



## Clinical Profile of Dengue Fever Outbreak in 2017- A Cross-Sectional Study from South Kerala

Vincy Nelson<sup>1</sup>, Teju P Thomas<sup>2</sup>, Sabu Stephen<sup>3</sup>, Sony Simon<sup>4</sup>

**Financial Support:** None declared

**Conflict of Interest:** None declared

**Copy Right:** The Journal retains the copyrights of this article. However, reproduction is permissible with due acknowledgement of the source.

### How to cite this article:

Nelson V, Thomas TP, Stephen S, Simon S. Clinical Profile of Dengue Fever Outbreak in 2017-A Cross-Sectional Study from South Kerala. Natl J Community Med 2020;11(4):144-148

### Author's Affiliation:

<sup>1</sup>Associate professor, Dept. of Community Medicine, Travancore Medical College, Kollam; <sup>2</sup>Assistant Professor, Dept. of Anaesthesia & Critical Care, Travancore Medical College, Kollam; <sup>3</sup>HOD, Dept. of Internal Medicine, ESIC super specialty Hospital, Kollam; <sup>4</sup>Assistant professor, Dept. of Community Medicine, Travancore Medical College, Kollam

### Correspondence

Dr. Vincy Nelson  
drvincy@rediffmail.com

**Date of Submission:** 16-02-2020

**Date of Acceptance:** 29-04-2020

**Date of Publication:** 30-04-2020

## ABSTRACT

**Introduction:** Dengue epidemics are a serious public health problem across the world. The recent outbreak of dengue in Kerala has shown different clinical patterns and high morbidity. This study focuses on the clinical features, laboratory investigations and outcome of dengue patients admitted in a tertiary care centre of south Kerala.

**Materials & Methods:** It was a cross sectional study done on the dengue cases done on 190 cases which were admitted in our hospital during the outbreak (July to august 2017).

**Results:** Out of the 190 patients, majority of the population were males 105(55.3%) compared to females 85(44.7%). 172(90.5%) were positive for NS1 antigen card test during admission. IgM assay was positive for 129(67.9%), 47 (24.7%) cases were referred from outside. Majority had platelet count of one lakh to 500000 62(32.6%) during admission. 116(61.1%) had altered liver function and 26(13.7%) had altered renal function. 32(16.8%) received platelet transfusion. There was a mortality rate of 14 (7.3%). There were 2 deaths reported due to subdural hematoma which was unlikely with dengue.

**Conclusion:** Dengue infection is increasing due to rapid urbanization and unplanned townships followed by waste disposal. Fever associated with headache, retro orbital pain, erythematous rash, conjunctival congestion and itching in palms and soles along with thrombocytopenia, Leucopenia, elevated liver transaminases should prompt a clinician on the possibility of dengue infection. Early diagnosis and prompt management can save many lives during an outbreak.

**Keywords:** Dengue fever, Altered LFT, Subdural Haematoma, Kerala

## INTRODUCTION

Dengue is the most rapidly spreading mosquito borne viral disease in the world. Dengue is a major public health problem globally affecting 50 million infections annually. The first clinically recognised dengue epidemics was reported from Asia, Africa, North America in 1780s<sup>1</sup>. The epidemiology of dengue in India was first reported in Madras (now Chennai) in 1780, and the first outbreak occurred in Calcutta (now Kolkata) in 1963; subsequent out-

breaks have been reported in different parts of India. The first case of Dengue fever was reported from Chennai in 1946. India witnessed the major epidemic of Dengue from Delhi in 1996. Delhi became hyper endemic area for dengue from 2003<sup>2</sup>. Now the disease is reported from all parts of the world. In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries and from urban to rural settings. More than 70% of the population at risk for dengue

worldwide live in member states of the WHO SEAR and Western Pacific Region. DHF has become endemic in various parts of India since 1987, with the first major widespread epidemics of DHF and DSS occurring in 1996<sup>2,3</sup>. In West Bengal state, nearly 61% of dengue cases reported between 2005 and 2007 were secondary dengue infection cases

As per the recent reports from various studies most dengue outbreaks occurred in Kerala, Punjab, Haryana, Rajasthan, Gujarat states during the monsoon or post-monsoon period. In all these states Dengue fever is influenced by strong seasonality, underscoring the roles of both rainfall and ambient temperature in the potential transmission of dengue virus during monsoon and post-monsoon periods. More studies are required to develop seasonal forecasting of dengue incidence in India<sup>3,4</sup>. In Kerala dengue fever cases are reported from past few years. 2017 witnessed an epidemic of dengue which lasted almost for 6 months. This created lot of panic situation in the community.

Dengue is a potential viral infection with potentially fatal complications. It is the commonest mosquito-transmitted arboviral disease. *Aedes aegypti* is the main vector transmitting dengue infection and to a smaller extent by *Aedes albopictus*. Dengue virus belongs to Flaviviridae family with four serotypes DEN-1, DEN-2, DEN-3, DEN-4. Infection by one serotype confer short term protection against other serotypes while homotypic immunity is complete & life long<sup>5</sup>. In general, dengue is a self-limiting acute febrile illness followed by a phase of critical effervescence, in which patients may improve or progress to a severe form. Severe illness is characterized by hemodynamic disturbances, increased vascular permeability, hypovolemia, hypotension, and shock<sup>5,6</sup>. Thrombocytopenia and platelet dysfunction are common in both cases and are related to the clinical outcome. Different mechanisms have been hypothesized to explain DENV-associated thrombocytopenia, including the suppression of bone marrow and the peripheral destruction of platelets. Studies have shown DENV-infected hematopoietic progenitors or bone marrow stromal cells. Moreover, anti-platelet antibodies would be involved in peripheral platelet destruction as platelets interact with endothelial cells, immune cells, and/or DEN V. Initial dengue infection may be asymptomatic (50-90%), may result in a nonspecific febrile illness, or may produce the symptom complex of classic dengue fever (DF)<sup>6,7</sup>. The disease presents with sudden onset fever, frontal headache, generalized myalgia, retro-bulbar pain and transient macular skin rash after an incubation period of 4-7 days of infected mosquito bite.

Various studies have been reported across world on various aspects of dengue. But the studies re-

ported from Kerala are few. Since Travancore Medical College is one of the best referral centres in Kollam a large number of dengue patients came for treatment. So this study was conducted to analyse the epidemiological and clinical profile of dengue patients admitted here during the last epidemic.

## METHODOLOGY

A cross sectional study was conducted at Travancore Medical College, Kollam. Patients admitted with dengue fever in the hospital (positive either for NS1 Ag or IgM Elisa) was taken as study participants using convenient sampling. Study was conducted from July to August 2017 oral questionnaire was used as study tool.

Data was collected using pretested structured questionnaire was filled by the investigators itself using information collected from the patients/bystanders or from the Medical Records department. Laboratory investigations such as haemoglobin, total and differential leucocyte counts, platelet count, haematocrit, liver function tests, blood urea and serum creatinine, chest radiograph and ultrasound scan of abdomen were taken from Medical records department. Blood counts were monitored periodically as and when required till resolution. Other differential diagnosis was excluded by appropriate tests. Study was conducted after the clearance from the ethics committee of the institution. Patients aged above 13 years of age having probable dengue (fever, headache, myalgia, with or without bleeding manifestations and thrombocytopenia) were included as study participants. Informed Consent was taken from all the patients/bystanders before the conduct of the study. Data was entered into Microsoft excel sheet and analysed using appropriate software and frequencies and percentages were taken.

## RESULTS

There were a total of 190 patients admitted with Dengue fever in various wards of Travancore Medical College, Kollam during July to August 2017. We chose this time period since we reported the largest number of dengue cases during this time period (Epidemic of dengue). All the patients were either positive for NS1 Antigen test or IgM ELISA were taken as study subjects.

Majority of the population belonged to the age group 40-60 years 65 (35.2%) and patients belonging to 13-20 years were 34 (17.9%). Males were predominantly affected with dengue fever 105 (55.3%) compared to females 85 (44.7%). It may be due to outdoor work habit of men compared to females.

**Table no:1 Clinical profile of patients admitted with dengue**

Symptoms and clinical manifestations	Cases (n=190) (%)
Rashes	9 (4.7)
Itching	18 (9.5)
Headache	60 (31.6)
Body pain	143 (75.3)
Joint pain	37 (19.5)
Retro-orbital pain	20 (10.5)
Seizures	8 (4.2)
Diarrhoea	18 (9.5)
Bradycardia	7 (3.7)
Vomiting	57 (30)
Hepatomegaly	9 (4.7)
Pleural effusion	14 (7.4)
Ascites	12 (6.3)
Bleeding gums	2 (1.1)
Haemoptysis	1 (0.5)
Haematuria	1 (0.5)
Menorrhagia	5 (2.6)
Malena	10 (5.3)
Bleeding from external orifices	1 (0.5)
History of MI	3 (1.6)
Myocarditis	5 (2.6)

**Table 2: Lab investigations of patients with Dengue**

Lab investigations	Cases (n=190) (%)
Thrombocytopenia (<1laks)	161 (84.6)
NS1 antigen ELISA	122 (64.2)
IgMELISA	157 (82.6)

**Table 3: showing Comorbidities of patients admitted with Dengue**

Comorbidities	Cases (n=190) (%)
Dyslipidaemia	4 (2.1)
CAD	28 (14.7)
Diabetes	31 (16.3)
Renal disease	3 (1.6)
Respiratory diseases	9 (4.7)
Hypertension	4 (2.1)
Leptospirosis	1 (0.5)
Rheumatoid arthritis	1 (0.5)
Viral pneumonia	1 (0.5)
History of stroke in the past	5 (2.6)

**Table 4: Condition of patient at the time of discharge**

Outcome	Cases (n=190) (%)
Recovered	176 (92.6)
Dead	14 (7.4)
<b>Cause of Death (n=14)</b>	
Expanded dengue syndrome	8 (57.1)
Dengue shock syndrome	4 (28.6)
Intra cranial bleed	2 (14.3)

Among the total patients 47(24.7%) were referred from outside. Prior history of dengue was found

with only 6(3.2%) of the population. 107(56.3%) had intermittent type of fever than continuous 83(43.7%).

Clinical features of Dengue fever:

Rashes was seen among 9(4.7%) of the population. Itching was seen among 18 (9.5%), Headache was seen among 60(31.6%) the subjects. Body pain was seen among 143(75.3%) and joint pain 37(19.5%) of the subjects. Retro-orbital pain was seen among 20(10.5%) of the patients, Diarrhoea was seen among 18(9.5%), vomiting among 57(30%), Bradycardia among 7(3.7%), Hepatomegaly was seen among 9(4.7%) of the cases. Ascites was seen among 12(6.3%), Bleeding gums among 2(1.1%), Haemoptysis among 1(.5%). Myocarditis was seen among 5(2.6%).

On admission 62(32.6%) of the population had a platelet count between 10,000 to 50,000 and 53(27.9%) had platelet count between 50,000 and one lakh. LFT was altered (Raised SGOT & SGPT) was found among 116(61.1%) of the patients and RFT (S. Urea and creatinine) was found to be elevated in 26(13.7%) of cases. Platelet transfusion was done for 32(16.8%) of the patients with dengue. Since our hospital being a referral centre we usually have referral when the patient is critically ill from the peripheries. Hence our mortality was 14(7.3%) cases out of the 190 cases being studied. Patients who were alcoholics and had altered LFT had gone into critical stages when compared with other cases. We lost two patients since they suffered from subdural haematoma which was rare presentation of dengue. Among the predisposing co-morbidities Type II DM constituted 31(16.3%) and old cases of CAD 28(14.7%) contributed the highest. Antipyretics (paracetamol) were used along with intravenous fluids (normal saline and ringer lactate) when required. Patients were advised not to brush the teeth using brush and to strain while passing motion.

## DISCUSSION

Dengue cases started rising over the past few years can be attributed to rapid unplanned urbanization with unchecked construction activities and climate change (unpredictable rains and droughts) contributing fertile breeding areas for mosquitoes. Due to increased sanitation and awareness among medical practioners and availability of diagnostic tools in the hospitals have contributed to the increased detection of cases. Because of this mortality and morbidity of the disease had reduced.

Males (55%) were suffering from dengue compared to the female (45%) population. Fever was the most common presentation (100%), this was



similar with other studies from India in a study done. In a study done by K Sahana et al<sup>8</sup>, also the predominance of males was more. This could be because of the occupation. Study reports from Asian countries such as Cambodia, Malaysia, Sri Lanka, Singapore and Philippines<sup>9</sup> and India<sup>10</sup> reveal the high preponderance of males in dengue fever and pointing out the fact that it may be due to the outdoor work habit of men compared to females. In the present study Headache(31.6%), body pain(75.3%) were the common findings where as in a similar study by Mandaletal<sup>11</sup> have documented headache in 62.16% and rash in 37.84%, body pain in 50% of cases. 30% of the patients had vomiting. Itching was found among 9.5% where as this was very rare among many studies, similar finding was seen in a study done in kolar<sup>12</sup>(9.3%) and another study by Rachel et al<sup>13,14</sup> from their study in Kollam, Kerala have found pruritis in 10.4% of their patients.

In our study LFT was altered (Raised SGOT & SGPT) levels among 61.1% of cases. This is similar to the findings done in kolar (61.93%)<sup>12</sup>. In another study by Kularatne et al<sup>15</sup>, done in Srilanka also, 88% patients showed elevated ALT and AST, with 122 of them having a two-fold increase. Mandal et al<sup>11</sup> documented elevated transaminases in 83.78% of cases. This abnormal pattern may be used as an early indicator of dengue infection.

Pleural effusion was seen among 14 (7.3%) and Ascites 12(6.3%) of cases. Pleural effusion was documented in 22.58% on chest radiography and ascites seen in 30.96% of patients on ultrasound scan of abdomen was found in a study done in kolar<sup>12</sup>, and in another study done in Ashwinikumar et al Udupi district<sup>16</sup> pleural effusion was seen in 6(13.9%). Hepatomegaly was seen in 4.7% of cases this was lesser when compared to the study done by A. Bhalla et al (31.1%) and in another study done in Udupi<sup>16</sup> the hepatomegaly was seen more 248(53.2%). The overall mortality of the study population was 4.7% this was similar to the study results done by Ashwinikumar et al in Udupi<sup>16</sup>.

In present study mortality rate was 14(7.3%) the results were closer with the study by Gupta et al and mortality rate was 4.14%<sup>17</sup> which was similar to the study done at Jamnagar, Gujarat<sup>18</sup> the mortality rate was 4%. In another study done in Kerala mortality rate was 3.2%<sup>13</sup>.

CNS features said to be very uncommon was documented in 4.2% which included seizures and sub-dural haematomas which lead to the death of our two patients(14.3%), where as in another study done north east India.<sup>19,20</sup> the CNS presentations contributed to 10.4% and included encephalopathy, seizures intracranial haemorrhage and even aseptic meningitis. In another study done in Malay-

sia<sup>21</sup> Four patients had cerebral convexity subdural haemorrhage, two patients had intracerebral haemorrhage, two patients had subarachnoid haemorrhage, and two had tentorium cerebral subdural haemorrhage.

## CONCLUSION

From the present study we conclude that dengue infection, which possesses serious public health problem, can be diagnosed early with the help of clinical features like retro orbital pain, myalgia, bleeding manifestations, thrombocytopenia, SGOT greater than SGPT that is supported by detection of NS1 antigen, IgG and IgM antibodies. In our study we could see that the patients who had comorbidities like chronic liver disease, chronic kidney disease, Diabetes, Coronary artery disease had bad prognosis when compared to the rest of the study sample. Hence clinicians should give utmost care for the patients suffering from dengue with comorbid illness.

## RECOMMENDATIONS

Educating the public about the early diagnosis and treatment of fevers especially among persons with comorbidities like CKD, CLD. High index of suspicion should be maintained even at the periphery level in the diagnosis of dengue fever. Treatment protocols should be followed both by the government and private hospitals. A government-undertaken distribution of pamphlets containing information on the disease, risk factors, emergency management & control measures.

## REFERENCES

1. World Health Organization. Global strategy for dengue prevention and control -2012-2020. Geneva: World Health Organization. 2012.
2. Chakravarti A, Arora R, Luxemburger C. Fifty years of dengue in India. *Trans R Soc Trop Med Hyg* 2012; **106**: 273-282.
3. Chaturvedi UC, Nagar R. Dengue and dengue haemorrhagic fever: Indian perspective. *J Biosci* 2008; **33**: 429-441
4. Ramakrishnan SP, Geljand HM, Bose PN et al. The epidemic of acute haemorrhagic fever, Calcutta, 1963; epidemiological inquiry. *Indian J Med Res* 1964; **52**: 633-650.
5. World Health Organization. First report on neglected tropical diseases: working to overcome the global impact of neglected tropical diseases. Geneva: World Health Organization. 2010
6. WHO. Scientific Working Group Report on Dengue [online]. Geneva, Switzerland: WHO; 2007
7. Bhattacharya N, Neogi, Hati AK. An outbreak of Dengue Fever in a rural area of West Bengal. *Indian J Med Microbiol* 1997; **15**: 139-141.

8. Sahana KS, Sujatha R. Clinical profile of dengue among children according to revised WHO classification: analysis of a 2012 outbreak from Southern India. *The Indian Journal of Pediatrics*. 2015 Feb 1;82(2):109-13.
9. Leong AS, Wong KT, Leong TY, Tan PH, Winnakraipot P. The pathology of dengue hemorrhagic fever. *SeminDiagn-Pathol*, 2007; 24: 227-236
10. Hati AK. Studies on Dengue and Dengue Haemorrhagic Fever in West Bengal State, India. *J Commune Dis* 2006;38:124-129.
11. Mandal SK, Ganguly J, KoelinaSil et al. Clinical profiles of dengue fever in a teaching hospital of eastern india. *Nat J Med Res.*, 2013; 3: 173-176
12. Vulavala S, Reddy Y, Kamarthy P. Study of clinical and laboratory profile of dengue fever patients Headache.;141:90-6.
13. Rachel D, Rajamohanan, Philip AZ. A Study of Clinical Profile of Dengue Fever in Kollam, Kerala, India. *Dengue Bulletin*, 2005; 29: 197-202
14. Mohan D K, Shiddappa, Dhananjaya M. A Study of Clinical Profile of Dengue Fever in a Tertiary Care Teaching Hospital. *Sch J App Med Sci.*, 2013; 1: 280-282. 12
15. Kularatne SA, Gawarammana IB, Kumarasiri PR. Epidemiology, clinical features, laboratory investigations and early diagnosis of dengue fever in adults: a descriptive study in Sri Lanka. *Southeast Asian J Trop Med Public Health*, 2005; 36: 68692
16. Kumar A, Rao CR, Pandit V, Shetty S, Bammigatti C, Samarasinghe CM. Clinical manifestations and trend of dengue cases admitted in a tertiary care hospital, Udupi district, Karnataka. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*. 2010 Jul;35(3):386.
17. Gupta E, Dar L, Kapoor G, Broor S. "The changing epidemiology of dengue in Delhi, India," *virology Journal*. : 2006;3:92. 10
18. World Health Organization. Global strategy for dengue prevention and control -2012-2020. Geneva: World Health Organization. 2012.
19. Chakravarti A, Arora R, Luxemburger C. Fifty years of dengue in India. *Trans R Soc Trop Med Hyg* 2012; **106**: 273-282.
20. Chaturvedi UC, Nagar R. Dengue and dengue haemorrhagic fever: Indian perspective. *J Biosci* 2008; **33**: 429-441
21. Ramakrishnan SP, Geljand HM, Bose PN et al. The epidemic of acute haemorrhagic fever, Calcutta, 1963; epidemiological inquiry. *Indian J Med Res* 1964; 52: 633-650.