

International Journal of Mosquito Research

ISSN: 2348-5906
CODEN: IJMRK2
IJMR 2019; 6(6): 01-03
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Received: 01-09-2019
Accepted: 03-10-2019

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Distribution pattern of dengue cases in the tribal UT of Dadra & Nagar Haveli, India

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Abstract

Objective: This study aims to estimate the age and gender-specific risks of dengue attack during the in the third smallest union territory India.

Methods: The data of dengue confirmed patients since last five years (from January 2015 to December 2018) were recorded. The confirmatory diagnosis of dengue was done on the basis of ELISA (NS1, IgM and IgG).

Results: The results of the study suggest that the working age group (19- 45 years) is more susceptible to got dengue infection due to the high possibility of exposure to the infected vector. The gender wise data indicated that the male was outnumbered on the female. The gender predominance in relation to dengue infection may be due social, cultural and exposure reasons.

Conclusion: The risk of dengue transmission is shifting from adult to children and urban to rural/tribal areas. The data of the present study may utilize to develop a state-specific strategy for the prevention and control of dengue.

Keywords: Dengue, risk factor, demographic factors

Introduction

Dengue is an important threat to the health of the entire world. As per world health organization, the countries of the South Asia region and the Western Pacific region bear the 75% burdens of the total disease. In India scenario, Dengue Fever (DF) and Dengue Hemorrhagic Fever (DHF) are emerging as a major public health problem; the incidence was reported from more than 19 states since 2003 [1]. The transmission dynamic of dengue is complex, but it believes that the role of genetic factors, demographic factors, maternal antibody, circulating serotype and infection with multiple serotypes are important [2-6]. In dengue infection, age is the most important epidemiological factor to analyze the risk and severity of the disease [3, 7]. The available literature suggests that risk for classic dengue fever as well as dengue hemorrhagic fever, differ by age [8]. Adults and male are more susceptible to clinical dengue than young children and females [3, 9, 10]. The significant increase in the dengue infection was noted in this Union Territory during the last five years. This present study was performed to determine the demographic factors as the risk of dengue infection in the third smallest UT of India.

Methods

Study area

The Union Territory (UT) of Dadra Nagar Haveli is the part of western India and located between 20°0' and 20°25' N latitude and between 72°50' and 73°15' E longitude in the Western Ghat of India. (Fig – 1). The 487 sq km area is hilly, forest is spread all around occupied by mainly tribes (population 3.42 lakh) in 72 villages and one town. Due to the subsidiary in taxes, many 2702 industries (large industries= 20; medium = 564 and small = 2118) have been established in this UT of India. The health services are provided to the people by the Nine Primary Health Centers (PHC), Two Community Health Center (CHC), one Sub District Hospital in the rural area and one District Hospital with five hundred beds indoor facilities. The Integrated Disease Control Programme (IDSP) in the UT is governed and supported by IDSP section, National; Centre for Disease Control, New-Delhi.

Patients and diagnosis

All suspected cases of dengue (febrile patients or with a history of fever) reported at the Health Institutions of the UT of Dadra & Nagar Haveli during the study period were screened for malaria and leptospirosis infection. All negative patients who had fever history of 7 days were subjected to the diagnosis of dengue with detection of NS-1 antigen (PanBio, Australia), IgM and IgG antibody ELISA. The demographic variables of all dengue confirmed cases were analyzed.

Statistical analysis

The Age of patient was recorded in the categorical variable (up to 0-5, 6-10, 11-15, 16-45, 46-50 and above > 50 years of age). The Excel 2007 was used for data entered and SPSS was used to cross-check for accuracy.

Results

Total 9486 cases of dengue confirm cases were reported in the UT of Dadra & Nagar Haveli during last four year (January 2015 to December 2018). The annual incidence per lakh population was encountered 614.9 in the year 2015, 1101.6 in the year 2016, 490.0 in the year 2017 and 113.6 in the year 2018. (Table -1) The age wise stratification of dengue positive patients showed that 2.2 % of cases of dengue were reported in the age group of 0-5 year, 7.2% cases in the age group of 6-12 year, 12.7 % cases in the age group of 13-18 year, 68.3 % cases in the age group of 19-45 year and 9.6% cases in the age group of > 45 years. An enormous variation in the gender of dengue positive patients was noted during the period of study. The male was always outnumbered on the female. The male and female ratios in the dengue-infected patients were recorded 1:0.53 during the study period. The significant shifting in the mean age of the dengue positive patients was recorded during the study period ($P = 0.005$).

The subsequent reduction was noted in the mean age of dengue-infected patients during the study period. The mean age of dengue-infected male and female patients were recorded as 28.15 years (range 1-87 year, $n = 1566$) and 29.95 years (range 1-76 year $n = 865$) year respectively during the year 2015. In the year 2018, the mean age of male and female was noted as 25.95 years (range 1-77 year, $n = 359$) and 26.46 years (range 1-64; $n = 134$) respectively. The ratio of adult and children exhibited huge variation; approximately 75% of victims of dengue were adult. However, it is observed that the risk of dengue infection is increasing in children. The percentage of dengue infection in children was 19.29 in the year 2015; it has been raised and reached up to 23.94 in the year 2018 (Table -2). The transmission of dengue is not restricted up to urban and semi-urban areas; it has been reached in rural/tribal areas of the Union territory of Dadra & Nagar Haveli. The value of Variance to mean ratio, Kurtosis and skewness were computed and given in table -2.

Discussion

The dengue virus has a major public health concern in tropical and sub-tropical countries. It also threatened half of the world's population. The higher proportion of male victims as compared to females among the affected patients is evident in this study. Similar results were also reported by studies from the Asian countries [5-6]. However, the equal proportion of both females and males or females in higher proportions in the dengue infected patients has reported from the North America [2, 11]. The cause of gender specificity in relation to

dengue infection may be due to social, cultural (women being more covered with clothes in camper to male) and exposure reasons. The previous studies conducted at various part of the world suggested a decrease in the median age of dengue patients [4, 6, 12]. The decrease in the median age of infected patients suggests the development of immunity against the circulation strain in the majority of the population over a period of time. The risk of dengue transmission is shifting from the adult to children's; it is alarming. The age and gender specific incidence of dengue cases in the present study was in accordance with the study conducted by previous researchers [9, 13-14], which suggest that the working age groups of males were highly susceptible to dengue fever. The findings of the present study are very helpful to generate specific surveillance and preventive strategies to control dengue outbreak at local level.

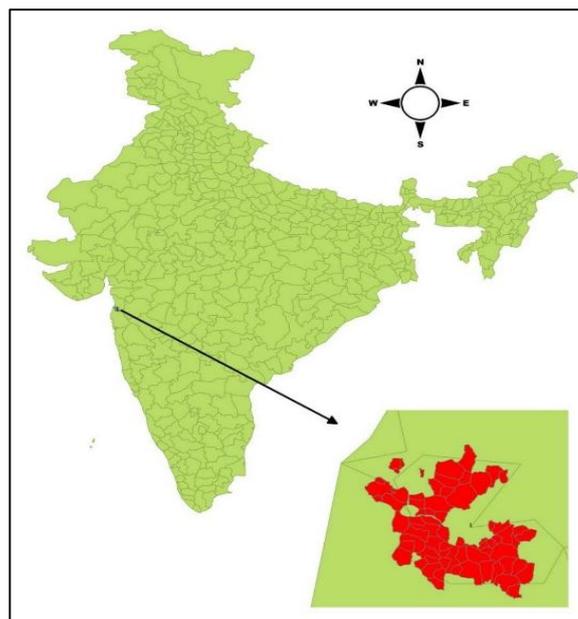


Fig 1: GIS map showing location of the UT of Dadra & Nagar Haveli.

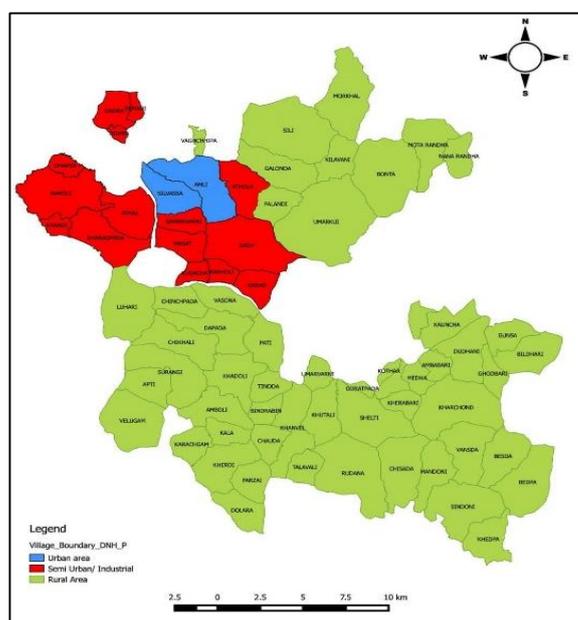


Fig 2: GIS map showing the demography of the UT of Dadra & Nagar Haveli

Table 1: Showing year wise distribution of dengue cases in the UT of Dadra & Nagar Haveli, India

S.N.	Variables	2015	2016	2017	2018
1	Population	395380	408297	421215	434133
2	No of Dengue Cases	2431	4498	2064	493
3	Incidence/Lakh population	614.9	1101.6	490.0	113.6
4	Male : Female	1:0.55	1:0.52	1:0.57	1:0.37
5	Adult : Children	1:0.24	1:0.27	1:0.37	1:0.31
6	Urban : Semi Urban : Tribal	1:0.97:0.46	1:0.33:0.14	1:0.29:0.30	1:0.33:0.27

Table 2: Showing the distribution pattern of dengue cases in different age groups in the UT of Dadra & Nagar Haveli

1	Parameter	Year 2015		Year 2016		Year 2017		Year 2018	
		Male	Female	Male	Female	Male	Female	Male	Female
a	0-5 Year	23 (54.8%)	19 (45.2%)	48 (63.2%)	28 (36.8%)	49 (60.5%)	32 (39.5%)	9 (69.2%)	4 (30.8%)
b	6-12 Year	90 (60.0%)	60 (40.0%)	178 (59.7%)	120 (40.3%)	110 (57.9%)	80 (42.1%)	26 (59.1%)	18 (40.9%)
c	13-18 Year	194 (70.0%)	83 (30.0%)	417 (71.0%)	170 (29.0%)	219 (77.1%)	65 (22.9%)	53 (86.9%)	8 (13.1%)
d	19-45 Year	1114 (65.0%)	599 (35.0%)	2071 (67.0%)	1021 (33.0%)	843 (62.9%)	498 (37.1%)	241 (72.8%)	90 (27.2%)
e	> 45 Year	145 (58.2%)	104 (41.8%)	249 (56.0%)	196 (44.0%)	95 (56.5%)	73 (43.5%)	30 (68.2%)	14 (31.8%)
	Total	1566 (64.4%)	865 (35.6%)	2963 (65.9%)	1535 (34.1%)	1316 (63.8%)	748 (36.2%)	359 (72.8%)	134 (27.2%)
2	Mean age	28.15	29.95	27.57	30.13	25.74	27.60	25.95	26.46
3	Median age	25	28	25	29	24	26	24	25
4	Range of age	1-87	1-76	1-88	1-87	1-96	1-80	1-77	1-64
5	Variance to mean ratio	5.78	6.03	5.46	6.62	6.51	7.30	5.88	6.94
6	Kurtosis	1.65	0.16	1.14	0.45	1.89	0.55	1.64	0.14
7	Skewness	0.99	0.49	0.84	0.61	0.99	0.63	1.00	0.62

Acknowledgments

We thank the Director, Medical & Health Services, UT of Dadra & Nagar Haveli Silvassa and the Integrated Disease Surveillance Programme for providing the laboratory facilities and other necessary support. The study is a part of routine surveillance under the Integrated Disease Surveillance Programme.

Conflict of interest: The authors declare no personal or financial conflict of interest.

Financial Support: The authors declared no financial support.

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