Dengue, the disease in Daman, India

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Abstract

Daman is a border UT city of India. Gujarat is the main neighboring state of Daman and which prevailing with dengue or dengue fever (DF)/dengue haemorrhagic fever (DHF)/dengue shock syndrome (DSS). Dengue fever is the vector borne disease caused by dengue virus. Aedes species mosquitoes are the transmitting vector of this disease which bite human host during day time (two hours after sunrise and several hours before sunset). To check the prevalence, epidemiology of dengue, we choose our study area Daman as its neighboring state Gujarat already prevailing with dengue. Blood samples were collected from the patients reported to DPHL, Daman and tested by Dengue NS1 Ag ELISA. Test results showed that dengue positivity rate in Daman are 22.27%. Males are the maximum affecting sex group and children, below 15 years are the maximum affecting age group in both sex. There are lots of scopes for future studies in Daman and to control this disease all departments must work jointly. Early detection by Dengue NS1 Ag ELISA in periphery level may helps government to make or prepare the dengue control strategies

Keywords: *DF, DHF, DSS, NS1, Ag, ELISA*

1. Introduction

Daman and Diu is a union territory of West Coast of India. The border state of this UT of Daman city is Gujarat. The area of Daman is 7200 Km^2, elevation 5 m, weather 27 ^{o}C , wind blows normally SW at 19 km/h, 91% humidity and sax ratio is 1.69 male/female (Daman City Administration). Daman is separated by Daman Ganga river into two segments which is Nani-daman and Moti-daman. The total population of Daman is 1, 91,173 (2011 census).i.e. 2700 people per square kilometer. Small industries and agriculture are the main income source of this city. The whole city is an urban area. As Dengue disease spread by the vector mosquitoes and *Aedes species* are mostly found in urban area than rural and as Daman city is a border UT of India as well as neighboring state Gujarat where prevailing dengue, we choose this area to study seroprevalence, epidemiology etc of dengue. The vectors of dengue virus are mainly *Aedes aegypti*, *Aedes albopictus*, *Aedes polynesiensis*, and *Aedes scutellaris* and maximum species are found in India. Clinically a patient consider as dengue fever (DF) when patient report AFI (Acute Febrile Illness) of 2-7 days with two of the headache, retro-orbital pain, myalgia, arthralgia, rash and haemorrhagic manifestations (NVBDCP, India guideline). But this can be confirmed only after laboratory diagnosis. The laboratory diagnosis must be done by the minimum one of the following tests - A] Isolation of the Dengue Virus from serum, plasma, autopsy samples or leucocytes. B] Antigen detection ELISA. C] IgM/IgG ELISA. And D] PCR otherwise the tests are not valid as per NVBDCP, India. Dengue fever may develop to dengue haemorrhagic fever (DHF) and to dengue shock syndrome (DSS). In DHF the positive DF case's platelets goes down to less than 1 lakh per cumm (thrombocytopenia), patient may develop malena or Haematemesis, Bleeding from different parts of body, leakage of plasma etc. In DSS the DHF case's pulse rate goes down or patient goes to hypotension.

In India the first dengue case was reported in 1956 from Vellore but the first DHF outbreak reported from West Bengal in1963. Dengue virus having four serotypes DEN-1, DEN-2, DEN-3 and DEN-4 and all four serotypes are prevalence in India. In 2007 a new serotype DEN-5 isolated in Sarawak state of Malaysia and this newly isolated serotype also confirmed in India in October 2013 (Mustafa MS et al., 2015). Every year 50-100 million peoples infected by dengue virus and approximately half

million people admitted in hospital(Whitehorn J et al., 2010). This is proves how dengue is medically important.

2. Methodology.

We choosed the DPHL (District Public Health Laboratory) of Daman for our study. The study was conducted in 2015, A one year study. The patients reported to the laboratory with fever, headache, joint pain as per NVBDCP guideline case definition and whose onset was less than seven days were selected for our study. The patients were informed about the study. Blood samples were collected with proper data. Serum were obtained from the blood samples and tested with dengue NS1 Ag ELISA (Panbio) for dengue antigen. The sensitivity of the kit was 91.89% and specificity was 98.39%. All age groups and both sex were included for the study. Total 862 (eight hundred sixty two) numbers of patients reported to DPHL for study.

3. Results and Discussion

Total 862 (eight hundred sixty two) numbers samples were tested by Dengue NS1 Ag ELISA test and 192 (One hundred ninety two) numbers samples were found positive (Table 1).

Table 1: Summary of test results

Technique / Results	Dengue NS1 Ag ELISA	
	Result	Percentage (%)
Positive	192	22.27%
Negative	670	77.73%
Total	862	100%

After analysis table 1 showed that 22.27% patients reported to DPHL, Daman with DF while 77.73% patients were with other infection. This positivity rate is more than a study conducted in the neighboring state Gujarat in 2012 by Patnkar M et al., 2014. They found 21.06% dengue positive. This indicates that dengue is transmitting to new or neighboring areas. It may be due to the travels of peoples, movement of vectors etc.
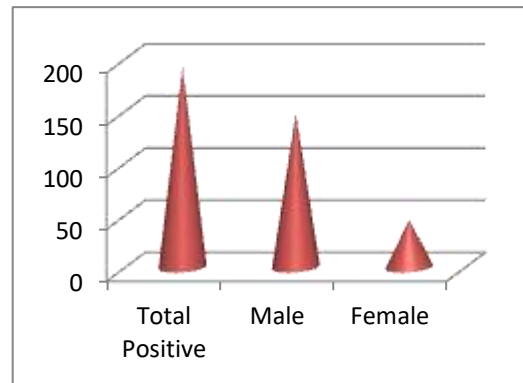

Figure 1: Sex wise positivity rate

Figure 1 showed that out of 192 positive patients 76.57% (147/192) were male and only 23.43% (45/192) patients were female. This is may be due to the men summer session habit to live bear body or stay outside maximum time during day as *Aedes* mosquitoes bite during day time or afternoon time in urban areas (Ndenga BA et al., 2017). A study by MU Rabbani et al., 2018 (April) also found similar results in sex ratio. They found 70.02% positive male and 29.8% positive female. Another study by Mistry M et al., 2017 also found maximum male positive in 2015, the positivity rate of male found by them was 68.7% positivity rate of female found by them was 31.3 %.

Table 2: Child and adult male positivity ratio

Positive Male	Result	Percentage %
Total Positive Male	147	100%
Below 15 Yrs Male	127	86.4%
Above 15 Years Male	20	13.6%

Table 3 : Child and adult female positivity ratio

Positive Female	Result	Percentage %
Total Positive Female	45	100%
Below 15 Yrs Female	43	95.60%
Above 15 Years Female	2	4.40%

After analysis both table 2 and table 3 we found that children are maximum affecting age group (below 15 years) weather male or female in comparisons with adults. As Aedes mosquito bite during day time (up to two hours after sunrise and several hours before sunset) and especially on the elbows and ankles, children may affects maximum because of which. The study hours and clothing patterns of children are noticeable. But a fifty years review studies by Chakravarti A et al., 2012 in India seen that maximum affecting age group was young adult, age range from 21-30 Years followed by children. Same

review showed maximum affected children from Delhi in 1996 during epidemic. Similar results came from West Bengal too in 1990 and 2005. This showed similar results with our study.

A study by Mutheneni SR et al., 2017 reports that the dengue having co-relation with climatic factors. So, there is a scope of study in Daman also to check co-relation of dengue with rain, temperature, winds etc. This study may help to take steps for the dengue control strategies. Sharma SK et al., 2010 informed that in 2006 rupees 125 cr. Approximately utilized to control the disease. Which indicates to reduce the economic burden we must make our nation dengue free and this help in nation's growth.

A study of dengue was carried out in Kutch, Gujarat in 2014 by Gusani JK et al., 2017. This is only 762.5 KM from Daman city. This study reveals few similarities with our study results. They found more dengue positive male in comparison with female but their maximum affecting age group was 21-30 Years age range. They report that maximum positive cases were from urban area and in the month of September, October and November. Daman is an urban city and there is a scope of moth wise analysis for further alert. They informed how important the Dengue NS1 ELISA test kit for early diagnosis.

A study to control mosquito vector by Carrington LB et al., 2013 showed large DTR (Diurnal Temperature Range or Daily fluctuating temperature) can reduce the dengue transmission probability.

4. Conclusions

With time Dengue is also expanding to new places to places and which have direct impact with economic condition and development of the country. To control the disease government must have specific control strategies. Other departments like meteorology, environment, agriculture, irrigation, fishery, media, education etc must help health department to control the disease by controlling all host, medium and vector. Early detection, epidemiological studies, molecular studies may help government to prepare a plan to control the disease.

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