A DENGUE OUTBREAK: NEW CIVIL HOSPITAL, SURAT IN GUJARAT ALERT!

Hiteshri Patel[1], Sukesha Gamit[2], Rahul Damor[3], Chintan Gamit[4], Keshav Vaishnav[5], J. K. Kosambiya[6]

[1]Tutor, Department of Community Medicine, Government Medical College & New Civil Hospital, Surat.
[2]Assistant Professor, Department of Community Medicine, Government Medical College & New Civil Hospital, Surat.
[3]Assistant Professor, Department of Community Medicine, Government Medical College & New Civil Hospital, Surat.
[4]Tutor, Department of Community Medicine, Government Medical College & New Civil Hospital, Surat.
[5]Insecticide Officer, Department of Community Medicine, Government Medical College & New Civil Hospital, Surat.
[6]Professor, Department of Community Medicine, Government Medical College & New Civil Hospital, Surat.

ABSTRACT

BACKGROUND

During September 2014, increased number of fever cases were reported from the New Civil Hospital Campus, Surat (NCHS), Gujarat State. An entomological and epidemiological investigation of this outbreak was conducted to ascertain the nature and cause of the outbreak.

METHODOLOGY

Epidemiological surveillance of fever cases was carried out in the New Civil Hospital Campus during the period of 3rd to 20th September 2014. House to house survey was carried out to find out the fever cases in three rounds. A person who has a history of fever with or without other symptoms within last one week is considered as a fever case. Entomological survey was carried out for the presence of potential and active breeding sites of mosquito. Resting collections of mosquitoes were done by a team of the Surat Municipal Corporation with mouth aspirators.

OBSERVATIONS

Total 1875 population was surveyed in each round. Among them, 79 (4.2%) cases had a fever within last one week. Mean age of fever cases was 24.5±12.8 years. Among total fever cases, 49.5% cases had viral fever whereas 27.8% cases had confirmed dengue fever. One death was reported due to dengue fever. The HI, CI and BI were 6.55%, 5.07% and 7.31% for all species of mosquitoes. The majority of species in active breeding sites were Aedes mosquito (82.7%). There was a huge reduction in the potential and active breeding sites after application of mosquito control measures.

RECOMMENDATIONS

Routine survey, source reduction strategies and possible control methods need to be organized regularly to avoid future outbreaks.

KEYWORDS

Fever Surveillance, Dengue, Mosquito.

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INTRODUCTION: Dengue fever (DF)/dengue Hemorrhagic Fever (DHF) has emerged as an important public health problem throughout the world.[1] Because of the distribution of Aedes vector, it is found in tropical and subtropical areas, around primary and near the urban areas.[2] About 55% of the world's population live in areas where there is a risk of Dengue fever. It is estimated that more than 3.6 billion people are at risk of infection and 124 countries are endemic for Dengue virus transmission. Cases of Dengue fever per year are 36 million. About 2.1 million cases of Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS), constituting 5-10% of the total cases, are reported annually.[2] Clinical manifestations of Dengue fever vary from fever, shock, hemorrhage and death with case fatality rate of 10-15%.[3]

However, perhaps the area most susceptible to epidemics and human suffering as a result of Dengue is India. Because of its warm climate and monsoon season, India offers a suitable environment for the breeding of Aedes mosquitoes. Surat city has a favorable climatic condition to profound its effect on the life cycle of a mosquito and the development of parasites. Surat city is witnessing a Dengue outbreak in the last two years. The Dengue fever outbreak will create panic among patients and the family members because of the uncertain course of clinical manifestation of Dengue fever. Surveillance is a pre-requisite for monitoring the Dengue situation in the area and should be carried out regularly for early detection of an impending outbreak and to initiate timely preventive and control measures.[4] During

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Corresponding Author:
Dr. Hiteshri Patel, Tutor,
Department of Community Medicine,
Government Medical College & New Civil Hospital, Surat.
E-mail: hiteshripatel2181@gmail.com
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September 2014, increased number of fever cases were reported from the campus of the New Civil Hospital, Surat (NCHS). An entomological and epidemiological Surveillance of this outbreak was conducted to ascertain the nature and cause of the outbreak.

AIMS AND OBJECTIVES:

1. To know the prevalence, age and sex-wise distribution of fever cases in NCHS.
2. To assess potential and active breeding sites for different species of mosquito in NCHS.
3. Action for preventive measures.

MATERIAL AND METHODS:

Study Design: Cross sectional observational study.

Study Area: New Civil Hospital Campus, Surat, Gujarat.

Study Population: All the people residing in campus of New Civil Hospital, Surat were included in this study.

Study Duration: 3rd September 2014 to 20th September 2014.

Study Tool: Pretested semi-structured questionnaire was used to collect the data from fever cases. Standard proforma for survey of mosquito breeding sites was used.

Ethical Approval: Ethical approval was not taken because this is an investigation due to sudden increased number of fever cases and not a planned research. It has been conducted by an order of the Institution head (Dean of New Civil Hospital, Surat).

STUDY METHODOLOGY:

Entomological Surveillance: First, entomological survey was carried out by a team of SMC during 1st and 2rd September in and around NCHS. Resting collections were done by a team of SMC using mouth aspirators. Mosquito control measures were applied by the team of SMC. A second entomological survey was carried out by a team of the PSM Department during 3rd and 4th September. Areas in and around the hospital, houses, construction sites and all the possible sites where mosquito breeding can take place were surveyed. There were 3 indices used to record mosquito density level like HI (Housing Index), Container Index (CI) and Breteau Index (BI). A HI>5% and/or BI>20% for any locality is Dengue sensitive and therefore adequate preventive measures should be taken. Depending on potential outbreak, an area can be placed in following three categories.[5]

Priority I: Death due to Dengue confirmed.
Priority II: HI>20, BI>20.
Priority III: HI < 5, BI <20.
Priority IV: Despite active search, no breeding sites found positive.

Fever Surveillance: House to house survey was carried out in three rounds in the campus of the New Civil Hospital, Surat to find out fever cases. Verbal consent was taken from head of household. First round was conducted during 5th and 6th September 2014, the second round was during the 12th and 13th September and the third round was during 18th and 19th September. All houses in campus were surveyed in each round. A person who has a history of fever with or without other symptoms within last one week is considered as a fever case.

RESULTS: Total population surveyed was 1875 in each round. More than 60% of fever cases were between 10 to 29 years of age group. Female (55%) are affected more as compared to male (45%). Among the total surveyed population, 79 (4.2%) cases had fever within the last 1 week. Mean age of fever cases was 24.5±12.8 years. (Table 1)

Age group	Sex		Total (N=79)
	Male (36)	Female (43)	N (%)
0 to 9	5 (13.9)	3 (7.0)	8 (10.1)
10 to 19	11 (30.5)	10 (23.2)	21 (26.6)
20 to 29	11 (30.5)	16 (37.2)	27 (34.2)
30 to 39	5 (13.9)	6 (13.9)	11 (13.9)
40 to 49	3 (8.3)	5 (11.6)	8 (10.1)
50 to 59	1 (2.8)	2 (4.6)	3 (3.8)
60 and more	0	1 (2.3)	1 (1.3)

Table 1: Age and Sex wise distribution of fever cases during study period

Out of total fever cases, 39 (49.5%) had viral fever, 22 (27.8 %) had Dengue fever and remaining cases had Acute Respiratory Infection (ARI 15.2%), Malaria (3.8%), Acute Gastroenteritis (2.5%) or Jaundice (1.3%). (Figure 1).

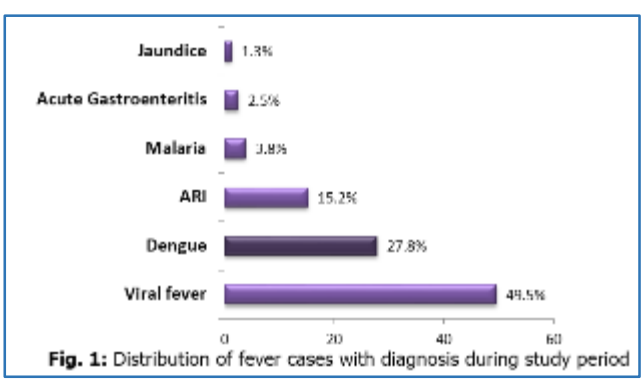

Fig. 1: Distribution of fever cases with diagnosis during study period

Total 42 Dengue cases were reported in New Civil Hospital Campus in the year 2014. Among which, 54.8% were male and 45.2% were female. The majority (76%) of cases is within the age group of 10 to 39 years and the majority of cases (63%) was occurring during the month of September. (Figure 2).

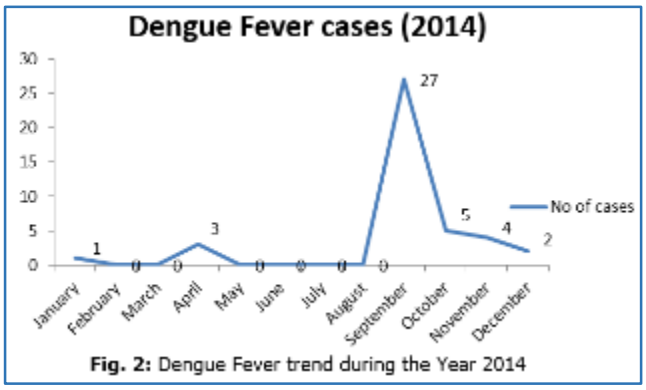

Fig. 2: Dengue Fever trend during the Year 2014

As per the report of SMC, total number of potential breeding site was 2288. Out of this, 116 were active breeding sites. Out of 1587 surveyed houses, 104 were positive. Mosquito density indices were—HI (6.55%), CI (5.07%) and BI (7.31%). The entire potential breeding places were removed with all possible efforts and in cases where removal was not possible Larvicide were used to kill the mosquito larvae. Anti-adult measures were carried out using ultra low-volume thermal fogging with a formulation of Pyrethrum. After application of mosquito control measures, total number of active and potential breeding sites were reduced to 12 and 280 respectively. (Table 2).

Sl. no.	Before mosquito control measures		Various Indices
1	Total Number of surveyed houses	1587	Housing Index 104*100/1587 = 6.55
2	Total number of positive houses	104	
3	Potential breeding sites	2288	Container Index 116*100/2288= 5.07
4	Active breeding sites	116	
			Breteau Index 116*100/1587= 7.31

Table 2: Findings of Entomological Survey

HI (Housing Index): Means the percentage of positive houses.[5]

CI (Container Index): Means the percentage of water-holding containers infested with larvae and/or pupae.[5]

BI (Breteau Index): Means the number of positive containers per 100 houses inspected.[5]

The majority of species in active breeding sites were Aedes mosquito (82.7%) (Figure 3). Common Potential breeding sites were water logging, open overhead tank, water collection on the terrace, open gutter and Construction sites. Common active breeding sites were rainy water logging areas and Construction sites.

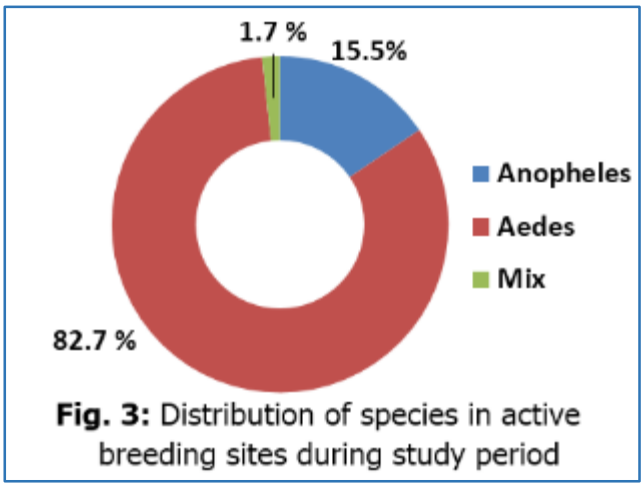

Fig. 3: Distribution of species in active breeding sites during study period

DISCUSSION: Surat city has a favorable climatic condition to profound its effect on the life cycle of a mosquito and the development of Malarial parasite and Dengue virus. Climatic factors such as temperature, humidity and rainfall would have contributed to the abundance of Aedes mosquitoes and virus transmission.

During September 2014, sudden increase in the number of fever cases along with one death due to Dengue fever was reported in NCHS. In the present study, Prevalence of fever during the study period was 4.2%. In the study regarding the investigation of a Dengue fever outbreak in Pondichhery conducted by Gnanamani, et al, prevalence of fever cases was 7%.[6] This difference in prevalence might be due to differences in the study setting. Majority of fever cases (61.8%) were between 10 to 29 year age group. Female were affected more as compared to male. Similar findings were observed by Biswas, et al and Durani, et al in their study.[7,8] In our study, among total fever cases, 49.5% of the cases had viral fever and 27.8 % had Dengue fever. This increased number of Dengue fever cases might be due to favorable climatic condition for transmission of Dengue virus. G. Rajendran, et al in their study regarding epidemiological and entomological investigation of Dengue Fever in Sulurpet, Andhra Pradesh, found that out of total fever cases, 22.9% had Dengue fever during the period of mid-September 2000.[9] In both these studies, increased number of Dengue fever cases in September month due to favorable climatic condition for vector of Dengue fever during monsoon in this study, we found that HI, CI and BI were 6.55%, 5.07% and 7.31% respectively. So, our surveyed area was considered as Dengue sensitive and therefore adequate preventive measures should be taken. In surveyed area, 1 confirmed death due to Dengue was reported. So, this area was included in Priority I.[5] A study done by Minhas, et al regarding survey of Dengue vector in institutional campus found the HI, CI and BI as 7.3%, 3.9% and 6.2% respectively.[5] Common Potential breeding sites were water logging, open overhead tank, water collection on terrace, open gutter and Construction sites. Common active breeding sites were rainy water logging and Construction sites. Biswas D. K., et al in their study found that water accumulated in drums, drains, ponds and other containers of water. Water accumulated in these containers, after rain.

After careful examination, coconut shells, tires, earthen pots, flower tubs and plastic containers were found to be positive for Aedes Aegypti Larvae.[7] Studies done by Sharma S. K., et al in Lakshadweep.[10] India found that common breeding sites for Aedes Aegypti are small cement tanks, used tyres, solid waste material holding rain water and, for Aedes albopictus, they are small pots holding drinking water for birds, metallic containers holding rain water, and tree holes. The difference in the breeding sites in both the studies might be due to different study areas.

CONCLUSION: Prevalence of fever during the period of investigation was 4.2%. The Young age group is commonly affected. Out of total fever cases, 49.5% cases had viral fever whereas 27.8% cases had confirmed Dengue. One death was reported due to Dengue fever. Surveyed area was Dengue sensitive and priority I as per entomological indices. The majority of species in active breeding sites was Aedes mosquito (82.7%).

RECOMMENDATIONS: Routine survey, source reduction strategies and possible mosquito control measures need to be organized regularly to avoid future outbreaks as huge construction work is undergoing in New Civil Hospital campus.

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