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- Tumor Necrosis Factor-Alpha (TNF-Alpha) and Intercellular Adhesion Molecule-1 (ICAM-1) Expression of *Plasmodium berghei* Infected Swiss Mice Treated with Red Fruit (*Pandanus Conoideus* Lam) Ethanol Extract
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Knowledge, Attitude and Practice on Dengue Fever Transmission Among Urban and Periurban Residents of Dhaka City, Bangladesh

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ABSTRACT

Introduction: Dengue is one of the most important emerging viral diseases of major public health concern in Bangladesh.

Objectives: The purpose of this study is to assess the level of knowledge, attitude and practice on dengue fever transmission and prevention among the residents of Dhaka city, Bangladesh.

Methods: A cross-sectional study was done among three hundred and forty three randomly selected residents of urban and periurban regions of Dhaka city in November in 2012 using a pretested and self administered questionnaire. Data was analyzed by a Chi square test and p value less than 0.05 is considered as significant.

Results: The study found that among the respondents 63.3% were female, 48% were married and 37.7% were of age group of 21-30 (mean=31.34, SD=11.758). Majority of the respondents had secondary/higher secondary (50.9%) and students represented 34.1% of the total respondents. It was found most of them had no history of having affected from dengue fever (97.7%) and 53.2% did not travel to the subtropical or tropical region. Television (61.2%) and radio (50.4) were most common source of information of dengue fever. Majority of the respondents had low level of knowledge on dengue (89.1%). It was found that 81% knew that mosquitoes generally lay their eggs on dirty water, 79.6% knew mosquitoes spread dengue from one person to another and 70.6% were aware that dengue can fever is flu like illness that affects infants, young, children and adults. The study revealed 50.1% had neutral attitude towards dengue fever, and there was significant association between age and practice ($p=0.031$); knowledge and practice ($p<0.000$) and also attitude and practice ($p<0.000$).

Conclusion: There is a different level of knowledge regarding dengue fever among respondents in the study area. Public awareness is necessary to address the knowledge gap revealed by this study. Hence it is necessary to organize the public education program to prevent the people from the outbreak of dengue by increasing level of Knowledge so that they can attain positive attitude and adopt desired behavioral changes.

Keywords: Knowledge, Attitude, Practice, Dengue Fever, Dengue Hemorrhagic Fever, Dengue Shock Syndrome.

INTISARI

Pendahuluan: Dengue merupakan salah satu penyakit viral yang paling penting dan masalah kesehatan masyarakat utama di Bangladesh.

Tujuan: Penelitian ini bertujuan untuk menilai tingkat pengetahuan, sikap dan perilaku penduduk Kot Dhaka, Bangladesh tentang pencegahan dan penularan demam dengue.

Metode: Penelitian ini merupakan penelitian potong lintang melibatkan 343 penduduk yang dipilih secara acak di daerah urban dan peri-urban Kota Dhaka pada bulan November 2012 dengan menggunakan kuesioner *pretested* dan *self-administered*. Data dianalisis dengan uji *Chi square* dan dinyatakan signifikan apabila $p < 0,05$.

Hasil: Subyek penelitian ini sebanyak 63,3% wanita, 48% menikah dan 37,7% merupakan kelompok usia 21-30 tahun (rerata=31,34, SD=11,758). Kebanyakan subyek (50,9%) merupakan pelajar lulusan sekolah menengah (SMP/SMA) dan merupakan 34,1% dari keseluruhan subyek. Sebagian besar subyek (97,7%) belum pernah menderita demam dengue dan 53,2% belum pernah pergi ke daerah tropis atau subtropis. Sumber informasi mengenai demam dengue didapatkan dari TV (61,2%) dan radio (50,4). Pengetahuan subyek tentang demam dengue umumnya rendah (89,1). Sebanyak 81% subyek mengetahui bahwa nyamuk meletakkan telurnya di air kotor, 79,6% mengetahui kalau nyamuk dapat menularkan dengue dari satu orang ke orang yang lain dan 70,6% menyadari kalau gejala dengue yang bersifat *flu like illness* dapat menyerang bayi, anak dan dewasa. Sebanyak 50,1% subyek memiliki pengetahuan yang cukup mengenai demam dengue dan terdapat hubungan yang bermakna antara usia dan perilaku ($p=0,031$); pengetahuan dan perilaku ($p < 0,000$) dan sikap dan perilaku ($p < 0,000$).

Simpulan: Terdapat perbedaan pengetahuan mengenai dengue pada masyarakat di wilayah penelitian. Kesiapan masyarakat tentang dengue sangat penting untuk mengatasi perbedaan ini. Program pendidikan masyarakat penting untuk dilaksanakan secara terorganisir untuk mencegah wabah demam dengue dengan meningkatkan tingkat pengetahuan masyarakat sehingga dapat meningkatkan sikap positif dan mengadopsi perubahan sikap seperti yang diharapkan.

Kata Kunci: Pengetahuan, Sikap, Perilaku, Demam Dengue, Demam Berdarah Dengue

INTRODUCTION

Dengue is one of the most important emerging viral diseases of major public health concern in Bangladesh. Dengue was first reported as “Dacca fever” in Bangladesh in 1964 by Aziz and his colleagues¹. Subsequent reports suggested that dengue fever may have been occurring sporadically in Bangladesh from 1964 to 1999^{2,3,4,5,6,7}. The first epidemic of dengue was reported in the capital city, Dhaka in the year 2000⁸. Since then the disease has shown an annual occurrence in all major cities of the

country. During January 2000–December 2007, Bangladesh recorded a total of 22 245 cases and 233 deaths (1.04%). Of these, Dhaka accounted for 20115 cases and 181 deaths (0.9%). Number of reported cases of dengue in Bangladesh in past few years is 1153 (in the year 2008), 474 (in the year 2009), 76 (in the year 2010). And Incidence of reported dengue cases is 0.72 (in the year 2008), 0.29 in the year 2009), 0.05 (in the year 2010)⁹.

In theory, distribution occurs biannually which are at the beginning of the rainy season,

from early May to July, when water containers and various discarded containers are wet and productive for mosquito breeding and the maturation of larvae and from early August to October. If we look at the dengue situation of Dhaka City in year 2012 month by month we can see an overview of dengue cases; January to May there is no dengue cases but from June there is reported dengue cases. In June there are 10 reported dengue cases, in July 129, in August 122, in September 256, in October 107, in November 27.

In 1996-97 dengue infections were confirmed in 13.7% of 255 fever patients screened at Dhaka Medical College. And the first epidemic of dengue haemorrhagic fever occurred in mid 2000, when 5551 dengue infections were reported from Dhaka and Khulna cities, occurring mainly among adults. Among the reported cases 4385 (62.4%) were dengue fever infections and 1186 (37.6%) cases were dengue haemorrhagic fever. The case fatality rate (CFR) was 1.7% with 93 deaths reported. *Aedes aegypti* was identified as the main vector responsible for the epidemic and *Aedes albopictus* was identified as a potential vector in Dhaka. The worst outbreak was in 2002 with 6,104 cases and 58 deaths¹⁰.

In 2005 there were 1048 reported cases and 4 deaths (CFR 0.38%). The number of cases and deaths reduction was about 73% and 69% as compared to 2004. In 2006 the number of cases and deaths increased by 2 fold as compared to 2005. The maximum transmission period is July to September each year since 2000.

There were several studies regarding dengue disease in Bangladesh. Most of the study was concerning about the transmission and outbreak

about dengue disease. Some were about health seeking behavior in rural Bangladesh. Conducted a knowledge, attitude and behaviour (KAB) survey among residents of Dhaka regarding dengue (DF) and dengue haemorrhagic fever (DHF) from August to October, 2000, during the first recognized outbreak of DF/DHF in Bangladesh⁵. A random sample of more than 9,000 houses was visited by survey teams throughout the city. More than 99% of people living in the city had heard about dengue and 95% knew that the disease was transmitted by mosquito bites, 93.5% knew that the dengue-transmitting mosquito bit during daytime and 52.1% knew that this mosquito bred in containers. Nearly 60% of slum-dwellers could not spend any money to buy commercially-available aerosols/coils for their houses, while the rest 40% could spend very little money for this purpose. About 10% of people living in independent houses and multistoried buildings spent more than US\$ 10 for mosquito control gadgets per month (equivalent to a week's salary for most workers in Bangladesh). In the slum areas and in semi-permanent (semi-pucca) houses, earthen jars and drums, common sources of *Aedes aegypti* breeding, were frequently used for storing water. In more upscale, independent houses where mosquito density was higher, rooftop concrete water tanks were more common. Two-thirds of city-dwellers thought that both government and citizens should be responsible for mosquito control.

The purpose of this study is to assess the level of Knowledge, Attitude and Practice on dengue fever transmission and prevention among the residents of Dhaka city, Bangladesh.

MATERIALS AND METHODS

A systematic simple random sampling technique was applied for the sample of respondents. For this the following steps were followed. Sample size was selected randomly from any five different random places of Dhaka City at landscape level representing the different ecotopes and ecological region (slum, dense settlement, industrial area, settlement near vegetation, residential area with grounds and gardens). The random selection of wards was done in each cluster for household selection. The respondents were chosen from every fifth house from the starting alternating the side of the transverse line.

Sample size

The study Sample size was taken on the basis of following formula,

$$\text{Sample size (n)} = \frac{Z_{\alpha}^2 pq}{d^2}$$

Where,

n = the minimum sample size

z = the standard normal deviate usually set at 1.96 which corresponds to the 95% CI

p = proportion of the target population = 68%

q = 1 – p

d = desired degree of accuracy considered = 0.05

By using formula,

$$\text{sample size (n)} = \frac{(1.96)^2 \times 0.68 \times 0.32}{(0.05)^2} = 334.3$$

Based on this formula, the sample size for this study was 335 subjects

Variables

Explanatory sociodemographic factors included age, gender, education, marital status, religion, family income and occupation.

Knowledge on eco-bio-social determinants of dengue and its vector included knowledge in *Aedes* mosquito and its ecology and knowledge in dengue fever. Attitude towards disease and vector control included feelings and beliefs towards dengue, behavior, feelings and beliefs towards *Aedes*. IEC related factors included sources of information (Radio/TV, newspaper, health worker, posters, hospital, internet, training, education, health training, relative/friends, consultation etc.)

Data Collection Tools

Semi structured questionnaire was used as the data collection tool. The respondents were interviewed and the practice level were observed and recorded in the observational checklist by the researcher. Most of the questions were close ended, semi structured, and few were mixed and open-ended questions. The questions were in English and Bengali as well.

Data management and analysis plan

Answered questionnaire was checked individually, edited and coded after collection. Compilation and subsequent tabulation was done. The respondent with inconsistencies has been discarded. Simple technique of data analysis such as frequency distributions and other descriptive statistics was used. Tabular and graphical presentation and charts will be used. Data was analyzed by a Chi square test and p value less than 0.05 is considered as significant.

Quality control and quality assurance

A draft questionnaire was developed according to the objectives of the study. The questionnaire was tested through pilot study. Before finalization of the questionnaire, necessary modification and correction was done.

Ethical consideration

Following the WHO and Bangladesh Medical Research Council (BMRC) guidelines of ethical consideration, the informed consent was taken before the interview. Respondent’s right to refuse and withdraw from study any time was accepted. Confidentiality of the respondents was maintained.

RESULTS AND DISCUSSIONS

This study was conducted in ward number 41, Patharghata Area, Dhaka. There were a total of three hundred and forty three (343) respondents. The study was conducted in six block/moholla of ward number 41 of Patharghata Area. The findings of the study are based on the questionnaires filled by the respondents, and observation checklist filled by the surveyors. Distribution of the respondents by sociodemographic characteristics is represented in Table 1.

Table1. Distribution of the respondents by sociodemographic characteristics

Characteristics	Number (n=343)	Percentage (%)
Age group (Years)		
<21	70	21.3
21-30	124	37.7
31-40	66	20.1
41-50	35	10.6
>50	34	10.3
Mean = 31.43 SD = 11.758	Minimum = 16	Maximum=60
Marital Status		
Unmarried	157	47.1
Married	160	48
Widowed/ Divorced	16	4.8
Education Level		
Illiterate	11	3.3
Literate	35	10.5
Primary	24	7.2
Secondary/higher secondary	170	50.9
Graduate and above	94	28.1
Income (Rupees/Month)		
≤5000	148	43.1
5001 -10000	73	21.3
10001 -25000	58	16.9
25001 -50000	25	7.3
≥50000	39	11.4
Travel to Sub Tropical /Tropical region		
Yes	160	46.6
No	182	53.2

The mean age of participants was 31.43 with standard deviation of 11.758. The range of age is from 16 to 60 years. Table 1 shows that the majority of the respondents (37.7%) were in the group of 21-30 years, 21.3% were younger than 21 years, and 41% were older than 30 years. Most of them (i.e. 48%) were married followed by Unmarried which was 47.1%. Most of them were educated to secondary/higher secondary level (50.9%) and in graduates and above (28.1%). Most of respondents had income of less than 5000 rupee per month (43.1%). Among the respondents 61.2% had received some form of information regarding dengue fever while rest had not received any as shown in Figure 1.

During the survey more than one source for received information about dengue fever were recorded. Among them 61.2% received from TV and then radio (50.4%) followed by newspaper.

Participants answered 10 multiple choice questions about dengue fever. Each correct response was given 1 mark with a total of 17 marks. The mean knowledge score for the respondents was 5.27 out of possible 17 points (standard deviation=2.158). None of the respondents were able to answer all the questions correctly. The range of the knowledge score was 0-17 as shown in Table 2.

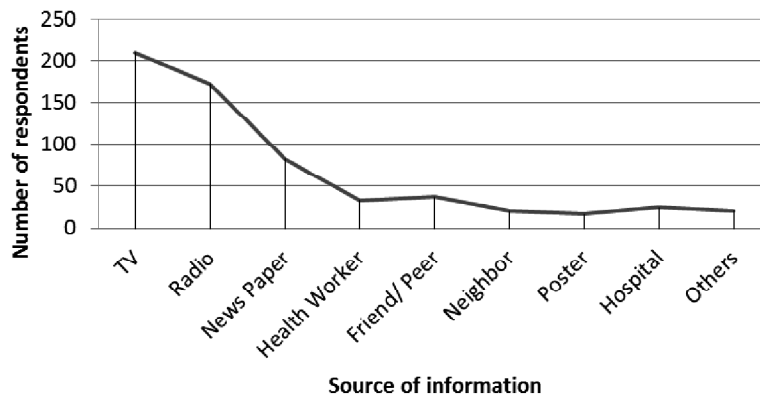


Figure 1. Distribution of respondents by source of information of dengue (n=343).

Table 2. Distribution of respondents on the basis of their level of Knowledge on dengue fever

Level	Number (n=343)	Percentage
High (17-13 scores)	0	0
Moderate (12-9 scores)	35	10.1
Low (8-0 scores)	286	89.1
Total	321	100
Mean=5.27; SD=2.158	Minimum=0	Maximum=9

Respondents answered a total of 11 questions which had a total score of 55. There were 7.6% of the respondents who had “positive attitude”, 50.1% had “neutral attitude” while 42.3% had “negative attitude”. The mean of attitude for all the respondents were 44.15 out of 55 points (SD=4.891). The range of the attitude score was 33 and 55 respectively as shown in Table 3.

Table 3. Distribution of respondents by Attitude level

Level	Number (n=343)	Percentage
Positive (55-46 scores)	26	7.6
Neutral (45-36 scores)	172	50.1
Negative (35-11 scores)	145	42.3
Total	343	100
Mean=44.15; SD=4.891	Minimum=33	Maximum=55

Table 4 shows a summarized response for the practice part of the questionnaire. Most of the respondents examine discarded things that can hold water around their house (82.6%). The questions which were least answered were 3.2% and 9.9% for the question regarding the method to reduce the nuisance of mosquitoes (items 1.4 and 1.2).

A total of 122 observation check list were filled out of 343 survey forms. These represented all the selected households of Patharghata representing respondents of this research. Among the respondents, 91% were considered as “clean”. Among 122 house hold 15.6% had water accumulated under flower pot and 14.8% had water accumulated in toilet, 24.6% had unwanted object that held water, 12.1% had bottles that could hold unwanted water. Among the respondents, 78.7% covered the stored water and most of the respondents (73.1%) did not have any water of rainwater accumulated around their houses.

As shown in Table 5, there is no association between travel history to the tropical region and the level of practice.

Table 4. Distribution of respondents on the basis of each item on the practices

Items	Number	Percentage
1.1 Indoor spraying to reduce the nuisance of mosquitoes.	100	29.2
1.2. Covering the water containers to reduce the nuisance of mosquitoes.	34	9.9
1.3. Cleaning rubbish to reduce the nuisance of mosquitoes.	126	36.7
1.4. Putting chemicals in water to reduce the nuisance of mosquitoes	11	3.2
1.5. Using electronic gazettes to reduce the nuisance of mosquitoes.	35	10.2
1.6. Bed net to reduce the nuisance of mosquitoes.	238	69.4
1.7. Nothing to reduce the nuisance of mosquitoes.	1	0.3
1.8. Others to reduce the nuisance of mosquitoes.	0	0.0
2. Do you often examine the mosquito larvae in the flower pots how even?	86	25.1
3. Do you change the water of the indoor plant every week.	225	67.0
4. Do you often drain off water in plates of flower pots?	229	71.3
5. Do you examine any discarded thing that can hold water around your house?	288	86.2

Table 4. Distribution of respondents on the basis of each item on the practices (continued)

Items	Number	Percentage
6. Do you use mosquito coil?	273	81.0
7. Do you participate in any campaign of dengue infection in any community?	60	18.0
8. Do you participate when your community has sprayed fog	112	33.6
9. Do you ever examine the mosquito breeding water container in toilet?	158	47.0
10. Do you check and clean your roof gutted in roof?	180	52.5

Table 5. Association between level of practice and travel history to tropical/subtropical region

Level	Travel History					
	Yes		No		Total	
	n	%	n	%	n	%
Poor Practice	109	75.69	125	78.62	234	77.23
Fair Practice	34	23.61	34	21.38	68	22.44
High Practice	1	0.69	0	0	1	0.33
Total	144	100	159	100	303	100
$\chi^2 = 1.355$	df=2		p=0.465			

The results of this study showed that the demographic data was not correlated with level of practice scores except for age. This study found that age had significant association with level of practice behavior of dengue fever prevention among the respondents. The respondents of age group 51-60 year old had better practice of dengue prevention than other group. This might be because elder population is the head of family and they care if everything is in order and care for the proper cleanliness and maintenance of the house environment. Level of education had no association with the practice of dengue prevention. This does not mean that education was not an important

factor which fell short to apply education to practice. One of the possible reasons might be that educated people have other jobs and responsibilities and have less or no time to practice prevention of dengue fever. People are well informed and well equipped with what to do and how to handle the situation but they are careless to put them into practice.

There was no significant association between travel to the tropical or subtropical regions and exposure to dengue ($p=0.465$). This indicated that dengue history and travel to the tropical and sub tropical regions were not important confounders in this analysis. The mean score was 5.27 point with a standard

deviation of 2.158. Most of the respondents who participated in this study (89.1%) had very low level of knowledge despite the fact that 61.2% had received the information regarding the dengue fever. This might be because dengue is emerging disease which has been detected recently and the study area has very less incidence rate. The people hear about the dengue in the form of dengue incidence from the mass media like TV, internet, radio etc., in the form of news like they heard about an Indian celebrity and they don't think it is challenge to their health in their places. It is also that people have insufficient knowledge about the understanding of the disease. There were no respondent with high level of know-ledge because the disease is very new in this place and has very low incidence in this region. There has not been any awareness program focusing the region.

The area where respondents scored well was on the question on how dengue spreads from one person to another person. The responses showed that 79.6% were aware that mosquitoes transmit dengue. The highest average percentage scored by the respondents was the question where the mosquitoes lay eggs. Among the respondents 81% responded understand that mosquitoes lay their eggs on the dirty water.

Another area in which the respondents had better knowledge was regarding the nature of dengue fever and the affected population. Most of the respondents were aware that dengue fever is flulike illness that affect infants, young, children and adults (70.6%). Most of respondents were unaware about when dengue mosquito bites. Of all the respondents, only 7.3% only knew that mosquitoes transmitting dengue

bite in the day time. Another important area the respondents incorrectly answered or did not know about its treatment and drug of choice. Among the respondents, 93.9% did not know that there is no specific treatment for dengue. This shows that they are unaware of drug and this also implies that they can take random drugs especially aspirin and acetaminophen when they get flu and body/headache which is very critical for dengue patients.

The mean survey score for the attitude was 44.15 from a possible 55 scores with the standard deviation of 4.891. In this study more than half of the respondent (50.2%) had neutral attitude while most of others (42.3%) had negative attitude towards dengue fever transmission. The probable reason for this might be that most of the respondents were students and job holders who keep busy and don't take active part or bother to do so in disease control and home environment related to health.

This study revealed a significant association between attitude and practice of dengue fever prevention. In this study more than half of the respondent disagreed that government should penalize household with mosquitoes breeding sites. Most of the respondents had not clearly positive attitude on role of neighborhood to prevent dengue disease. This may be due to the individualistic lifestyle of Patharghata where the people don't bother to speak on behalf of their community. A total of 122 houses were representing all the areas of data collection of which 91% had their home environment clean. The residents of Patharghata have less area around their place of living due to high density, as a result, even they keep their area of authority clean the property next to them are not maintained well.

This study found that 84.4% of respondents did not have water under flower pot because they wipe off or sweep away water under the flower pot. Among the respondents 85.2% did not have unwanted water collected in the toilet. However, most of the house had usable water accumulated for flushing and or washing purpose. Among respondents, 24.6% house had unwanted things that held water, the places which had unwanted objects holding water was due to lack of availability of regular municipal waste management services. The study found 87.7% did not have bottles with dirty water; this was because most of the respondent used to sell the used bottles. It was found that 78.7% household had their stored water covered and 73.8% of the respondent had no rainwater or other form of water collected, this is because the data were collected post monsoon period and most of the locations had dearth of water.

CONCLUSION

There is a different level of knowledge regarding dengue fever among respondents in the study area. Public awareness is necessary to address the knowledge gap revealed by this study. Hence it is necessary to organize the public education program to prevent the people from the outbreak of dengue by increasing level of Knowledge so that they can attain positive attitude and adopt desired behavioral changes.

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Scientific Journal

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