

SIGNIFICANCE OF APTT AS AN EARLY PREDICTOR OF BLEEDING IN DENGUE FEVER

Kevin D'souza¹, Anand A V², Sandhya R³, Ramya S S⁴

Received : 15/05/2026
 Received in revised form : 10/07/2026
 Accepted : 25/07/2026

Keywords:

Dengue fever, Activated partial thromboplastin time, Thrombocytopenia, Bleeding manifestations, Coagulopathy.

Corresponding Author:

Dr. Anand A V,
 Email: alurvishnuanand@gmail.com

DOI: 10.47009/jamp.2026.8.4.106

Source of Support: Nil,
 Conflict of Interest: None declared

Int J Acad Med Pharm
 2026; 8 (4); 611-614



¹Assistant Professor, Department of General Medicine, Karwar Institute of Medical Sciences, Karwar, Karnataka, India.

²Consultant Physician, Department of General Medicine, KLE Hospital - Bengaluru (KLE Academy of Higher Education and Research), India.

³Assistant Professor, Department of General Medicine, Vydehi Institute of Medical Sciences and Research Centre, Bangalore, Karnataka, India.

⁴Assistant Professor, Department of General Medicine, JSS Institute of Medical Sciences and Research Centre, Mysore, Karnataka, India.

ABSTRACT

Background: Bleeding manifestations in dengue fever are traditionally attributed to thrombocytopenia; however, coagulation abnormalities may also play a significant role. Activated partial thromboplastin time (aPTT) has been proposed as a potential marker for predicting haemorrhagic complications. This study aimed to evaluate the significance of aPTT as an early predictor of bleeding manifestations in dengue fever and to compare its predictive value with platelet counts. **Materials and Methods:** A hospital-based prospective observational study was conducted among 92 adult patients with confirmed dengue infection admitted to KR Hospital, Mysuru, between January 2020 and June 2021. Patients positive for NS1 antigen and/or IgM antibodies were included. Platelet counts and aPTT values were assessed and correlated with bleeding manifestations over a five-day follow-up period. Statistical analyses included Pearson's chi-square test and Student's t-test, with $p < 0.05$ considered statistically significant. **Results:** The mean age of participants was 37.07 years, with females accounting for 63% of cases. Thrombocytopenia was observed in all patients, and bleeding manifestations occurred across all grades of thrombocytopenia. The association between platelet count and bleeding manifestations was not statistically significant ($\chi^2 = 7.598$, $p = 0.055$). Among 78 patients with bleeding manifestations, 54 (69.23%) had prolonged aPTT values, with a mean aPTT of 41.96 seconds. Elevated aPTT showed a significant association with bleeding manifestations ($p < 0.001$). **Conclusion:** Severity of thrombocytopenia alone is a poor predictor of bleeding risk in dengue fever. Prolonged aPTT demonstrates a strong association with bleeding manifestations and may serve as an early predictor of haemorrhagic complications. Routine monitoring of aPTT may help identify high-risk patients and facilitate timely intervention.

INTRODUCTION

Dengue is an important arthropod-borne viral illness in humans, caused by the dengue virus (DENV-1 to DENV-4) and transmitted by Aedes mosquitoes.^[1] Dengue virus infection may be asymptomatic or may lead to dengue fever without warning signs, with warning signs or severe dengue. Dengue fever and its severe forms — haemorrhagic fever (DHF) and dengue shock syndrome (DSS) — have become major international public health concerns.^[2] Dengue virus infection can lead to bleeding manifestations, and dengue fever with bleeding is the most severe form of this infection.^[3] Many factors contribute to the pathogenesis of bleeding manifestations in dengue infection, which

is multifactorial in nature.^[4] Various mechanisms underlie bleeding in dengue, including vasculopathy, thrombocytopenia, impaired coagulation, and disseminated intravascular coagulation (DIC). It is evident that the coagulation system, in addition to thrombocytopenia — which is a universal finding in dengue haemorrhagic fever — is also affected in dengue and contributes to bleeding manifestations. It is therefore essential to identify these coagulation abnormalities at the earliest opportunity in order to minimise bleeding manifestations of dengue infection and reduce its morbidity and mortality.

Aims and Objectives

1. To study the activated partial thromboplastin time in patients with dengue.

- To correlate activated partial thromboplastin time with platelet counts and bleeding manifestations.

MATERIALS AND METHODS

Source of Data: The primary source of data was patients diagnosed with and admitted for dengue fever at KR Hospital, Mysuru. Secondary sources of information included published articles, journals, books, and selected review articles.

Study Design: Hospital-based prospective observational cross-sectional study.

Study Period: January 2020 to June 2021.

Sample Size: The sample size was calculated using the formula $n = N / (1 + Ne^2)$, where N is the average number of dengue cases over the preceding three years (300 cases) and e is the margin of error ($e = 0.05$ for a 95% confidence interval). The estimated sample size was 92.

Study Population: The study was conducted among 92 patients admitted to the Medical Ward, KR Hospital, Mysuru.

Inclusion Criteria

- Age >18 years.
- All dengue patients testing positive for NS1 antigen or IgM antibody.

Exclusion Criteria

- Patients with a known bleeding or clotting disorder.
- Patients with decompensated liver disease predisposing to coagulopathy.
- Patients with sepsis known to cause deranged coagulation profile.
- Other causes of febrile thrombocytopenia with negative NS1 antigen and/or IgM.
- Pregnancy.
- Patients with known connective tissue disorders and/or on medication causing coagulopathy..

RESULTS

Age-wise Distribution of Patients

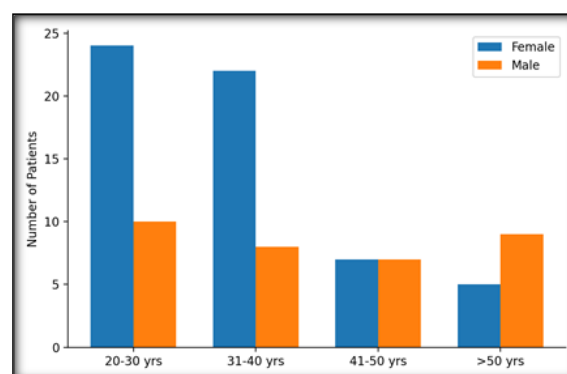


Figure 1: Age and sex-wise distribution of patients

The mean age of patients in this study was 37.07 years.

Sex Distribution of Patients

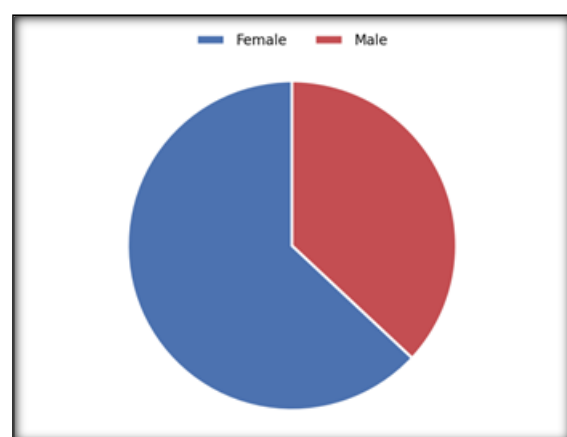


Figure 2: Sex distribution of patients

This study included 58 females (63.0%) and 34 males (37.0%).

Dengue Illness Phase-wise Distribution of Patients at Presentation

Table 1: Distribution of patients according to phase of dengue illness at presentation

Dengue Illness Phase	Number of Patients, n (%)	Bleeding Manifestation, n (%)
Viraemic phase (<3 days)	20 (21.73)	16 (20.51)
Critical phase (4-7 days)	57 (61.95)	53 (67.94)
Convalescent phase (>7 days)	15 (16.30)	9 (11.53)
Total	92 (100.0)	78 (100.0)

At the time of presentation to the hospital, the majority of patients were in the critical phase.

4.4 Comparison of Platelet Values with Bleeding Manifestation

Platelet counts were compared with the presence of bleeding manifestations over five days of follow-up. [Tables 2–6]

Table 2: Platelet count and bleeding manifestation — Day 1

Platelet Count (μL)	Bleeding Present, n (%)	Bleeding Absent, n (%)	Total
50,000–100,000	6 (13.6)	15 (31.2)	21
20,000–50,000	24 (54.5)	25 (52.0)	49
<20,000	14 (31.8)	8 (16.6)	22
Total	44	48	92

Table 3: Platelet count and bleeding manifestation — Day 2

Platelet Count (/μL)	Bleeding Present, n (%)	Bleeding Absent, n (%)	Total
50,000–100,000	2 (4.2)	16 (35.5)	18
20,000–50,000	22 (46.8)	23 (51.1)	45
<20,000	23 (48.9)	6 (13.3)	29
Total	47	45	92

Table 4: Platelet count and bleeding manifestation — Day 3

Platelet Count (/μL)	Bleeding Present, n (%)	Bleeding Absent, n (%)	Total
50,000–100,000	7 (17.9)	20 (37.7)	27
20,000–50,000	15 (38.4)	14 (26.4)	29
<20,000	17 (43.5)	19 (35.8)	36
Total	39	53	92

Table 5: Platelet count and bleeding manifestation — Day 4

Platelet Count (/μL)	Bleeding Present, n (%)	Bleeding Absent, n (%)	Total
50,000–100,000	6 (19.3)	17 (27.8)	23
20,000–50,000	12 (38.7)	28 (45.9)	40
<20,000	13 (41.9)	16 (26.2)	29
Total	31	61	92

Table 6: Platelet count and bleeding manifestation — Day 5

Platelet Count (/μL)	Bleeding Present, n (%)	Bleeding Absent, n (%)	Total
50,000–100,000	4 (16.6)	48 (70.5)	52
20,000–50,000	5 (20.8)	13 (19.1)	18
<20,000	15 (62.5)	7 (10.2)	22
Total	24	68	92

Correlation of aPTT with Bleeding Manifestation

Table 7: Mean aPTT values in patients with and without bleeding manifestations over the follow-up period

Day	Mean aPTT — Bleeding Present (s)	Mean aPTT — Bleeding Absent (s)	Standard Deviation	p-value
Day 1	41.96	34.01	8.2027	0.001
Day 2	42.47	37.25	8.7367	0.036
Day 3	39.41	36.17	8.4121	0.164
Day 4	34.14	34.35	5.6447	0.891
Day 5	31.87	30.92	2.5244	0.192

Among the 78 patients with bleeding manifestations, aPTT was found to be increased on day 1 in 54 patients (69.23%).

DISCUSSION

In this study, thrombocytopenia was a consistent finding and was correlated with bleeding manifestations. Bleeding manifestations were noted across mild, moderate, and severe thrombocytopenia alike. Over the five-day follow-up period, 54.5% of patients with moderate thrombocytopenia had bleeding manifestations on day 1.

The correlation between thrombocytopenia and bleeding manifestations was assessed using the Pearson chi-square test ($\chi^2 = 7.598$, $p = 0.055$), which did not reach statistical significance.

This finding is consistent with the study by Hamsa BT et al., who concluded that thrombocytopenia is a poorer predictor of bleeding manifestations in patients with dengue fever compared with aPTT.^[5]

In this study, aPTT was deranged in 54 patients (69.23%) with bleeding manifestations, with a mean aPTT of 41.96 seconds (cut-off value 34 seconds). This finding is comparable to the study by Kannan et al., in which aPTT was deranged in 71.4% of patients with dengue fever.^[6]

The association between raised aPTT levels and bleeding manifestations was assessed using Student's t-test, which showed a statistically significant correlation ($p < 0.001$).

CONCLUSION

Thrombocytopenia was observed in all cases of dengue haemorrhagic fever; however, the correlation between the grade of thrombocytopenia and bleeding manifestations was of limited significance. aPTT was raised in the majority of cases of dengue haemorrhagic fever and correlated with bleeding manifestations, with bleeding risk increasing as aPTT levels rose. A high index of clinical suspicion is therefore required to predict bleeding manifestations in patients with raised or rising aPTT values, warranting close monitoring and timely intervention.

REFERENCES

1. Khetarpal N, Khanna I. Dengue fever: causes, complications, and vaccine strategies. *J Immunol Res*. 2016;2016:6803098.

2. World Health Organization. Dengue and severe dengue. Available from: <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue>.
3. Chuansumrit A, Chaiyaratana W. Hemostatic derangement in dengue hemorrhagic fever. *Thromb Res*. 2014;133:10–16.
4. Isarangkura PB, Pongpanich B, Pintadit P, Phanichyakarn P, Valyasevi A. Hemostatic derangement in dengue haemorrhagic fever. *Southeast Asian J Trop Med Public Health*. 1987;18:331–339.
5. Hamsa BT, Srinivasa SV, Prabhakar K, Raveesha A, Manoj AG. Significance of APTT as early predictor of bleeding in comparison to thrombocytopenia in dengue virus infection. *Int J Res Med Sci*. 2019;7(1):67–70.
6. Kannan A, Narayanan KS, Sasikumar S, Philipose J, Surendran SA. Coagulopathy in dengue fever patients. *Int J Res Med Sci*. 2014;2(3):1070–1072.