



## Retrospective analysis of dengue infection in Sirsa, Haryana (India)

Authors

**Dr Govind Gupta<sup>1</sup>, Dr Deep Gagneja<sup>2</sup>**

<sup>1</sup>M.D (Medicine) Civil Surgeon, Sirsa (Former Assistant Professor, BPS Govt. Medical College for Women, Khanpur Kalan, Sonapat, Haryana)

<sup>2</sup>M.D (Microbiology) Deputy Civil Surgeon (Vector Borne Disease, Sirsa) District Civil Hospital Sirsa  
Corresponding Author

**Dr Deep Gagneja**

Deputy Civil Surgeon (Vector Borne Disease, Sirsa), District Malaria Office, District Civil Hospital Sirsa  
Phone number: 9812592425, Email: [drdeep0@gmail.com](mailto:drdeep0@gmail.com)

### Abstract

Every year dengue outbreaks are reported from various parts of the country. A retrospective analysis of dengue cases was done from year 2014 to 2017 with a aim to assess the dengue burden in this part of country. Serosurveillance study was done on serum samples and were tested for NS1 Ag and IgM antibodies. Maximum number of cases were reported in year 2015 and peak of dengue cases was found in the month of October. A lot of work for prevention is still required to combat the disease.

**Keywords:** Dengue, ELISA.

### Introduction

Out of the major vector-borne diseases (VBDs), dengue fever has re-emerged as a major public health challenge worldwide and is a matter of serious concern. Approximately 2.5 billion people are at risk of infection and more than 100 million cases and 25,000 deaths being reported annually.<sup>1</sup> In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries and, in the present decade, from urban to rural settings. Cyclic epidemics are increasing in frequency and in-country geographic expansion is occurring within the countries like Bangladesh, India and Maldives which are in the deciduous dry and wet climatic zone and where multiple virus serotypes are circulating.<sup>2</sup> But Still any drug specific to dengue and vaccine is lacking and we are left to focus on preventive part of this disease.

The virus causing dengue belongs to family Flaviviridae and there are 4 serotypes: DENV-1, DENV-2, DENV-3 and DENV-4 which are transmitted to humans principally by *Aedes aegypti* and *Aedes albopictus* mosquitoes. The spectrum of disease ranges from mild DF (Dengue fever) to the very severe form of the disease, DHF (Dengue Hemorrhagic Fever) and DSS (Dengue Shock Syndrome).<sup>3</sup> Looking at the Indian figures from last two decades high levels of dengue transmission was noted, with large epidemics every 2–3 years, with the exception of the period from 1997–2002. But the numbers of dengue started rising again after 2002. In the early 2000s, only few states were endemic for dengue like Maharashtra, Karnataka, Tamil Nadu and Pondicherry, Delhi, Rajasthan, Haryana, Punjab and Chandigarh but now it has spread to many

states and union territories.<sup>4</sup> The overall planning for prevention and management including guidelines for case detection, management, preventive methods, development of SSH (Sentinel Surveillance Hospital) labs, mandatory reporting even by private hospitals and laboratories, setting up of minimum rates for dengue detection has been well established by NVBDCP (National vector borne disease control programme).<sup>5</sup>

### Material and Methods

We selected 1200 patient's samples received in District Civil Hospital from year 2014-2017. Samples were tested at SSH (sentinel surveillance hospital) Lab, District Civil Hospital, 1 Sirsa. Samples were received from patients of District civil hospital Sirsa, various other Govt. and private facilities in the district Sirsa. Samples received from other districts or states were not included in the study. Serosurveillance study was done on serum samples and were tested for NS1 Ag and IgM antibodies using ELISA as per criteria laid by NVBDCP. Patients having onset of fever and other symptoms suggestive of dengue during first five days were tested for NS1 Ag and more than 5 days of duration were tested for IgM antibodies. Controls provided in the kits were used with every batch of tests.

### Results

A retrospective analysis of dengue cases was done from year 2014 to 2017 with a aim to assess the

**Table1:** Year wise distribution of dengue positive cases

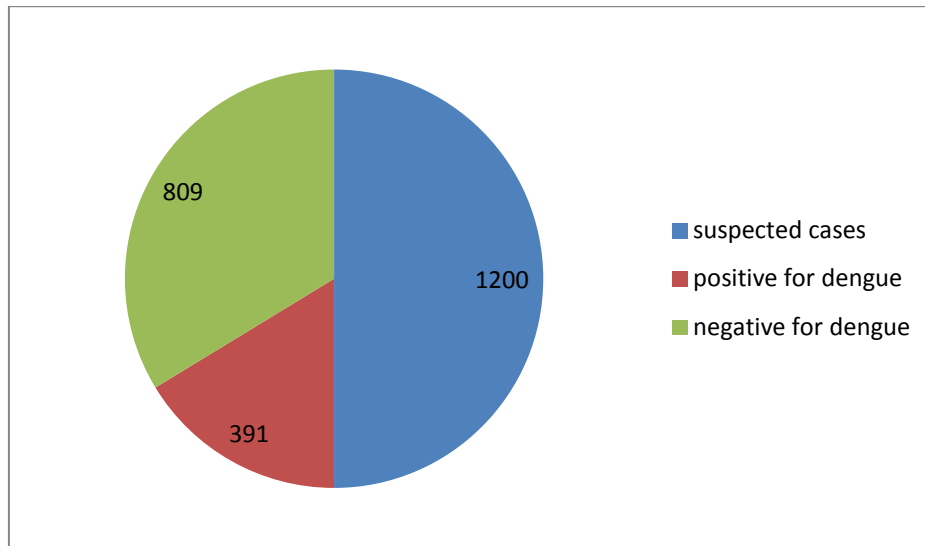
	2014	2015	2016	2017	Total
IgM	5(100%)	102(51%)	3(14.3%)	8(4.9%)	118(30%)
NS1 Ag	0(0%)	99(49%)	18(85.7%)	156(95.1%)	273(70%)
Total	5	201	21	164	391

**Table 2:** Area wise distribution of dengue cases (2014-2017)

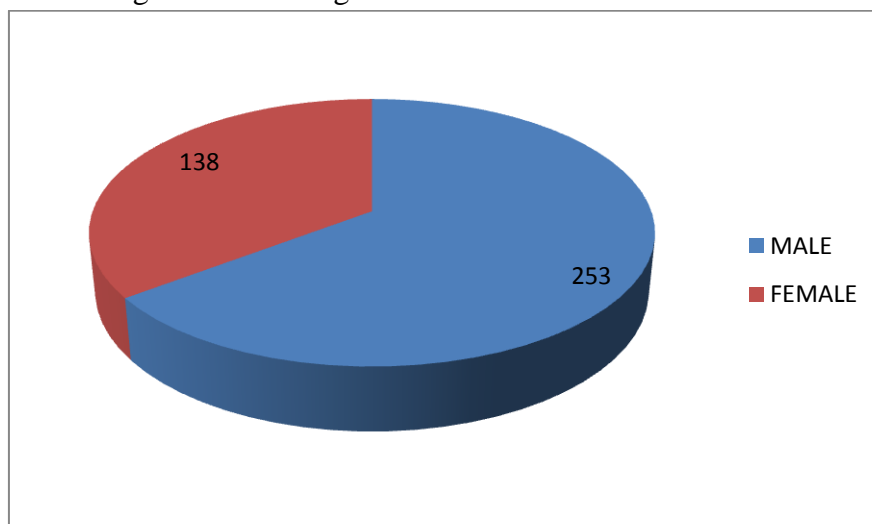
Area	2014	2015	2016	2017	Total
Rural	1(25%)	65(32.33%)	9(42.85%)	63(38.41%)	138(35.3%)
Urban	4(75%)	136(67.66%)	12(57.14%)	101(61.58%)	253(64.7%)

dengue burden in this part of country. Of the 1200 suspected dengue samples received at SSH Lab. District Civil Hospital Sirsa during the study period, 391 samples were found to be seropositive for dengue.(Graph 1) Maximum number of cases were reported in the year 2015(201) followed by 164 cases in year 2016. In the year 2014 and 2017, 5 and 21 cases were detected respectively. (Table1) Maximum number of dengue positive cases were males (64.7%) and 35.7% were females.(Graph2) In our study majority of the cases were from the age group of 21-30 yrs. followed by in the age group of > 40 yrs. (Graph3) More number of cases were reported from urban area, however percentage of cases from rural area increased during these years i.e.2014(25%), 2015(32.3%), 2016(42.85%) to 2017(38.41%) showing impact of increasing urbanization. (Table2) Detection of cases during first five days of onset of symptoms was done using NS1 Ag (ELISA) and of the total 391 positive cases, 273(70%) were positive for NS1 Ag.(Table1.) In the 2014 all the detected cases were IgM antibody positive and from 2014 to 2017 percentage of NS1Ag detection increased from 0% to 95% showing early reporting of cases. Seasonal trend showed that cases start appearing in the month of August just after rains and peak of cases was reported in month of October, thereafter declining in December. (Graph 4)

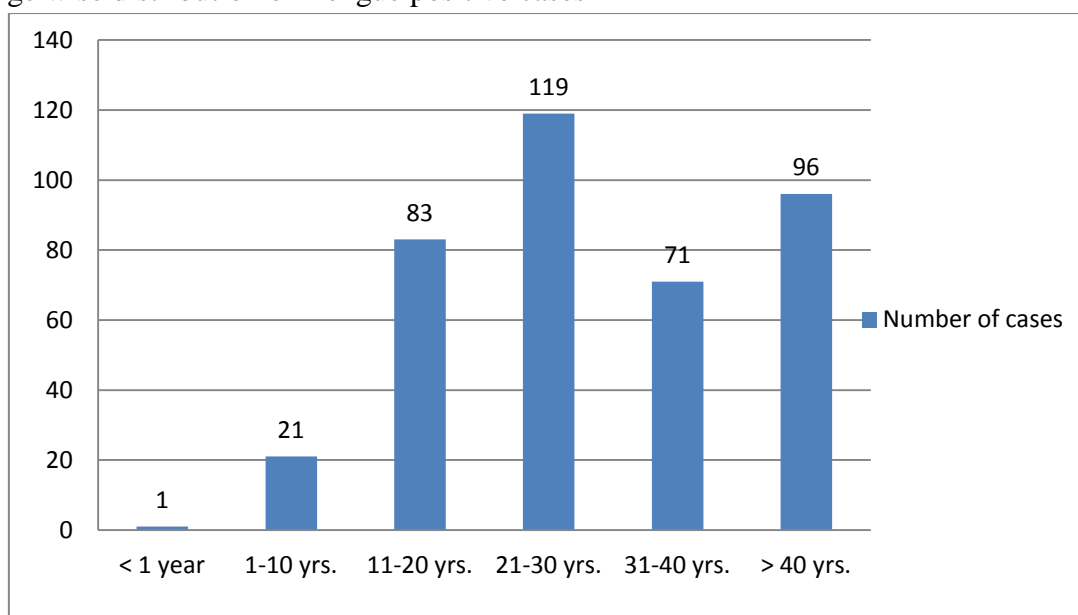
**Graph 1:** Distribution of suspected Dengue, Dengue confirmed and Dengue negative cases



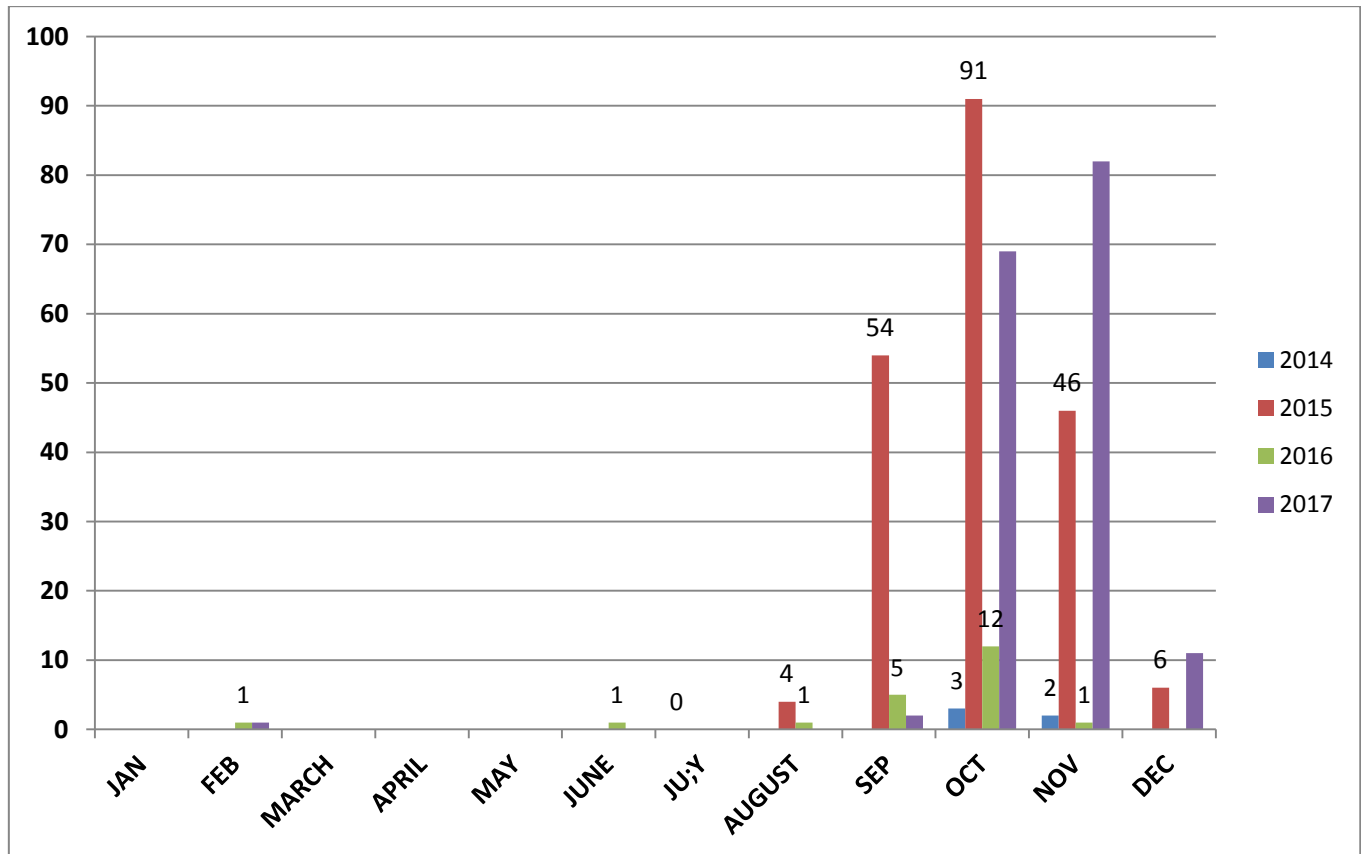
**Graph 2:** Distribution of Dengue cases among male and female



**Graph 3:** Age wise distribution of Dengue positive cases



Graph 4: Seasonal trend of Dengue cases from 2014 to 2017



**Discussion**

Dengue affects a large number of population in our country every year. It causes spectrum of disease ranging from mild to DSS/DHF. Keeping in mind the above study was conducted and a retrospective analysis of various factors linked to dengue cases were studied. Although a rise in number of cases from 2014-2017 was seen but the rise was not steady. Rather a rise and fall in number of cases on alternate years was observed. This pattern coincided with figures of state Haryana as per NVBDCP data<sup>6</sup>. The maximum number of cases were reported in the year 2015(201). Frequent movement of people to another endemic areas for education, employment and business might be the reason for spread of disease. In our study during these four years maximum number of cases (64.7%) were from urban areas but percentage of positivity in rural areas increased steadily. Increasing urbanization, which is usually unplanned, increased construction and inefficient water drainage system is adding to already existing poor sanitary

conditions. However under NVBDCP, integrated vector management(IVM) consisting of environmental management, entomological surveillance, use of antilarval insecticides has improved the control measures and improved awareness regarding the disease through IEC has made public more aware which is evident from the figures that early detection of cases has increased to 70%. Availability of better detection facilities like ELISA for dengue at district hospitals has also led to increased detection of cases which were previously undetected or referred. Male preponderance was evident in our study which is similar to as reported by other authors<sup>7,8</sup>. We observed majority of cases from age group of 21-30 yrs. followed by in the age group of > 40 yrs. which is in accordance with Gupta et al<sup>8</sup>. However Padhi et al<sup>9</sup> and Garg et al<sup>7</sup> reported more number of cases from 11-20 yrs and 0-15 yrs age group respectively. On analyzing the seasonal trend it was found that cases start appearing in the month of August just after rains and peak of cases was reported in month of

October, thereafter declining in December. This trend was supported by other studies from North India<sup>7,8</sup>, whereas Ahmad et al<sup>10</sup> reported more cases during September. But all the studies are in agreement that there is post monsoon rise in cases. Increase in water collections after rains, warm and humid environment favors mosquito breeding.

Diagnostics and management of dengue cases at district hospitals has improved during previous years leading to early detection of cases. Preventive measures are being implemented but a lot more need to be done to combat dengue in coming years.

### References

1. Maj MS Mustafa, Brig AS Bansal, Col V Rastogi Flightless Aedes mosquitoes in dengue control. Med J Armed Forces India 2011; 67(2): 192–193.
2. World Health Organization. Dengue: Guidelines for Diagnosis. Treatment, Prevention and Control: New Edition. World Health Organization: Geneva, 2009 <http://www.who.int/tdr/publications/documents/dengue-diagnosis.pdf> Accessed on 18 JULY 2018
3. Raza FA, Rehman Su, Khalid R, Ahmad J, et al. (2014); Demographic and Clinico-Epidemiological Features of Dengue Fever in Faisalabad, Pakistan. PLoS ONE 2014;9(3): e89868.
4. Anita Chakravarti , Rohit Arora , Christine Luxemburger , A. Chakravarti et al. Fifty years of dengue in India. Transactions of the Royal Society of Tropical Medicine and Hygiene 2012;106: 273–282.
5. National Vector Borne Disease Control Programme. Guidelines. <http://nvbdcp.gov.in/index1.php>- accessed 18 JULY 2018
6. National Vector Borne Disease Control Programme. DENGUE/DHF SITUATION IN INDIA. Dengue cases and deaths in the country since 2015. <http://nvbdcp.gov.in/index4.php>-accessed 15 JULY 2018
7. Atul Garg\*, Jaya Garg, Y. K. Rao, G. C. et al. Prevalence of dengue among clinically suspected febrile episodes at a teaching hospital in North India. Journal of Infectious Diseases and Immunity 2011; 3(5): 85-89.
8. Ekta Gupta, Lalit Dar, Priyanka Narang, V.K. Srivastava et al. Serodiagnosis of dengue during an outbreak at a tertiary care hospital in Delhi. Indian J Med Res 2005; 121: 36-38.
9. Sanghamitra Padhi, Muktikesh Dash, Pritilata Panda, Banojini Parida et al. A three year retrospective study on the increasing trend in seroprevalence of dengue infection from southern Odisha, India. Indian J Med Res. 2014;140(5): 660–664.
10. Nishat Hussain Ahmed and Shobha Broor. Dengue Fever Outbreak in Delhi, North India: A Clinico-Epidemiological Study. Indian J Community Med. 2015; 40(2): 135–138.