RESEARCH PAPER

Profile of Dengue Fever in Hospitalized Children in Saurashtra, Gujarat, 2013-2017

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Objective*:** To study the five year trend of epidemiological and demographic characteristics of dengue infections from year 2013 to 2017 among children upto 15 years. ***Methods*:** This study presents data from review of microbiology department records of samples for dengue testing with information supplied by clinicians on the investigation request form. Patients were tested for NS1 Ag, IgM Ab or both. ***Results*:** Out of 4216 samples, 1072 (25.4%) were positive for dengue. Positivity ranged from 44.1% in year 2013, 25.8% in 2015 to 16.1% in year 2017. Most cases reported were among male (57.9%), from urban areas (77.9%) and Rajkot district (75.7%). Reporting of dengue cases increased from July to November with peak during October every year. ***Conclusion: Serum samples for dengue serology were more commonly positive in July-September months during the study period, and in male children, and those from urban areas.

Keywords: *Epidemiology, Microbiology, Trend, Seasons*.

Dengue fever follows a seasonal pattern with cases peaking after monsoon, but in Gujarat and southern states the transmission remains perennial [1]. During year 2016-17, highest numbers of dengue cases were reported from West Bengal, Punjab, Odisha and Gujarat states [2]. The present study was conducted with the objective to study the five-year trend of epidemiological and demographic characteristics of dengue infections from year 2013 to 2017 among children up to 15 years in Saurashtra region, Western Gujarat.

METHODS

The study was conducted at a tertiary-care institute of Rajkot for five years from January 2013 to December 2017. Under National Vector Borne Disease Control Program (NVBDCP), Virology section of Microbiology department is identified as one of the sentinel surveillance centres in Gujarat state for dengue testing [3]. This study presents the data from samples received in microbiology department for dengue testing with information supplied by clinicians on the investigation request form. Ethical clearance was taken from the Institutional Ethical Committee to conduct this study.

During study period, total 20060 blood samples were received from suspected patients of dengue. Though analysis was done for samples of all age group, specific analysis was made for children to know dengue trend among them. Total 4216 such samples were from children upto 15 years of age included in present study. All such samples from children were tested for Dengue, and samples with details of co-infections like malaria, typhoid or any co-morbid diseases were excluded. Information about clinical signs/symptoms and any other lab investigations were not collected.

Based on history of illness, patients were tested for (1) NS1 Ag – illness less than 5 days, (2) NS1 Ag & IgM Ab – illness between 5-7 days, and (3) IgM Ab – illness more than 7 days [3]. The IgM dengue ELISA capture test kits were supplied by National Institute of Virology (NIV), Pune under the NVBDCP and Dengue NS1 antigen capture ELISA assay was performed by Platelia Dengue NS1 Ag (Bio-Rad, Marnes-la-Coquette, France).

The data were entered and analyzed by using Epi Info (version 7.2.2.2) software by Centre for Disease Control, Atlanta, USA [4].

RESULTS

Out of total 4216 samples of children, 1072 (25.4%) were positive for dengue. Positivity ranged from 44.1% in year 2013, 25.8% in 2015 to 16.1% in year 2017. More cases were reported among boys (57.9%), from urban areas (77.9%) and Rajkot district (75.7%) (***Table* I**). Total 797 (74.3%) samples were tested within five days of onset of fever by NS1 Ag test. Cases of dengue were reported mostly throughout the year during study period. Reporting of dengue cases increased from July to November with peak during October every year.

DISCUSSION

Dengue serology was positive among 4.6% samples in infants (with youngest infant aged 15 days), higher than as reported from Bangalore [5] but much lower than others [6,7]. Significant numbers of cases (45.7%) were from 10-14 years age children, higher than reported in previous studies from different areas [6-9]. More than one third (34.2%) cases were reported from 5-9 years age group, almost similar to or lower than other studies [5-9].

Male preponderance among dengue cases has also been reported in previous studies [5,8,9]. Low prevalence among females may be due to low reporting rate and indoor/household activities, using covered clothes may be another cause for less exposure to risk of vector borne infection [8]. Significant numbers of cases (77.9%) were reported from urban areas. Dengue is a disease of urban areas where solid wastes, air conditioners, air coolers, flower pots and so forth are the major contributors in the growth of the vector [10].

Perennial transmission is reported in Gujarat and southern states of India [1]. Similar pattern of dengue was also seen in the present study. For seasonal variation, month-wise and quarter-wise data were analyzed. Only 12.8% dengue cases were reported in first two quarters of the study period. Majority of dengue cases reported from every July to November during study period showing monsoon and post-monsoon seasonality. Significant numbers of dengue cases (56.6%) were reported in last quarters (October-December) of study years (P<0.01), followed by 30.6% in third quarters (July-September).

Increased positivity is due to the favorable temperature and humidity condition which helps mosquitoes to breed [11-14]. The presence of stagnant water after rainfall favors breeding of the mosquito vector, results in large number of dengue cases. As the monsoon season favors breeding of Aedes mosquitoes, effective preventive and control measures to be taken prior to and with the beginning of monsoon to reduce the occurrence of dengue in the community [3,13,14]. Though data is part of sentinel surveillance data, it does not represent the NVBDCP data as not all the surveillance sites are part of study. Cases reported in private hospitals were not included in the study.

Dengue infection is endemic and occurs perennially among children in Saurashtra region. Dengue reported extensively showing July to November seasonality during study period and affected all age-group male children from urban areas. Focus should be on effective implementation of surveillance, vector control measures through source reduction and personal prophylaxis against mosquito bites, especially during monsoon months.

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TABLE I CHARACTERISTICS OF CHILDREN WITH DENGUE FEVER, RAJKOT 2013-2017

Variables	*Dengue Positive Cases – No. (%)*					
	2013 (n=408)	*2014 (n=43)*	*2015 (n=208)*	*2016 (n=237)*	*2017 (n=176)*	*Total (n=1072)*
Age group (y)						
< 1	19 (4.7)	4 (9.3)	9 (4.3)	10 (4.2)#	7 (4.0)	49 (4.6)
1-4	42 (10.3)*	8 (18.6)	28 (13.4)*	39 (20.7)*	39 (22.1) #	166 (15.5)*
5-9	118 (28.9)	14 (32.6)	70 (33.7)*	92 (38.8)	73 (41.5)	367 (34.2)
10-<15	229 (56.1)*	17 (39.5)	101 (48.6)*	86 (36.3)*	57 (32.4)	490 (45.7)*
Male gender	237 (58.1)	19 (44.2)	129 (62.0)	135 (57.0)	101 (57.4)	621 (57.9)
Urban residence	323 (79.2)	33 (76.7)	143 (68.8)*	189 (80.1)	146 (83.0)	834 (77.9)*
District						
Rajkot	265 (65.0)	30 (69.8)	178 (85.6)*	193 (81.4)	145 (82.4)	811 (75.7)
Other	143 (35.0)	13 (30.2)	30 (14.4)	44 (18.6)	31 (17.6)	261 (24.3)
Quarter						
Jan-Mar	8 (2.0)*	6 (14.0)	7 (3.4)*	3 (1.3)*	19 (10.8)	43 (4.0)*
Apr-Jun	21 (5.1)	9 (20.9)	25 (12.0) #	30 (12.6)	9 (5.1)*	94 (8.8)*
Jul-Aug	197 (48.3)*	4 (9.3)	33 (15.9)	41 (17.3)*	53 (30.1)	328 (30.6)
Sep-Dec	182 (44.6) #	24 (55.8)	143 (68.7)*	163 (68.8)*	95 (54.0)*	607 (56.6)*

**P<0.01, #P<0.05.*

WHAT THIS STUDY ADDS?

- Dengue was reported mainly in July to November months in Western Gujarat..

REFERENCES

1. Government of India. Annual report to the people on health. Director General of Health Services, Ministry of Health and Family Welfare, India, 2011. Available from: *http://mohfw.nic.in/WriteReadData/l892s/6960144509Annual%20Report%20to%20the%20People%20on%20Health.pdf*. Accessed January 09, 2018.
2. Government of India. National health profile - 2017. Director General of Health Services, Ministry of Health and Family Welfare, India, 2017. Available from: *http://www.cbhidghs.nic.in/writereaddata/mainlinkFile/NHP-2017.pdf*. Accessed March 06, 2018.
3. Mistry M, Goswami Y, Chudasama RK, Thakkar D. Epidemiological and demographic characteristics of dengue disease at a tertiary care centre in Saurashtra region during the year 2013. J Vector Borne Dis. 2015;52:299-303.
4. Centers for Disease Control and Prevention. Epi Info version 7.2.2.2, 2017. Available from: *https://www.cdc.gov/epiinfo/index.html*. Accessed January 01, 2018.
5. Sahana KS, Sujatha R. Clinical profile of dengue among children according to revised WHO classification: Analysis of a 2012 outbreak from Southern India. Indian J Pediatr. 2015;82:109-13.
6. Kabilan L, Balasubramanian S, Keshava SM, Thenmozhi V, Sekar G, Tewari SC, *et al*. Dengue disease spectrum among infants in the 2001 dengue epidemic in Chennai, Tamil Nadu, India. J Clin Microbiol. 2003;41:3919-21.
7. Hammond SN, Balmaseda A, Perez L, Tellez Y, Saborio SI, Mercado JC, *et al*. Differences in dengue severity in infants, children, and adults in a 3-year hospital-based study in Nicaragua. Am J Trop Med Hyg. 2005;73:1063-70.
8. Sharma GK, Bhatt D, Garg GK, Sharma D, Gulati RK. A prospective seroepidemiologic study on dengue in children in Southeastern Rajasthan, India. Int J Pediatr Res 2016;3:726-31.
9. Mishra S, Ramanathan R, Agarwalla SK. Clinical profile of dengue fever in children: a study from Southern Odisha, India. Scientifica (Cairo). 2016;:6391594.
10. Khan SA, Dutta P, Topno R, Soni M, Mahanta J. Dengue outbreak in a hilly state of Arunachal Pradesh in Northeast India. Scientific World Journal. 2014;584093.
11. Garg A, Garg J, Rao YK, Upadhyay GC, Sakhuja S. Prevalence of dengue among clinically suspected febrile episodes at a teaching hospital in North India. J Infect Dis Immun. 2011;3:85-9.
12. Prakash O, Singh DD, Mishra G, Prakash S, Singh A, Gupta S, *et al*. Observation on dengue cases from a virus diagnostic laboratory of a tertiary care hospital in North India. Indian J Med Res. 2015;142:S7-S11.
13. Padmapriya P, Senthil KV, Senthil RR, Khaleefathullah SA, Uma TS, Mohana S, *et al*. Dengue scenario: Chennai perspective – a six-year study (2009-2014). Arch Virol. 2017;162: 273-9.
14. Roy MP, Gupta R, Chopra N, Meena SK, Aggarwal KC. Seasonal variation and dengue burden in pediatric patients in New Delhi. J Trop Pediatr. 2017;0:1-6.