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Cross sectional study of dengue fever related knowledge, attitude and practice among different socio-economic groups of population on control of dengue and its vectors in Vijay Nagar area of Ghaziabad (Uttar Pradesh), India

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Abstract
Dengue Fever (DF) is one of the rapidly spreading mosquito-borne viral illness all over the world. With time DF is spreading to different countries and has expanded its wings from urban to rural areas. Dengue has been made a notifiable public health problem in many places including Delhi during recent decades. Rapid urbanization, environmental changes and neglected rural areas which leads to vector breeding have resulted in rise of Dengue fever. The objective of this study was to assess the knowledge, attitudes and practices (KAP) regarding DF among residents of Vijay Nagar, Ghaziabad. Detailed survey was done among residents of Vijay Nagar area of Ghaziabad using a pre-designed questionnaire knowledge, attitudes and practices of DF among study population was represented as percentage.
Out of 275 individuals interviewed, 95% identified fever as an important symptom of DF. The knowledge about other symptoms of DF was low among residents. Only about 19% of residents knew that DF is transmitted by Aedes mosquitoes. Only 30% of residents knew the correct biting time. Despite low knowledge, the residents had good attitude and most of them reported good preventive practices against dengue prevention and control. Awareness campaigns and involvement of community can help to protect the health of people against DF and to limit in future spread of DF.

Keywords: Dengue fever, knowledge, attitude, practice, mosquito-borne viral

Introduction
Dengue is a mosquito-borne viral disease that has spread rapidly throughout the tropics and sub tropics, Climate parameters as well as social and environmental factors influence the local variations. Wide spectrum of disease ranging from subclinical disease (people may not know, they are even infected) to severe flu-like symptoms in those infected is caused by Dengue. People with severe dengue develop complications associated with severe bleeding, organ impairment and/or plasma leakage although this is less common. High risk of death is involved with severe dengue if not treated timely. Severe dengue was first recognized in the 1950s during dengue epidemics in the Philippines and Thailand severe dengue case was first recognized [1]. Today, severe dengue affects most Asian and Latin American countries and has become a leading cause of hospitalization and death among children and adults in these regions [2].
Dengue is caused by a virus of the Flaviviridae family and there are four distinct serotypes, but closely related, serotypes of the virus that cause dengue (DENV-1, DENV-2, DENV-3 and DENV-4). Lifelong immunity against that serotype is believed to be provided after recovery from Infection. However, cross-immunity to the other serotypes after recovery is only partial, and temporary. Risk of developing severe dengue is increased after subsequent infections (secondary infection) by other serotypes.
The virus is transmitted to humans through the bites of infected female Aedes mosquitoes, primarily the *Aedes aegypti* mosquito. Other species within the Aedes genus can also act as vectors, but their contribution is secondary to *Aedes aegypti*.

A drastic increase in incidence of dengue has been witnessed in the recent decades around the world. As majority of cases are asymptomatic or mild and self-managed, the actual numbers of dengue cases are under-reported. Many cases are also misdiagnosed as other febrile illnesses [3]. One estimate indicates 390 million dengue virus infections per year (95% credible interval 284-528 million), of which 96 million (67-136 million) manifest clinically (with any severity of disease) [4]. During the last two decades 8-fold increase in Dengue cases have been reported to WH., from 505,430 cases in 2000, to over 2.4 million in 2010, and 5.2 million in 2019. Reported deaths between the year 2000 and 2015 increased from 960 to 4032, affecting mostly younger age group. The total number of cases and number of reported deaths seemingly decreased during years 2020 and 2021 [5], Asia bears nearly 70% of the actual burden [6]. However, the data is not yet complete and COVID-19 pandemic might have also hampered case reporting in several countries [7].

After feeding on a DENV-infected person, the virus replicates in the mosquito mid gut, before it disseminates to secondary tissues, including the salivary glands. Extrinsic Incubation Period (EIP) is the time taken from ingesting the virus to actual transmission to a new host. The EIP takes about 8-12 days when the ambient temperature is between 25-28 °C [8-10]. In addition to ambient temperature the extrinsic incubation period required for mosquito to transmit virus can be altered by number of factors such as the magnitude of daily temperature fluctuations [11, 12], virus genotype [13], and initial viral concentration [14]. Once infectious, the mosquito is capable of transmitting virus for the rest of its life.

The present study was undertaken to assess the knowledge, attitudes and practices (KAP) regarding DF among residents of Vijay Nagar, Ghaziabad.

Material and Methods

A detailed cross sectional study was carried out in urban area of Vijay Nagar, Ghaziabad during October 2021. Data collection was done by Face-to-face interviews of inhabitants. To avoid the biased results, the inhabitants were not provided the correct answers to the survey questions.

Prior to the interview the residents were informed about the aims, risks and benefits of the study and Participation in this study was completely voluntary and no incentive was given to the residents. Residents were free to stop and leave the interview whenever they felt that they are not comfortable.

To further improve the precision, sample size of 225 residents above age of 21 years was taken and 50 residents were of the age 15 to 20 years. So total of 275 inhabitants were interviewed for the study, it was ensured that 40% females were selected for interview while selecting the household on random basis from the study area.

Data was collected using a semi structured questionnaire. The questionnaire covered the following areas: (1) socio-demographic information (sex, age, occupation and education); (2) knowledge about dengue symptoms, signs, and transmission modes; (3) attitude towards dengue; (4) preventive practices against dengue e.g. methods used to reduce breeding sites, and reduce potential human-mosquito contact (repellents, bed nets and window screens). (5) Whether residents had information about biting time of mosquitoes (6) Source of knowledge about Dengue and its control. Intra-domestic water containers were examined in every house for presence of mosquito larvae by removing the cover on it if any, followed by naked eye observation (for small containers & overhead tanks).

Data were collected from a total of 275 (225 above age of 18 and 50 in the age group off 15 to 20) respondents. House to house visits were done and subjects were interviewed through house to house visits. It was ensured that at least one female will be interviewed from each household, in case of non-availability of female member, male respondent was interviewed. Predesigned format was used to record the shared information.

Results

A total 275 participants were interviewed during the study. Table 1 depicts the socio-demographic details of the residents. Residents in the age group of 15 to 75 years were interviewed. (n=275). 28% of the participants were in the age group 31-40 years. 180 males and 95 females were interviewed and Male to Female ratio was 1.8:1. 40.7% of the participants had studied upto secondary school and only 11.6% of study participants were illiterate. Among the female members that were interviewed 26.8% were housewives.

Table 1: Socio-demographic profile of the study population (N= 275).

Variable	No (%)
15-20	50(18.2)
21-30	45(16.3)
31-40	77(28)
41-50	54(19.6)
51-60	34(12.3)
>60	15(5.5)
Sex	
Male	180(65)
Female	95(35)
Marital Status	
Single	69(25.1)
Married	206(74.9)
Education Level	
Illiterate	32(11.6)
Primary	59(21.4)
Secondary	112(40.7)
UG and above	72(26.3)
Occupation	
Service	78(28.4)
Labourer	74(26.9)
Business	35(12.7)
Housewife	74(26.9)
Others	14(5.1)

Residents were questioned about the knowledge of symptoms, signs and transmission of Dengue fever Almost 95% of the residents were able to identify fever as an important symptom of DF. However, when further queried about other typical symptoms of DF, a significantly lower number of respondents were able to correctly identify these. About 59% of the residents knew that all mosquitoes can transmit dengue but only few 19% knew that Dengue virus is transmitted by female Aedes mosquitoes. On the other hand, more than 60% of the residents were aware of the fact that flies and ticks do not transmit dengue. About 67% of the respondents responded that DF could be contracted through blood transfusion (Table 2).

Table 2: Knowledge of symptoms, signs and transmission of dengue fever (N= 275).

Variables	Yes (%)	No (%)	DNK (%)
Symptoms of Dengue Fever			
Fever	260(94.5)	8(2.9)	7(2.5)
Headache	205(74.6)	56(20.5)	13(4.9)
Joint pain	230(83.6)	30(10.9)	15(5.4)
Muscle pain	165(60.0)	64(23.3)	46(16.7)
Pain behind the eyes	82(29.8)	64(23.2)	129(47)
Nausea/ Vomiting symptoms	180(65.5)	63(22.9)	32(11.6)
Rash	109(39.6)	95(34.6)	71(25.8)
Diarrhoea	62(22.6)	93(33.8)	120(43.6)
Stomach pain	65(23.6)	83(30.2)	127(46.2)
Dengue fever is transmitted by			
All mosquitoes	160(58.2)	59(21.5)	56(20.3)
Aedes mosquitoes	51(18.5)	85(30.9)	139(50.6)
Flies	47(17.1)	165(60)	63(22.9)
Bugs/Ticks	38(13.8)	186(67.6)	59(21.4)
Person to person contact	82(29.8)	148(53.8)	45(16.4)
Food and water	164(59.6)	67(24.3)	44(16.0)
Blood transfusion	185(67.2)	53(19.2)	37(13.4)
Mosquitoes can breed in clear standing water	205(74.5)	20(7.2)	50(18.2)
Window screen and bed net reduce mosquitoes	243(88.3)	11(4)	21(7.6)
Insecticidal spray reduce mosquitoes	256(93)	8(2.9)	11(4.1)
Tightly covering water containers reduce mosquitoes	198(72)	56(20.4)	21(7.6)
Removal of standing water can prevent breeding	208(76.5)	42(15.3)	25(9.1)
Mosquito repellents prevent mosquito bites	206(74.9)	39(14.2)	30(10.9)
Can you identify *Aedes* mosquitoes?	21(7.6)	237(86.2)	17(6.2)

Figure 1 Respondents were asked about the knowledge about biting time of mosquitoes. Only 30.55% knew that these mosquitoes mostly bite in day time.

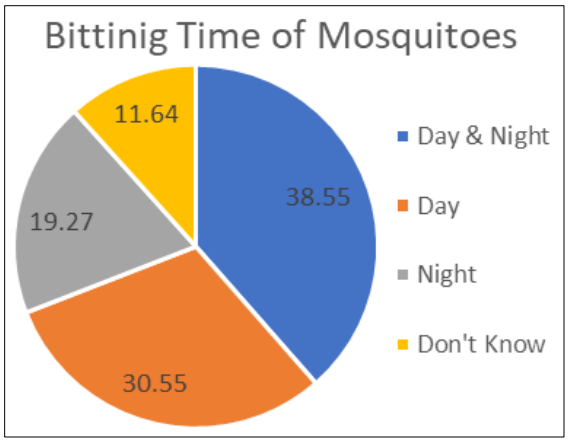

Fig 1: Knowledge of biting time of dengue mosquitoes (N=275)

Figure 2 presents findings on sources of information on DF. After inquiring from residents selected for the study it was found that majority of the research participants had heard of DF through Television, Radio and Newspaper few respondents said they were informed about *Aedes aegypti* and Dengue by their children. Only 20.36% of respondents said that Health workers had educated them about diseases its control and prevention.

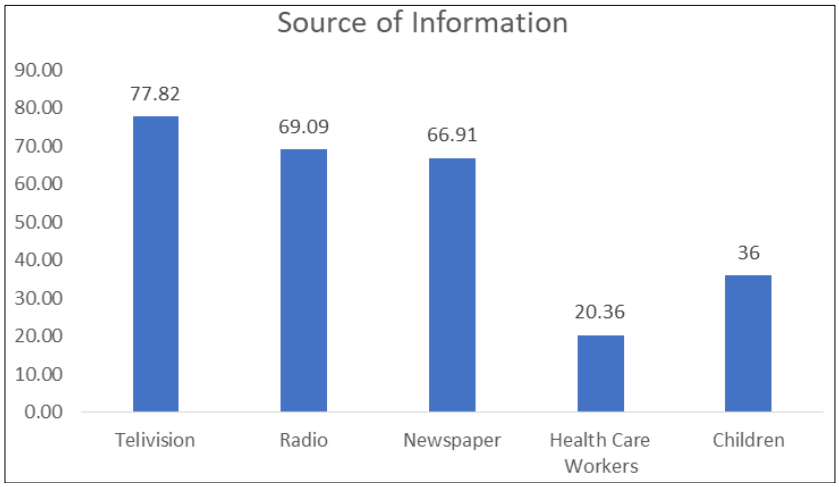

Fig 2: Sources of information on DF

Table 3 summarizes participants' attitude regarding DF is a serious illness was. Strongly agreed (70.5%) or agreed (20%) by most of the residents. Serious nature of the disease was effectively appreciated by, 81% of the participants. None of the participants strongly disagreed on facts related to DF. 70.5% strongly agreed and 20% residents agreed that DF is a serious diseases. Almost 20.4% participants strongly agreed and 47.3% agreed that the disease is preventable. Almost 27.3% strongly agreed and 68% agreed that dengue can be prevented by controlling breeding sites of mosquitoes. Nearly 43% participants disagreed to this proposition that it is only governments' responsibility to control mosquitoes. This is indicative of the fact that general public is very much responsible as almost majority of the respondents thought that everybody should actively participate in controlling mosquitoes.

Table 3: Attitude towards dengue fever (DF).

Variable	Strongly Agree (%)	Agree (%)	Not Sure (%)	Disagree (%)
Is DF a serious disease?				
Response	194(70.5)	55(20)	21(7.6)	5(1.8)
Are you at risk of getting diseases?				
Response	32(11.6)	205(74.5)	23(8.4)	15(5.5)
DF can be treated at home				
Response	52(18.9)	59(21.5)	60(21.8)	104(37.8)
Can DF be prevented?				
Response	56(20.4)	130(47.3)	38(13.8)	51(18.5)
Is controlling the breeding places of mosquitoes a good strategy to prevent dengue?				
Response	75(27.3)	187(68)	10(3.6)	3(1.1)
Do you think that stagnant water around the houses in discarded tyres, broken pots and bottles are breeding places of dengue mosquitoes?				
Response	132(48)	125(45.8)	10(3.6)	5(1.8)
Do you think it is only government responsibility to control mosquitoes?				
Response	60(21.8)	75(27.3)	21(7.6)	119(43.3)
Do you think everybody should actively participate in controlling mosquitoes?				
Response	75(27.3)	162(58.9)	21(7.6)	17(6.2)

Almost all respondents stated that the best strategy for the prevention of DF is preventing mosquito-man contact. Different measures employed by participants to protect themselves from DF are depicted in Table 4. Almost 57% of their participants have the habit of using mosquito net. Insecticidal sprays are used by more than half of the participants to reduce mosquitoes and equal number of them used screen windows. Mosquito repellent machines were used by almost 94% of interviewed residents, Water containers were covered by nearly 74.5% residents.

Table 4: Preventive measures against dengue fever (DF).

Variables	Yes	No
Use mosquito net	157(57.1)	118(42.9)
Use insecticide sprays to reduce mosquitoes	221(80.3)	54(19.6)
Use screen windows to reduce mosquitoes	245(89.1)	30(10.9)
Eliminate standing water around the house to reduce mosquitoes	202 (73.5)	73 (26.5)
Cut down extra bushes in the yard to reduce mosquitoes	185(67.3)	90(32.7)
Cleaning of garbage/ trash	238(84)	37(16)
Disposing water holding containers (Tyres, bottles etc.)	219(79.6)	56(20.4)
Use mosquito repellent equipment (electric/coil)	259(94.2)	16(5.8)
Use mosquito repellent cream	197(71.6)	78(28.4)

Use mosquito repellent oil	54(19.6)	221(80.4)
Use smoke to drive away Mosquitoes	186(67.6)	89(32.4)
Use fan to drive away mosquitoes	218(79.3)	57(20.7)
Covering body with clothes	242(88)	33(12)
Cover water containers at home	205(74.5)	70(25.5)

Discussion

After analyzing the response of all the participants findings of our study suggest that there are relatively average knowledge, attitudes and practices regarding DF and its control among residents.

Fever as an important symptom of DF has been identified in many studies [14, 15, 16]. Typical symptoms of DF apart from fever and headache could not be correctly identified by residents' Similar findings were identified in a study done in Nepal [17].

Limited knowledge among respondents about different symptoms of DF was shown in our study when compared to a study done by Itrat *et al*. 2008 [18] in a cosmopolitan city. Difference in observation may have been because of Low literacy level among many residents. It is very important to emphasis that severe cases are identified in time and such cases should be managed promptly and timely. Health seeking behavior needs to be modified by early identification of severe cases and their prompt and timely management.

Awareness about biting time of mosquitoes was very low among residents on enquiring about biting time of mosquitoes it was found that almost 70% of residents were not aware about the biting time of mosquitoes. Out of these 38.6% of the residents said that mosquitoes bite during both day and night and 30.6% residents were of the opinion that mosquitoes bite during day time (Figure 1). It is very important that health authorities make people aware of the biting time of Aedes mosquito so that steps can be taken to avoid being bitten by mosquitoes like encouraging children to wear full sleeve cloths (shirt and trousers) for school.

Television, radio and newspaper has been the main source of information about prevention and control of Dengue fever as told by residents was. This has been followed by children education and health professionals. Similar findings were reported from Jamaica, Laos and the Philippines [19, 20, 21]. In the present study it was informed that only 20.4% of the participants had received information about DF from health professionals. This indicates that there is dire need to strengthen Information, Education and Communication (IEC) by health workers. IEC material should be made available with all health workers, this can maximize the benefits of health facility visits by also communicating correct information about DF and its prevention. Health professionals in this area should be more adequately mobilized for awareness raising programmes (Figure 2).

It was found while interviewing the residents that majority of the participants in our study were classified as having good attitude. This result might not be completely correct it may have been be partially influenced by culture of trying to please the enumerators by agreeing or strongly agreeing to interview questions, As there is general perception that person who comes to interview or suggest preventive measures is a great doctor. Almost 49.1% of the participants believed that it is the responsibility of the Government to control mosquitoes. While the initial framework can be erected by the Government to eradicate the disease by capacity building measures of the community, Self-help Initiatives can go a long way in dengue control as suggested by Swaddiwudhipong W *et al*. [22]

Use of preventive measures was found to be higher than the knowledge as reported in our study. A study done in Thailand also found similar results [23] One of the reasons for higher practice levels attained in this study may be that many questions on practice level were related to daily practices for the control of other common mosquito borne diseases in this area like malaria and mosquito nuisance in general.

It is concluded that in the sample population there is a low level of good or sufficient knowledge on DF., The practice level was fair and attitude level was good despite low level of knowledge. Awareness programmes need to be initiated on urgent basis to raise the knowledge of people in this area regarding DF. For achieving this IEC/BCC activity on DF need to be developed and more use of social as well as other source of media to spread messages regarding symptoms of DF and its control. Students can be used as multipliers by including this in school curriculum.

As the study was cross sectional the results of the study must be interpreted with caution, and did not account for the dynamics of relationships between the factors analysed. It is possible that some respondents might have provided socially desirable responses to some questions, especially in the attitude domain, since the survey was conducted by an interviewer base use of a semi structured questionnaire. Our sample might not be a representative for the whole community. However, this study provides crucial baseline information on the overall KAP of people regarding DF.

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