

# Clinico-Epidemiological Study of Dengue in a Tertiary Care Hospital in Jaipur, Rajasthan

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## Abstract

**Introduction:** 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 a higher in poor people who live together in communities.

**Aim and objectives:** The present study is aimed to assess the incidence, signs, symptoms, and epidemiological characteristics of cases of DF in a Tertiary Care Hospital in Jaipur, Rajasthan.

**Materials and Methods:** A cross-sectional study was conducted in all diagnosed cases of DF admitted at Mahatma Gandhi Hospital, Jaipur from 1<sup>st</sup> September to 31<sup>st</sup> October, 2015. Rapid immunochromatographic card test was used to detect dengue nonstructural protein 1 (NS1) antigen and dengue immunoglobulin M/immunoglobulin G (IgM/IgG) antibodies in the microbiology laboratory of the hospital to confirm the diagnosis. A predesigned and pretested questionnaire was used to collect socio-demographic profile, signs and symptoms of serologically diagnosed cases.

**Results:** Out of 1226 patients, 545 patients were tested serologically positive for DF (NS1, IgM and IgG). The highest number of cases (110 cases) was reported in the 3<sup>rd</sup> week of September. 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 month of September and October. Measures can be taken both at personal and government level to reduce morbidity and mortality from dengue.

**Key words:** Dengue, Epidemiology, Fever, Signs, Symptoms

## INTRODUCTION

Dengue fever (DF) is a common mosquito borne disease caused by dengue virus (DENV) which belongs to family Flaviviridae and is transmitted by Aedes mosquito. There are four serotypes of virus namely DENV-1, DENV-2, DENV-3, and DENV-4.<sup>1</sup> 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.

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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.

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. DF affects all levels of society but the burden of disease is higher in poor people who live together in communities.<sup>2</sup> 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.

A study on dengue outbreak in Kolkata in 2012 revealed that maximum number of cases of DF occurs during the month of August-November indicating increased vector transmission in the monsoon and post-monsoon periods. Maximum number of cases were from 11 to 30 years age group with male preponderance.<sup>3</sup> Another study in Faisalabad, Pakistan showed that there are various other factors also found to be associated with DF like excessive travelling, travelling during epidemic, presence of disease in the family or neighboring houses, people living near watery areas, immunocompromised persons and low level of awareness.<sup>4</sup>

A study done in KEM hospital, Mumbai showed that there is an association between platelet counts and treatment outcome. Severity in signs and symptoms lead to complication and death in dengue cases.<sup>5</sup> A study done in North Karnataka showed that dengue should be suspected in all cases presenting with symptoms such as fever, vomiting, and headache. Rapid immunochromatographic card test (RICT) is used to detect serologically positive cases by detecting NS1, immunoglobulin M (IgM), or immunoglobulin G (IgG) antibodies. The use of dengue RICT helps in the prompt and early diagnosis and management of the case and prevents complications of dengue.<sup>6</sup> There is no specific treatment for dengue other than symptomatic and supportive measures with judicious fluid therapy.

Despite large number of cases being reported every year in Jaipur, not much of literature is available on clinico-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 a tertiary care hospital in Jaipur, Rajasthan.

## MATERIALS AND METHODS

It was a cross-sectional study done at Mahatma Gandhi Hospital, Sitapura, Jaipur. Due approval was taken from

the Institutional Ethical Committee of Mahatma Gandhi Medical College before conducting the present study.

All the patients admitted from September 1<sup>st</sup>, 2015 to October 31<sup>st</sup>, 2015 with fever or dengue like symptoms were serologically tested for DF. The serological test was done using RICT to detect dengue NS1 antigen and dengue IgM/IgG antibodies in the microbiology laboratory of the hospital. Detection of at least one component (NS1, IgM, or IgG) was considered to be positive for serodiagnosis. Informed consent was taken from the patient in the local language prior to the interview. A predesigned and pretested questionnaire was used to collect the following socio-demographic and clinical manifestation of serologically diagnosed cases:

- Age
- Sex
- Area of residence (rural/urban)
- Clinical manifestations:
  - Fever
  - Vomiting
  - Headache
  - Abdominal pain
  - Hepatomegaly
  - Myalgia
  - Bleeding manifestations
  - Generalized weakness
  - Cough
  - Splenomegaly
  - Rashes
  - Diarrhea etc.

## RESULTS

A total of 1226 patients visited in Mahatma Gandhi Hospital, Jaipur with the complaint of fever and other dengue like symptoms. Out of these patients, 545 patients were tested serologically positive for DF. Figure 1 shows the week wise distribution of dengue cases in the month of September and October 2015. The highest number of cases (110 cases) was reported in the 3<sup>rd</sup> week of September from September 15, 2015 to September 21, 2015.

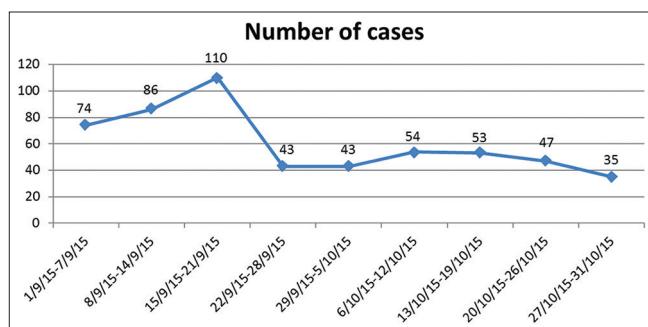


Figure 1: Week wise distribution of dengue cases

Highest number of dengue cases 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. However, dengue cases in <10 years, 41-60 and >60 years age group were reported to be 2.01%, 6.05% and 3.30%, respectively (Table 1).

Tables 2 and 3 showed sex wise and area wise distribution of dengue cases. Out of all reported cases, 70.09% cases were males and only 29.90% cases were females. 61.83% cases belonged to urban area while 38.16% belonged to rural area.

Fever was the main complaint in all the cases of dengue reported in the hospital. Vomiting, headache and abdominal pain was reported in 43.48%, 40.55%, and 30.82% of cases, respectively. Hepatomegaly, myalgia, bleeding manifestations was reported in 27.70%, 27.33% and 20.55% cases, respectively. Generalized weakness, cough, and splenomegaly were reported in 17.79%, 16.88%, and 10.45% cases, respectively. Rashes and diarrhea were the least common complaint reported in 5.32% and 2.01% cases, respectively (Table 4).

## DISCUSSION

A total of 1226 patients visited in Mahatma Gandhi Hospital, Jaipur with the complaint of fever and other dengue like symptoms. Out of these patients, 545 patients were tested serologically positive for DF. On studying the week wise distribution of these cases, highest number of cases (110 cases) was reported in 3<sup>rd</sup> week of September from September 15, 2015 to September 21, 2015. A similar study conducted by Bandyopadhyay *et al.*, in Kolkata, India (2012) also showed that a maximum number of cases are reported from 1<sup>st</sup> week of September to almost mid-October.<sup>3</sup> This is due to increased vector transmission in the monsoon and post-monsoon periods. 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.<sup>4</sup>

Highest number of dengue cases 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. However, dengue cases in <10 years, 41-60 and >60 years age group were reported to be 2.01%, 6.05% and 3.30%, respectively. A similar study by Pardeshi *et al.*, in KEM hospital, Mumbai revealed that maximum number of dengue cases were in the age group of 21-30 years.<sup>5</sup> Nasreen *et al.*, also reported maximum cases in 21-30 years group in Faisalabad, Pakistan.<sup>4</sup> Bandyopadhyay *et al.*, reported maximum cases in age group 11-30 years.<sup>3</sup> Kumar *et al.*, in their study in North Karnataka reported a higher number of cases of DF in 14-30 years age group.<sup>6</sup>

**Table 1: Age wise distribution of Dengue cases**

Age (in years)	n (%)
<10	11 (2.01)
10-20	142 (26.05)
21-30	138 (25.32)
31-40	203 (37.24)
41-50	33 (6.05)
51-60	18 (3.30)

**Table 2: Sex wise distribution of dengue cases**

Gender	Number of cases	Percentage
Male	382	70.09
Female	163	29.90

**Table 3: Area wise distribution of dengue cases**

Area	Number of cases	Percentage
Urban	337	61.83
Rural	208	38.16

**Table 4: Distribution of dengue cases according to clinical manifestations**

Clinical manifestations	n (%)
Fever	545 (100)
Vomiting	237 (43.48)
Headache	221 (40.55)
Abdominal pain	168 (30.82)
Hepatomegaly	151 (27.70)
Myalgia	149 (27.33)
Bleeding manifestations	112 (20.55)
Generalized weakness	97 (17.79)
Cough	92 (16.88)
Splenomegaly	57 (10.45)
Rashes	29 (5.32)
Diarrhea	11 (2.01)

\*Multiple response

In the present study, out of all reported cases of DF, 70.09% cases were males while only 29.90% cases were females. Nasreen *et al.*, in her study in Faisalabad, Pakistan also reported similar finding. Relative incidence of DF was significantly higher in males (71%) than in females (29%).<sup>4</sup> Male preponderance of dengue cases was also reported in studies by Kumar *et al.*, in North Karnataka<sup>6</sup> and Bandyopadhyay *et al.*, in Kolkata, India.<sup>3</sup>

In the present study 61.83% of dengue cases belonged to urban area while 38.16% belonged to rural area. Similar findings were reported by study conducted by Nasreen *et al.*, in Faisalabad, Pakistan. In her study, relative incidence of DF was 62% in urban area and 38% in rural area.<sup>4</sup>

In the present study, fever was the main complaint in all the cases of dengue reported in the hospital. Vomiting, headache and abdominal pain was reported in 43.48%,

40.55% and 30.82% of cases, respectively. Hepatomegaly, myalgia, bleeding manifestations was reported in 27.70%, 27.33% and 20.55% cases, respectively. Generalized weakness, cough, and splenomegaly were reported in 17.79%, 16.88%, and 10.45% cases, respectively. Rashes and diarrhea were the least common complaint reported in 5.32% and 2.01% cases, respectively. Similar findings were reported in study conducted by Kumar *et al.*, in North Karnataka. Fever was the presenting symptom in all the cases followed by vomiting and headache.<sup>6</sup>

Similar study conducted by Kashinkunti *et al.*,<sup>7</sup> Kumar *et al.*, in Udupi, Karnataka<sup>8</sup> and Khan *et al.*, in Karachi, Pakistan<sup>9</sup> also showed that fever, vomiting and abdominal pain are the most common symptoms in patients with DF.

In the present study petechiae, gum bleeding and other bleeding manifestations were reported in 20.55% dengue cases. Kashinkunti *et al.*,<sup>7</sup> Kumar *et al.*,<sup>6</sup> also reported 21% and 19.5% bleeding manifestation, respectively, in their study.

## 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 month of September and October owing to increased vector transmission. Young males belonging to 21-40 years of age are more susceptible to infection due to more outdoor activity. Fever, vomiting, headache, and abdominal pain are the most common clinical manifestation of DF.

## 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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