

Original Research Article

Prevalence and epidemiological aspect of dengue fever in western Rajasthan in year 2018

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ABSTRACT

Background: Dengue fever (DF) is a common mosquito borne disease caused by dengue virus and is transmitted by *Aedes* mosquito. It is one of the major public health problems in India which affects all levels of society, but the burden of disease is higher in poor people who live together in communities. Aim of present study is aimed to assess the prevalence and epidemiological characteristics of cases of DF in Tertiary Care Hospitals in Jodhpur, Rajasthan.

Methods: A cross-sectional study was conducted in all cases of DF registered in the associated group of Hospitals of Dr. S.N. Medical College, Jodhpur from 1st January 2018 to 31st December 2018. Rapid immune-chromatographic card test and MAC ELISA test method was used to detect dengue non-structural protein 1 (NS1) antigen and dengue immunoglobulin M (IgM) antibodies in the Viral Research Diagnostic Laboratory (VRDL) of Department of Microbiology, Dr. S.N. Medical College to confirm the diagnosis.

Results: Out of 2701 patients, 541 patients were tested serologically positive for DF (NS1, IgM). The highest number of suspected cases (1061) was reported in the month of October, 2018 out of whom 228 were positive. Maximum number of dengue cases reported were males belonging to 31-40 years age group from urban area. Fever was the main complaint in all the cases followed by vomiting, headache, and abdominal pain.

Conclusion: Dengue is one of the major public health problems in India. A large number of cases are reported in the monsoon and post-monsoon period in the months from September to December. Measures can be taken both at personal and government level to reduce morbidity and mortality from dengue.

Keywords: Dengue, Epidemiology, Enzyme-linked immuno-sorbent assay

INTRODUCTION

Dengue fever (DF) is a common mosquito borne disease caused by Dengue viruses (DENV), single-stranded positive polarity ribonucleic acid (RNA) viruses of the family *Flaviviridae*, are the most common cause of arboviral disease in the world and is transmitted by *Aedes* mosquito. The intensity of transmission of dengue virus is fatally high because of global warming, climate

change, rapid urbanization, improper sanitation, inadequate public health services and migratory population.¹ There are four serotypes of virus namely DENV-1, DENV-2, DENV-3, and DENV-4.1 All four serotypes can cause the full spectrum of disease from a subclinical infection to a mild self-limiting disease, the DF, a severe disease that may be fatal, and the dengue hemorrhagic fever (DHF)/dengue shock syndrome. Each DENV is an encapsulated RNA virus which has seven

structural proteins (nonstructural protein 1 [NS1], NS2a, NS2b, NS3, NS4, NS4b, and NS5) and three structural protein genes which encode the nucleocapsid or core (C) protein, a membrane-associated (M) protein, and an enveloped (E) glycoprotein. There is no cross protective immunity but lifelong immunity develops with infection of one type of DENV. More severe signs and symptoms develop in patients infected with DEN-2 as compared to DEN-1, DEN-3 and DEN-4. DEN-2 and DEN-3 have been mostly linked with dengue hemorrhagic fever.

The most important and suitable arthropod vector for DENV is *Aedes aegypti* due to its social behavior and frequent biting habit before breeding. Urbanization of *A. aegypti* mosquito has occurred due to biodiversity, increase in population, global warming, and climate change. South East Asia, Western Pacific, Africa, Eastern Mediterranean and Latin America are all endemic for frequent outbreaks of dengue fever.² Dengue is one of the major public health problems in India. However, during the last decade more frequent and severe epidemics of dengue have been reported in several Indian cities. As the temperature rises, the development rate of DENV is also accelerated enormously thereby increasing the mosquito biting rate dominated up to a temperature of 40degree C.³

DF affects all levels of society but the burden of disease is higher in poor people who live together in communities. The World Health Organization estimates that 50-100 million infections occur every year, including 500,000 DHF cases and 22,000 deaths mostly affecting children.

Despite large number of cases being reported every year in Jodhpur, not much of literature is available on clinic-epidemiological profile of cases of DF. The present study is aimed to assess the incidence, signs, symptoms and epidemiological characteristics of cases of DF in associated group of Hospitals of Dr. S.N. Medical College, Jodhpur, Rajasthan.

METHODS

It was a cross-sectional study done Viral Research Diagnostic Laboratory (VRDL) of Department of Microbiology, Dr. S.N. Medical College to confirm the diagnosis.

All the patients registered from January 1st, 2018 to December 31st, 2018 with fever or dengue like symptoms were serologically tested for DF. The serological test was done using RICT to detect dengue NS1 antigen. Enzyme Linked Immuno-Sorbent Assay (ELISA) test was performed by kits supplied by National Institute of Virology (NIV), Pune to detect the levels of dengue IgM antibodies. The ELISA test was performed in the Viral Research Diagnostic Laboratory (VRDL) of Dr. S.N. Medical College by automated DAVINCI Quattro (Biomeurieux, Marcy l' Etiole, France) along with spectrophotometric reading which was recorded quantitatively as Optical Density (OD) value. The OD value of samples were compared with the cutoff value

(calculated as instructed by manufacturer) and reported as positive or negative. Detection of at least one component (NS1 or IgM) was considered to be positive for sero-diagnosis.

The predesigned CRFs (case report forms) filled by physicians were used to collect the following socio-demographic information like Age, Sex, Area of residence (rural/urban) and clinical manifestation of serologically diagnosed cases.

Inclusion criteria

Outdoor and indoor patients of all age group and both sexes who were admitted in various wards of this hospital and were advised to undergo testing for acute febrile illness and Dengue fever for diagnostic purpose.

Exclusion criteria

Patients whose blood sample was not requested for testing for acute febrile illness and Dengue fever.

Study Period

The study was conducted on patients registered in all the tertiary care hospitals associated with Dr. S. N. Medical College from January 1st, 2018 to December 31st, 2018.

Statistical analysis

The collected data was transferred to a computer. The SPSS Data Editor Software version 20 was used for analysis of the data. Chi-square test was performed and p value ≤ 0.05 were considered statistically significant.

RESULTS

A total of 2701 patients associated group of Hospitals of Dr. S.N. Medical College, Jodhpur with the complaint of fever and other dengue like symptoms. Out of these patients, 541 patients were tested serologically positive for DF. Figure 1 shows the month-wise distribution of dengue cases in the year 2018. The highest number of suspected cases (1061) was reported in the month of October out of whom 228 were positive (Table 1) (Figure 1).

Highest number of dengue cases was reported in 31-40 years age group (65.04%). Dengue cases in age group 10-20 years and 21-30 years were 15.88% and 15.01%, respectively (Table 2).

However, suspected dengue cases reported in <1 and 1-10 years of age group were 975 and 875 respectively. Tables 3 and 4 showed sex wise and area wise distribution of dengue cases. Out of all reported cases 70.09 % cases were males and only 29.9% cases were females. 84.29% cases belonged to urban area while 15.71% belonged to rural area.

Table 1: Number of Positive cases in each month.

Month	Total	Positive
January	30	6
February	6	1
March	7	1
April	24	4
May	57	15
June	43	3
July	20	4
August	35	4
September	222	46
October	1061	228
November	800	153
December	396	76
Total	2701	541

Table 4: Area wise distribution of dengue cases.

Area	Number of cases	Percentage
Urban	456	84.29
Rural	85	15.71

DISCUSSION

A total of 2701 patients visited in associated group of Hospitals of Dr. S.N. Medical College, Jodhpur with the complaint of fever and other dengue like symptoms. Out of these patients, 541 patients were tested serologically positive for DF. In the present study, out of all reported cases of DF, 70.09% cases were males while only 29.90% cases were females. On studying the month wise distribution of these cases, highest number of cases (228 cases) was reported in the month of October 2018. A similar study conducted by Bandyopadhyay et al., in Kolkata, India (2012) also showed that a maximum number of cases are reported from 1st week of September to almost mid-October.⁴ This is due to increased vector. transmission in the monsoon and post-monsoon periods.^{5,6} A study conducted on epidemiology of DF in district Faisalabad, Pakistan by Nasreen et al, stated that relative incidence was the highest (43%) in the month of October.⁷ Kumar et al, in their study in North Karnataka reported a higher number of cases of DF in 14-30 years age group.⁸

Highest number of dengue cases in this study was reported in 31-40 years age group (37.24%). Dengue cases in age group 10-20 years and 21-30 years were 26.05% and 25.32%, respectively. Children of age group 1-10 years are prone towards Dengue like illness due to lack of immunity.⁹ Young males belonging to 21-40 years of age are more susceptible to infection due to more outdoor activity.¹⁰ Fever, vomiting, headache, and abdominal pain are the most common clinical manifestation of DF.¹¹

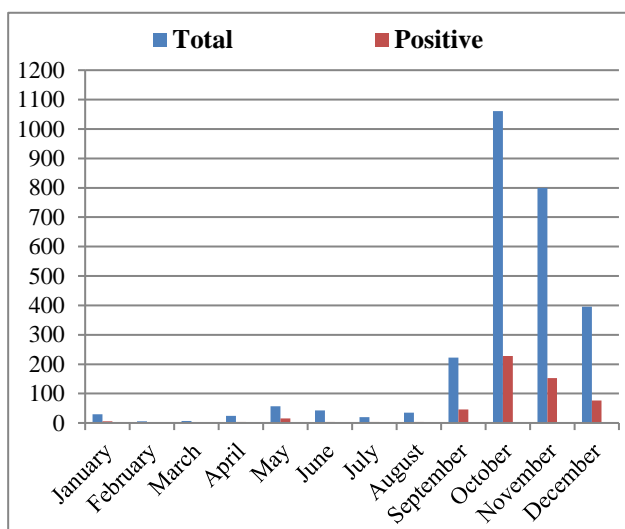


Figure 1: Month wise distribution of cases.

Table 2: Age wise distribution of Dengue Suspected Patients.

Age (in years)	Total (positive)	Positive %
<1	138(12)	8.69
1-10	975 (196)	20.10
10-20	875(139)	15.88
21-30	466 (70)	15.01
31-40	118 (77)	65.24
41-50	59 (22)	37.28
51-60	36 (6)	16.66
>60	34(6)	17.64

Table 3: Sex wise distribution of dengue cases.

Gender	Number of cases	Percentage
Male	377	70.09
Female	164	29.90

CONCLUSION

Dengue is one of the major public health problems in India. Roaring figures of cases are reported in the monsoon and post-monsoon period in the month of September and October owing to increased vector transmission. Maximum cases of DF reported in the present study belong to the age range 31 to 40 years followed by 10-20 years and 21-30 years on account of having a propensity for infections due to outdoor chores.

Recommendations

Following measures can be taken both at personal and government’s level to reduce morbidity and mortality from DF:

- Source reduction: Avoid collection of water
- Spraying of insecticide and larvicide: Both regular and focal spraying can be done depending on the incidence of disease.

- Personal protection: Wearing full clothes, use of mosquito repellants, use of bed nets, screening of building, etc.
- Health education: Any person with fever, vomiting, headache and abdominal pain should immediately report to the hospital and should be investigated for DF.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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