,9}

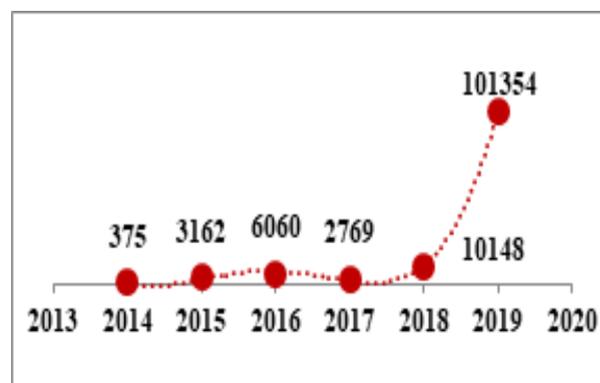


Figure 1: Dengue Cases Reported in 2014-2019 by IEDCR⁸

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Factors like unplanned urbanization and poor water management systems, including water storage practices leading to the proliferation of mosquito breeding sites.⁹ The only key strategy to curb this menace are vector control measures like elimination of breeding sites, usage of insecticide sprays and insecticide treated bed nets. These measures are in turn dependent on knowledge and awareness, and can be promoted in communities.¹⁰

Material and methods

A community based cross sectional study was carried out to ascertain the knowledge, awareness and practices on dengue fever in rural and urban communities. The study sample was selected purposively who satisfied the inclusion criteria of the study during the period of November, 2019 to January, 2020. Total 347 samples were purposively selected, where 196 participants were living in the rural communities of Golapganj upazila and 151 participants were living in Sylhet City Corporation as urban population, located in the western part of Bangladesh. Sample size of urban setting was not equal with rural setting due to limitation of the study period. A pre-tested semi-structured questionnaire was used for data collection through face to face interview after obtaining informed written consent from each. The questionnaire consists of four parts: questions on socioeconomic state, knowledge about of dengue fever, awareness about of dengue fever and practices regarding prevention and control measures of dengue fever. The data were checked and cleaned followed by making a template, categorizing data, coding and recoding into IBM SPSS v25. The analysis was carried out by using descriptive statistics and presented with frequency tables and charts. The study was approved by the Sylhet Women's Medical College Research Ethics Committee.

Results

The study participants consisted of 347 (196 from rural and 151 from urban) community population. Table 1. depicts there were 243 (137 and 106) females and 104 (59 and 45) males, giving a male to female ratio 1:2.34. Most of them were married (69.90% and 58.28%) and housewives (43.37% and 37.09%). Among the participants and their spouses, 21.94% and 23.47% were illiterate in rural areas whereas 9.27% and 5.30% were in urban settings respectively. Majority (71.94%) of the rural population had an average monthly family income ≤10000 BDT which is opposite for the urban participants with advantage for them.

Table 1.: Participant's socioeconomic state (N=347)

	Rural (n=196) f (%)	Urban (n=151) f (%)
Sex		
Male	59 (30.10)	45 (29.80)
Female	137 (69.90)	106 (70.20)
Educational state		
Illiterate	43 (21.94)	14 (9.27)
Literate	153 (78.06)	137 (90.73)
Spouse's educational state		
Illiterate	46 (23.47)	8 (5.30)
Literate	150 (76.53)	143 (94.70)
Occupational state		
Housewife	85 (43.37)	56 (37.09)
Service	15 (7.65)	35 (23.18)
Business	8 (4.08)	17 (11.26)
Labor	32 (16.33)	5 (3.31)
Others (student, abroad etc.)	56 (28.57)	38 (25.16)
Average monthly family income (BDT)		
≤10,000	141 (71.94)	31 (20.53)
10,001-30,000	48 (24.49)	64 (49.01)
>30,000	7 (3.57)	46 (30.46)

Knowledge about dengue fever

Figure 2. illustrates that most of the participants, 61.12% (53.57%, 68.27%) were well known about fever, as a typical symptom of dengue fever in both rural and urban settings. However, when further queried about the other symptoms, a lower number of participants were able to correctly identify these. Table 2. portrays, most of the participants (61.22%, 82.12%) knew that mosquito bite as a mode of spread of the dengue fever, but among them only 40.83% and 64.52% knew that Aedes mosquito (AM) as vector. On the other hand, 26.02% and 56.95% knew that Aedes mosquitoes bite at day time. Stagnant water was mentioned as an important source of breeding place (58.16%, 74.83%). Removal of water stagnation (40.31%, 64.90%) found an effective measure for dengue prevention in both settings whereas rural people found use of bed nets (61.73%) and urban found use of window screen (40.40%) is the second most effective measures to prevent dengue.

Awareness about dengue fever

Table 3. reveals, majorities (90.31%, 89.40%) have the knowledge regarding management and treatment and well aware about the prevention of major risk of

complication following consultation with physicians (69.90%, 86.09%) respectively in both rural and urban settings. Sources of information on dengue fever has been illuminated in Figure 3.

Table 2.: Knowledge about dengue fever

	Rural f (%)	Urban f (%)
Mode of spread (Rural, Urban; n=196, 151)		
Mosquito bite	120 (61.22)	124 (82.12)
Others (housefly bite, contaminated water & food etc.)	33 (16.84)	17 (11.26)
Don't know	43 (21.94)	10 (6.62)
Name of mosquito (Rural, Urban; n=120, 124)		
Aedes	49 (40.83)	80 (64.52)
Others (anopheles, culex etc.)	21 (17.5)	2 (1.61)
Couldn't mention	50 (41.67)	32 (25.81)
Biting time of AM (Rural, Urban; n=196, 151)		
Daytime	51 (26.02)	86 (56.95)
Night	52 (26.53)	16 (10.60)
Anytime	8 (4.08)	14 (9.27)
Don't know	85 (43.37)	35 (23.18)
Breeding place of AM (Rural, Urban; n=196, 151)		
Stagnant water	114 (58.16)	113 (74.83)
Others (drain, garbage etc.)	12 (6.13)	14 (9.27)
Don't know	70 (35.75)	24 (15.89)
Elimination of AM breeding place		
Removal of water stagnation	79 (40.31)	98 (64.90)
Covering of water containers	43 (21.94)	57 (37.75)
Insecticides	24 (12.24)	63 (41.72)
Smoke	6 (3.06)	18 (11.92)
Others (cleaning of pot & flower vase etc.)	45 (22.96)	43 (28.48)
Don't know	46 (23.47)	16 (10.60)
*Multiple responses		
Measures for control of AM bites		
Use of bed net	121 (61.73)	44 (29.13)
Use of window screen	11 (5.61)	61 (40.40)
Mosquito coil	23 (11.73)	35 (23.18)
Others (repellant, wearing full sleeves & socks etc.)	15 (7.65)	59 (39.07)
Don't know	36 (18.36)	15 (9.93)

*Multiple responses

Table 3: Awareness about dengue fever (N=347)

	Rural (n=196) f (%)	Urban (n=151) f (%)
Aware about management of dengue fever		
Consultation with physicians	177 (90.31)	135 (89.40)
Medicine from pharmacy	2 (1.02)	1 (0.66)
Others (medicine by themselves etc.)	17 (8.67)	15 (9.93)
Risk of complications decreases by consulting with physicians		
Yes	137 (69.90)	130 (86.09)
No	59 (30.10)	21 (13.91)

Practices for controlling dengue fever

Table 4. interprets that measures taken for elimination of Aedes mosquito breeding places and measures taken for control of mosquito bites in both rural and urban settings.

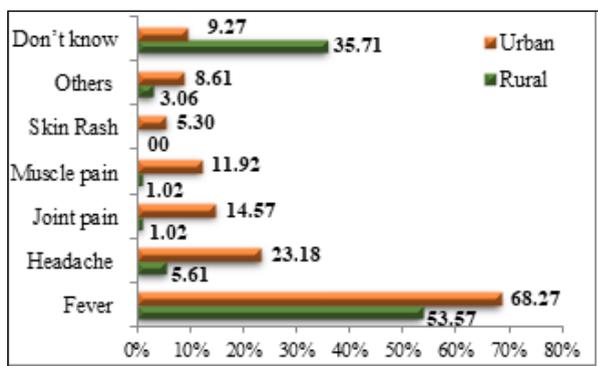


Figure no 2.: Knowledge about symptoms of dengue fever

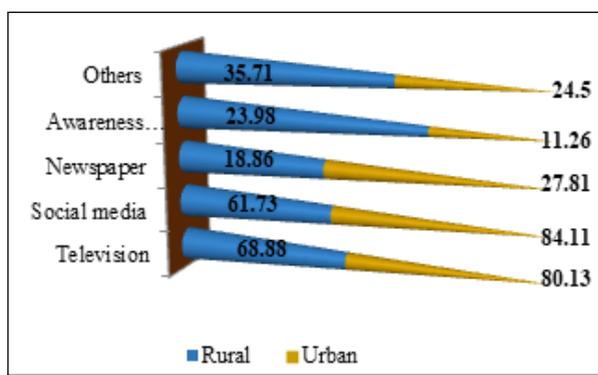


Figure no 3.: Sources of information on dengue fever

Table 4: Practices for controlling dengue fever

	Rural f (%)	Urban f (%)
Measures taken for elimination of AM breeding places		
Removal of water stagnation	61 (31.12)	89 (58.94)
Covering of water containers	47 (23.98)	37 (24.50)
Residual spray	18 (9.18)	42 (27.81)
Others (smoke, cleaning of pot & flower vase etc.)	81 (41.33)	48 (31.79)
Doesn't taken	66 (33.67)	17 (11.26)
	*Multiple responses	
Measures taken for control of AM bites		
Use of bed net	94 (47.96)	42 (27.81)
Use of window screen	14 (7.14)	73 (48.34)
Others (mosquito coil, repellent, wearing full sleeves & socks etc.)	57 (29.08)	71 (47.02)
Doesn't taken	61 (31.12)	18 (11.92)
	*Multiple responses	

Discussion

Globally, dengue fever is the most common vector borne viral infection in the current century.¹¹ It tends to be of urban and peri-urban distribution, though it occurs in rural areas.¹² The present study reveals wide socioeconomic gap between rural and urban settings. This gap exists among the participants among their literacy level and monthly family income even from the national average for a rural setting.¹³

The present study shows that although a poor number of participants in rural communities than urban communities were correctly answered the questions pertaining to mosquito bite as the mode of spread (61.22%, 82.12%), Aedes mosquito as the vector (40.83%, 64.52%), day as biting time (40.83%, 64.52%), stagnant water as an important source of breeding places (58.16%, 74.83%) and removal of water stagnation as eliminations of breeding place (40.31%, 64.90%). On the other hand, most (53.7%, 68.27%) of the participants identified fever as a foremost symptom and many could not correctly recognized the other symptoms of dengue fever. Using of bed nets (61.73%) was a common recognition in rural whereas window screen were mostly (40.40%) recognized in urban as effective measures for controlling mosquito bite. Though the study found a lack of in depth knowledge collectively, but the majority of the participants found insufficiently knowledgeable with rural predominance.¹⁴⁻¹⁹

This exact awareness is important to be raised among the communities so that they could minimize the loss. The positive findings of the study were maximum participants

were aware about the risk of complications and medical management. Our study showed, most of the participants had adequately aware in both settings.^{20,21}

Another important finding of this investigation was the poor utilization of dengue preventive measures such as the use of bed nets (47.96%, 27.81%), window screen (7.14%, 48.34%), mosquito coils and control measures like removal of water stagnation (31.12%, 58.94%), covering of water container (23.98%, 24.50%) and other measures. Those findings are little less differentiable with the studies.^{14-19,22}

Conclusion

There is relatively poor knowledge and preventive practices regarding dengue fever in both rural and urban communities which is predominant in the rural community. The lack of basic knowledge of the community on dengue epidemiology and vector bionomics could also be a major cause of the increasing trend of dengue in the environment. Interestingly, the awareness level was good in both settings. It may be due to various levels of literacy among participants.

Recommendation

To control or prevent the transmission of dengue virus its mandate to combat vector mosquitoes through removing of water stagnation, covering of domestic water storage containers, using of residual spray and using of personal protection such as bed nets, window screens etc. Intersectoral coordination meetings should be conducted with public health authorities to organize health education campaigns on dengue disease to increase community knowledge, awareness and also to sensitize the community to participate in integrated and sustained vector control.

References

1. WHO. Dengue: Guidelines for diagnosis, Treatment. Prevention and Control. [Internet]. WHO: 2009. Available from: <https://apps.who.int/iris/handle/10665/44188>. [Cited on 2020 April 20].
2. Alyousefi TA, Abdul-Ghani R, Mahdy MA, Al-Eryani SM, Al-Mekhlafi AM, Raja YA, Shah SA, Beier JC. A household-based survey of knowledge, attitudes and practices towards dengue fever among local urban communities in Taiz Governorate, Yemen. BMC infectious diseases. 2016 Dec;16(1):543.
3. Etemad B, Batra G, Raut R, Dahiya S, Khanam S, Swaminathan S, Khanna N. An envelope domain III-based chimeric antigen produced in pichia pastoris elicits Neutralizing antibodies against all four dengue virus serotypes. The

- American journal of tropical medicine and hygiene. 2008 Sep 1;79(3):353-63.
4. WHO: Dengue and severe dengue. [Internet]. WHO: 2017. Available from: <http://apps.who.int/mediacentre/factsheets/fs117/en/index.html>. [Cited on 2020 April 20].
 5. Wong LP, AbuBakar S. Health beliefs and practices related to dengue fever: a focus group study. *PLoS neglected tropical diseases*. 2013 Jul;7(7).
 6. Brady OJ, Gething PW, Bhatt S, Messina JP, Brownstein JS, Hoen AG, Moyes CL, Farlow AW, Scott TW, Hay SI. Refining the global spatial limits of dengue virus transmission by evidence-based consensus. *PLoS neglected tropical diseases*. 2012 Aug;6(8).
 7. IEDCR: Dengue situation update, 05082019. [Internet]. Available from: <https://www.iedcr.gov.bd/>. [Cited on 2020 April 20].
 8. IEDCR: Dengue Current Situation 2019. [Internet]. Available from: <https://www.iedcr.gov.bd/website/index.php/dengue/219>. [Cited on 2020 April 20].
 9. Singh B. Dengue outbreak in 2006: Failure of public health system?. *Indian Journal of Community Medicine*. 2007 Apr 1;32(2):99.
 10. Stoler J, Brodine SK, Bromfield S, Weeks JR, Scarlett HP. Exploring the relationships between dengue fever knowledge and *Aedes aegypti* breeding in St Catherine Parish, Jamaica: a pilot of enhanced low-cost surveillance. *Research and reports in tropical medicine*. 2011;2:93.
 11. Gubler DJ. Epidemic dengue/dengue hemorrhagic fever as a public health, social and economic problem in the 21st century. *Trends in microbiology*. 2002 Feb 1;10(2):100-3.
 12. Van Kleef E, Bambrick H, Hales S. The geographic distribution of dengue fever and the potential influence of global climate change. *TropIKA. net*. 2010 Mar 21.
 13. Bangladesh demographic and health survey. [Internet]. BDHS: 2018. Available from: https://www.researchgate.net/publication/337680718_Bangladesh_Demographic_and_Health_Survey_BDHS_2017-18_Key_Indicators_Report. [Cited on 2020 April 20].
 14. Basra GK, Rohilla S, Singh S. Knowledge, Attitude and Practice regarding Dengue fever among residents of Indira Colony, Ghaziabad. *Journal of Communicable Diseases (E-ISSN: 2581-351X & P-ISSN: 0019-5138)*. 2019 Dec 23;51(3):22-7.
 15. Uematsu M, Mazier CZ. Knowledge, attitudes and practices regarding dengue among the general population in Honduras. *Am J Public Health Res*. 2016;4(5):181-7.
 16. Shuaib F, Todd D, Campbell-Stennett D, Ehiri J, Jolly PE. Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. *The West Indian Medical Journal*. 2010;59(2):139.
 17. Nalongsack S, Yoshida Y, Morita S, Sosouphanh K, Sakamoto J. Knowledge, attitude and practice regarding dengue among people in Pakse, Laos. *Nagoya J Med Sci*. 2009 Feb 1;71(1-2):29-37.
 18. Yboa BC, Labrague LJ. Dengue knowledge and preventive practices among rural residents in Samar province, Philippines. *American Journal of Public Health Research*. 2013 Apr;1(2):47-52.
 19. Jeelani S, Sabesan S, Subramanian S. Community knowledge, awareness and preventive practices regarding dengue fever in Puducherry–South India. *Public health*. 2015 Jun 1;129(6):790-6.
 20. Harish S, Srinivasa S, Shruthi P, Ranganatha AD, Bhavya G. Knowledge, attitude and practice regarding dengue infection among parents of children hospitalized for dengue fever. *Profession*. 2018 Jan 1;2:1.
 21. Mohapatra S, Aslami AN. Knowledge, attitude and practice regarding dengue fever among general patients of a rural tertiary-care hospital in Sasaram, Bihar. *Int J Community Med Public Health*. 2016 Feb;3(2):586-91.
 22. Said MF, Abdullah H, Ghafar NA. Dengue prevention practices among community in dengue hotspot area. *International Journal of Community Medicine and Public Health*. 2018 Nov;5(11):4664.