



## Original Research Article

# CLINICAL AND LABORATORY PROFILE OF DENGUE FEVER IN ADULT PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY AT A TERTIARY CARE CENTRE

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**ABSTRACT**

**Background:** Dengue fever (DF), a mosquito-borne viral infection, is a significant public health issue in India, characterized by recurrent outbreaks and a wide range of clinical presentations. The disease can progress to severe forms such as Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS), which increase the risk of morbidity and mortality. This study aims to analyze the clinical, laboratory, and diagnostic findings in adult dengue patients. **Objective:** To evaluate the clinical symptoms, complete blood count (CBC) abnormalities, liver and renal function tests (LFT and RFT), and imaging results in adult patients with dengue fever to enhance diagnostic accuracy and assess potential markers of disease progression.

**Materials and Methods:** A prospective observational study was conducted from September 2023 to January 2024 at Veer Surendra Sai Institute of Medical Sciences and Research (VIMSAR), Burla. Forty adult patients with suspected dengue were included based on positive laboratory tests (NS1 antigen, IgG, or IgM). Patients were monitored for clinical symptoms, and their CBC, LFT, RFT, ECG, X-ray, and ultrasonography results were systematically recorded. Data were analyzed using descriptive statistics, and ethical approval was obtained.

**Results:** Among the 40 patients, the male-to-female ratio was 35:5, with an average age of 39.4 years. High-grade fever (100%), myalgia, headache, and arthralgia (90%) were the most common symptoms. Thrombocytopenia was observed in 77.5% of patients, while 67.5% showed leukopenia. Elevated AST and ALT levels were seen in 92.5% and 70% of patients, respectively. Sinus bradycardia was noted in 25% of patients, pleural effusion in 22.5%, and ascites in 12.5%. One patient died from myocarditis, while the remaining 39 recovered.

**Discussion:** The findings align with other studies, with high fever and myalgia being the predominant symptoms. Although thrombocytopenia was common, it did not always correlate with bleeding tendencies. Liver function abnormalities, such as elevated AST and ALT, were observed in most patients. The presence of sinus bradycardia, pleural effusion, and ascites provided additional insight into the disease's pathophysiological impact.

**Conclusion:** This study highlights the importance of monitoring CBC, liver function, and imaging results in dengue patients. Early identification of

laboratory markers and appropriate interventions can help reduce the risk of severe outcomes. However, the small sample size and potential underreporting of cases limit the generalizability of the findings. Further studies with larger populations are needed to confirm these observations and improve dengue management strategies.

**Keywords:** Dengue fever, thrombocytopenia, liver function tests, sinus bradycardia, pleural effusion, ascites, myocarditis.

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## INTRODUCTION

Dengue fever, a mosquito-borne viral disease, is a significant public health challenge in India, causing recurrent outbreaks with high morbidity and mortality rates. Over the past three decades, its global spread has substantially increased.<sup>[1]</sup> Dengue virus (DV), part of the Flaviviridae family, has four serotypes: DV-1, DV-2, DV-3, and DV-4. It is a positive-stranded RNA virus encased in a lipid envelope, with three structural proteins: the core (C) protein, membrane-associated (M) protein, and the envelope (E) glycoprotein, along with seven non-structural proteins.<sup>[2]</sup> While *Aedes aegypti* is the primary vector, transmission also occurs through *Aedes albopictus*.<sup>[2]</sup> According to WHO, nearly 3 billion people are at risk of dengue annually. The National Centre for Vector Borne Diseases Control (NCVBDC) reported over 800,000 cases and 1,132 deaths between 2018 and 2023 in India.<sup>[3]</sup> Dengue's clinical presentation is diverse and often overlaps with other tropical fevers, making diagnosis challenging.<sup>[4]</sup> Human-to-mosquito transmission begins one day before the onset of fever and lasts until the sixth day of illness, during the viremia phase. After the mosquito bites an infected person, the virus incubates in the vector for 8-12 days.<sup>[5]</sup> Symptoms typically include a sudden onset of fever, which lasts 2-7 days, accompanied by muscle pain, joint pain, headache, sore throat, and sometimes a skin rash.<sup>[4,5]</sup> The severity of the disease can vary, ranging from mild dengue fever (DF) to more severe forms like Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS), which may lead to hypovolemic shock, internal bleeding, or organ failure.<sup>[6]</sup> Common laboratory findings in dengue cases include leukopenia, thrombocytopenia, and alterations in liver and kidney function tests. This study aims to assess major changes in complete blood counts (CBC), biochemical reports, 12-lead ECGs, X-rays, and ultrasonography findings in dengue patients to improve diagnostic accuracy and identify potential laboratory markers for disease progression.

## MATERIALS AND METHODS

A prospective observational study was conducted on patients admitted to the Department of General Medicine, Veer Surendra Sai Institute of Medical Sciences and Research (VIMSAR), Burla, with suspected dengue fever between September 2023 and January 2024. The study involved 40 patients,

aged 18 years and older, who exhibited two or more dengue symptoms, such as high-grade fever, severe myalgia, headache, and arthralgia. Laboratory tests, including NS1 antigen, IgG, and IgM, were conducted to confirm dengue positivity. Patients who tested negative or had chronic kidney disease or chronic hepatitis were excluded from the study.

Upon admission, detailed patient data, including name, address, age, sex, clinical features, blood pressure, and medical history, were collected. A complete physical examination was performed for each patient, accompanied by laboratory investigations such as a complete blood count, liver function tests, renal function tests, ECG, X-ray, and ultrasonography. All findings were systematically recorded.

Throughout the treatment period, patients were monitored daily, with symptoms such as fever, headache, myositis, and myocarditis being closely observed and treated as necessary. The treatment regimen, including specific medications for dengue management, was also documented.

During the study, all 40 patients received continuous care and were under constant supervision. Of these, 20 patients with a platelet count below 30,000, ascites, pleural effusion, or hemorrhagic symptoms were given symptomatic treatment along with random donor platelets (RDP). The remaining 20 patients received IV fluids in addition to symptomatic treatment.

Ethical approval for the study was obtained from the institutional ethics committee, and written informed consent was secured from all participants.

Statistical analysis was performed using R software. Descriptive statistics, including mean and standard deviation, were used for quantitative data, while frequency and proportion were employed for categorical variables.

## RESULTS

All 40 cases in the study were clinically confirmed to have dengue. The group consisted of 35 men and 5 women, with a higher prevalence of the disease among males. The patients were divided into three age groups: 20-34, 35-59, and 60 years and above. The average age of the patients was 39.4 years (SD 12.3). The distribution of males and females across the age groups is shown below. [Table 1]

The table indicates that most of the cases occurred in the 35-59 age group, with 22 males and 3 females, followed by the 20-34 age group. There were fewer cases among patients aged 60 and above.

Significant clinical symptoms were observed in all 40 patients. All patients (100%) presented with high-grade fever, while 36 patients (90%) reported severe myalgia, headache, and arthralgia. Vomiting and loose motion were reported in 20 patients (50%), shortness of breath in 7 patients (17.5%), and abdominal swelling in 4 patients (10%). Hemorrhagic manifestations were observed in 4 patients (10%), and petechiae were found in another 4 patients (10%). Additionally, subconjunctival hemorrhage, gum bleeding, upper gastrointestinal (GI) bleed, and hematuria were each observed in 1 patient (2.5%). [Table 2]

Abnormalities in complete blood count (CBC) were also common. Leukopenia was observed in 27 patients (67.5%), with a mean leukocyte count reduction of 657.07 (SD 598.44). Thrombocytopenia occurred in 31 patients (77.5%), with a mean platelet count decrease of 66,680.85 (SD 46,831.38). Lymphocytosis was observed in 15 patients (37.5%) with a mean increase of 49.89 (SD 13.39). Eosinopenia was found in 23 patients (57.5%) with a mean reduction of 0.83 (SD 0.26). Eight patients (20%) showed increased neutrophil levels, with a mean rise of 6.30 (SD 6.49), and the

packed cell volume (PCV) increased by 1.89 (SD 1.22) in 12 patients (30%). [Table 3]

Liver and renal function tests (LFT and RFT) revealed further abnormalities. Aspartate aminotransferase (AST) levels were elevated in 37 patients (92.5%), with a mean increase of 139.84 (SD 87.54). Alanine transaminase (ALT) levels were raised in 28 patients (70%) with a mean increase of 79.82 (SD 34.70). Four patients (10%) showed elevated total bilirubin levels, with a mean rise of 1.42 (SD 0.24). Protein levels decreased in 27 patients (67.5%), with a mean drop of 0.46 (SD 0.29). Serum calcium levels were reduced in 33 patients (82.5%) by a mean of 0.76 (SD 0.39), and serum phosphate levels dropped in 13 patients (33.25%) by a mean of 0.29 (SD 0.16). [Table 4]

Further abnormalities were observed in electrocardiograms (ECG), X-rays, and ultrasonography. Sinus bradycardia was noted in 10 patients (25%). Mild to moderate bilateral pleural effusion was observed in 9 patients (22.5%) through X-rays, while 5 patients (12.5%) had mild unilateral pleural effusion. Additionally, 5 patients (12.5%) had mild to moderate ascites, as indicated by ultrasound results. [Table 5]

**Table 1: Age and gender distribution of study participants**

Age Group (Years)	Males	Females	Total
20-34	10	1	11
35-59	22	3	25
60 and above	3	1	4

**Table 2: Clinical symptoms of study participants**

Clinical Symptom	Number of Patients	Percentage (%)
High-grade fever	40	100
Severe myalgia and headache	36	90
Arthralgia	36	90
Vomiting and loose motion	20	50
Shortness of breath	7	17.5
Abdominal swelling	4	10
Hemorrhagic manifestations	4	10
Petechiae	4	10
Subconjunctival hemorrhage	1	2.5
Gum bleeding	1	2.5
Upper GI bleed	1	2.5
Hematuria	1	2.5

**Table 3: CBC abnormality in study participants**

CBC Abnormality	Number of Patients	Percentage (%)	Mean Change (SD)
Leukopenia	27	67.5	-657.07 (598.44)
Thrombocytopenia	31	77.5	-66,680.85 (46,831.38)
Lymphocytosis	15	37.5	+49.89 (13.39)
Eosinopenia	23	57.5	-0.83 (0.26)
Increased neutrophils	8	20	+6.30 (6.49)
Increased PCV	12	30	+1.89 (1.22)

**Table 4: Biochemical abnormality among study participants**

Biochemical Abnormality	Number of Patients	Percentage (%)	Mean Change (SD)
Elevated AST	37	92.5	+139.84 (87.54)
Elevated ALT	28	70	+79.82 (34.70)
Increased total bilirubin	4	10	+1.42 (0.24)
Decreased protein levels	27	67.5	-0.46 (0.29)
Decreased serum calcium	33	82.5	-0.76 (0.39)
Decreased serum phosphate	13	33.25	-0.29 (0.16)

**Table 5: Diagnostic test abnormalities of study participants**

Diagnostic Test Abnormality	Number of Patients	Percentage (%)
Sinus bradycardia (ECG)	10	25
B/L pleural effusion (X-ray)	9	22.5
Unilateral pleural effusion (X-ray)	5	12.5
Ascites (Ultrasonography)	5	12.5

## DISCUSSION

The current study describes the clinical profile, laboratory characteristics, and outcomes of dengue fever (DF) in adult patients. Gastrointestinal symptoms were notably prevalent during this outbreak. In comparison to 38% of patients in Sharma et al.'s study, 50% of patients in our study reported abdominal discomfort.<sup>[7]</sup> Bleeding from various sites was relatively rare in this series, occurring in only 5% of cases. In contrast, Horvath in Australia,<sup>[8]</sup> and Sharma in India,<sup>[7]</sup> reported bleeding events in 63% and 69% of cases, respectively. The gastrointestinal tract and gums were the primary sites of bleeding in this study, similar to other studies. The lower incidence of bleeding could be attributed to the exclusion of increased bleeding from venepuncture sites in the study's definition of bleeding tendency.

Thrombocytopenia was frequently observed, but there was little association between thrombocytopenia and bleeding, a finding also reported by Sharma et al.<sup>[7]</sup> In our study, 76.67% of patients experienced thrombocytopenia, whereas another study reported a lower prevalence of 43.8%. Liver function test results were also an important point of comparison. In our study, elevated AST and ALT levels were observed in 92.5% and 70% of patients, respectively, compared to 88.4% and 76.7% in the Sharma et al. study.<sup>[7]</sup> The incidence of elevated bilirubin levels was 10%, similar to the 8.82% found in the previous study.

Protein, serum calcium, and serum phosphate levels were significantly altered, showing noticeable deviations from normal values. Protein and serum levels in renal function tests (RFT) also showed abnormal results.

Bradycardia was present in 25% of participants in our study, similar to the 24% reported by Gudi Srinivas et al.<sup>[9]</sup> However, there was a marked difference in the percentage of patients affected by pleural effusion. In our study, 12.5% of patients had pleural effusion, whereas only 3% were reported in a comparable study. Additionally, our study found that 12.5% of patients had ascites, compared to 9.4% in the study by Gudi et al.<sup>[10]</sup> Out of the 40 patients, there was one death due to myocarditis, which was the only fatality during the study period. The remaining 39 patients recovered well.

Key findings from the study include the high prevalence of thrombocytopenia and eosinopenia in complete blood count (CBC) results, along with elevated serum calcium, AST, ALT, and protein levels in liver and renal function tests. The presence

of effusion and sinus bradycardia further illustrated the pathophysiological effects of DF on the body.

The main limitations of the study include the small sample size and potential underreporting of unrecognized or misreported cases. However, future research may help confirm that early investigation and timely intervention upon hospital admission can reduce mortality and morbidity in dengue cases, aiding in faster patient recovery.

## CONCLUSION

This prospective observational study provides valuable insights into the clinical and laboratory profile of dengue fever in adult patients at a tertiary care center. High-grade fever, myalgia, arthralgia, and thrombocytopenia were the most common clinical and hematological findings, with notable abnormalities in liver and renal function tests. The findings highlight the importance of comprehensive diagnostic evaluation, including CBC, LFT, RFT, and imaging, in monitoring disease progression and guiding treatment. Early identification of key laboratory markers, such as thrombocytopenia, elevated liver enzymes, and electrolyte imbalances, can help healthcare providers intervene promptly to prevent complications and improve patient outcomes. Further research with larger populations is needed to corroborate these findings and enhance dengue management strategies, particularly in resource-limited settings where dengue is endemic.

## REFERENCES

- World Health Organization. Dengue and severe dengue [Internet]. Geneva: WHO; 2023 [cited 2024 Mar 9]. Available from: <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue>
- Gupta N, Srivastava S, Jain A, Chaturvedi UC. Dengue in India. *Indian J Med Res.* 2012;136(3):373–90.
- Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, et al. The global distribution and burden of dengue. *Nature.* 2013 Apr 25;496(7446):504–7.
- Murray NEA, Quam MB, Wilder-Smith A. Epidemiology of dengue: past, present, and future prospects. *Clin Epidemiol.* 2013; 5:299–309.
- Oishi K, Saito M, Mapua CA, Natividad FF. Dengue illness: clinical features and pathogenesis. *J Infect Chemother.* 2007 Apr;13(3):125–33.
- Tang KF, Ooi EE. Diagnosis of dengue: an update. *Expert Rev Anti Infect Ther.* 2012 Aug;10(8):895–907.
- Sharma SK, Mohan A, Wadhwa J, Dar L, Thulker S, Singh S, et al. Clinical profile of dengue haemorrhagic fever in adults during 1996 outbreak in Delhi. *Dengue Bull.* 1998; 22:20–7.
- Horvath R, McBride WJ, Hanna JN. Clinical features of hospitalized patients during the dengue-3 epidemic in Far North Queensland, 1997-1999. *Trop Public Health Physician.* 1999; 23:10–5.

9. Srinivas G, Rao YR. Dengue fever: Its clinical profile, radiological findings, haematological and biochemical parameters - Study from a tertiary care hospital. *J Evol Med Dent Sci*. 2018 Mar 26;7(13):1588–91.
10. Jairaj S, D S, Reddy MP. Clinical, laboratory and radiological profile of dengue among pediatric patients admitted in a tertiary care hospital. *Int J Community Med Public Health*. 2018 May 22;5(6):2237–41.