Section: General Medicine

Original Research Article

A CLINICAL STUDY OF ACUTE FEBRILE ILLNESS WITH THROMBOCYTOPENIA IN A TERTIARY CARE CENTRE, BAREILLY

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ABSTRACT

Background: Acute febrile illness (AFI) with thrombocytopenia is a frequent clinical challenge in tropical regions, commonly associated with infections such as dengue and malaria. Thrombocytopenia is a crucial marker of disease severity. This study aimed to evaluate the etiological profile, clinical characteristics, and outcomes of AFI with thrombocytopenia in Bareilly, where epidemiological data are less. **Aim and Objective:** The study aimed to identify the common causes of AFI with thrombocytopenia, assess demographic and clinical profiles, and determine the relationship between thrombocytopenia severity and clinical outcomes.

Materials and Methods: A one-year (July-2024 to June-2025) cross-sectional study was conducted in the Department of General Medicine, including 150 adult patients presenting with AFI and confirmed thrombocytopenia. Detailed clinical assessment and laboratory investigations, including complete blood count and specific tests for dengue, malaria, scrub typhus, enteric fever, and leptospirosis, were performed. Data were analyzed using descriptive and inferential statistics.

Results: Dengue was the most common etiology (46%), followed by malaria (25.3%). The majority were aged 31–45 years (40%) with male predominance (61.3%). Fever (100%), headache (65.3%), and myalgia (60%) were the main symptoms. Moderate thrombocytopenia (50,000–99,999/µL) occurred in 44.7% of patients. Thrombocytopenia severity correlated significantly with bleeding, platelet transfusion need, renal and hepatic dysfunction, and mortality ($p<0.05$).

Conclusion: Dengue and malaria are the leading causes of AFI with thrombocytopenia in Bareilly. The severity of thrombocytopenia predicts complications and outcomes, aiding in risk assessment and management in resource-limited settings.

Keywords: Acute febrile illness, thrombocytopenia, dengue, malaria, clinical outcome, Bareilly.

INTRODUCTION

Acute Febrile Illness (AFI) is characterized by the sudden onset of fever lasting less than two weeks, without an immediately identifiable source of infection. It remains a major clinical and public health challenge in tropical and subtropical regions due to the coexistence of multiple infectious agents facilitated by favorable environmental, climatic, and socio-economic factors.[1] The presentation of AFI is often nonspecific, ranging from mild self-limiting fever to severe, life-threatening infections. The complexity in managing AFI lies in its broad

differential diagnosis, encompassing viral, bacterial, parasitic, and emerging zoonotic diseases. Prompt etiological identification is critical, as diagnostic delays can result in serious complications, prolonged hospitalization, and increased mortality. Therefore, systematic diagnostic approaches and strengthened surveillance systems are essential for reducing the disease burden in endemic regions.[1]

Thrombocytopenia, defined as a platelet count below the normal range, is a frequent hematological finding in AFI and serves as an important indicator of disease severity. It commonly accompanies infections such as dengue, malaria, leptospirosis, and rickettsial diseases, arising from mechanisms like platelet destruction, sequestration, or impaired production.[2] In dengue, a rapid decline in platelet count may indicate progression to dengue hemorrhagic fever or shock syndrome, while in malaria, thrombocytopenia correlates with severe parasitemia and systemic inflammation. Monitoring platelet levels not only aids in assessing disease progression but also guides therapeutic interventions, such as platelet transfusions, thereby influencing patient outcomes.[2]

Globally, AFI continues to cause substantial morbidity and mortality, particularly in low- and middle-income tropical countries. Vector-borne diseases like dengue and malaria contribute significantly to this burden. According to the World Health Organization, dengue affects an estimated 100–400 million individuals annually, while malaria accounted for approximately 249 million cases worldwide in 2022, with significant mortality among children.[3] India bears a large portion of this burden due to diverse climatic conditions and socio-economic disparities. Seasonal outbreaks during the monsoon and post-monsoon periods are associated with environmental factors that favor mosquito proliferation and waterborne transmission. Additionally, the resurgence of scrub typhus and rickettsial infections has further complicated the clinical picture of AFI in India.[4]

The etiology of AFI in northern India often reflects seasonal and environmental influences, with dengue being the predominant cause due to extensive breeding of Aedes mosquitoes during monsoon months. Malaria, particularly from Plasmodium vivax and P. falciparum, also contributes significantly, with up to 80% of malaria cases exhibiting thrombocytopenia in regional studies. Other notable causes include scrub typhus, leptospirosis, typhoid fever, and chikungunya.[12-14] Socioeconomic factors such as poor sanitation, water stagnation, and limited healthcare access further exacerbate the disease burden, particularly in rural and peri-urban populations.[15]

Demographically, AFI with thrombocytopenia most commonly affects individuals aged 20–40 years, with a slight male predominance likely due to increased outdoor exposure.[16] Fever is universal, often accompanied by headache, myalgia, arthralgia, rash, and gastrointestinal symptoms. Severe thrombocytopenia frequently leads to bleeding manifestations, prolonged hospitalization, and increased transfusion requirements.[17,18] Environmental factors, especially during monsoon seasons, play a major role in the epidemiology of AFI, correlating with vector abundance and transmission rates.

The severity of thrombocytopenia has been shown to correlate strongly with disease outcomes. Infections such as dengue and malaria exhibit a direct relationship between platelet decline and clinical severity, including complications like shock, multiorgan dysfunction, and mortality.[19] Similarly, in leptospirosis and rickettsial diseases, severe thrombocytopenia indicates systemic involvement and poor prognosis.[20] Thus, platelet count serves as both a diagnostic and prognostic marker in AFI.

MATERIALS AND METHODS

This cross-sectional study was conducted for one year in the Department of General Medicine, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, a tertiary care center catering to a diverse urban and rural population. A total of 150 adult patients (≥18 years) presenting with acute febrile illness (<14 days) and thrombocytopenia (platelet count <150,000/µL) were consecutively enrolled after informed consent. Patients with chronic illness, normal platelet counts, pre-existing hematological, hepatic, or autoimmune disorders, or recent blood transfusion were excluded. Data were collected using a structured case record form covering socio-demographic, clinical, and laboratory parameters. Investigations included complete blood count, peripheral smear, liver and kidney function tests, and etiology-specific tests for dengue (NS1/IgM), malaria (smear/RDT), scrub typhus, leptospirosis, enteric fever, viral hepatitis, and sepsis; additional tests (bone marrow, autoimmune serology, ultrasonography) were done when indicated. Clinical outcomes such as bleeding, organ dysfunction, transfusion requirement, and mortality were recorded. Data were entered in MS Excel and analyzed using SPSS v26. Descriptive statistics summarized baseline features, and associations were tested using Chi-square, ANOVA, or non-parametric equivalents; $p<0.05$ was considered significant. Ethical clearance was obtained from the Institutional Ethics Committee, and written informed consent was taken from all participants.

RESULTS

In this study of 150 patients with acute febrile illness and thrombocytopenia, the 31-45 year age group was most affected (40%), followed by 18-30 years (26.7%), 46–60 years (22%), and >60 years (11.3%). The age distribution was statistically significant ($\chi^2 = 25.41$, $p < 0.001$), showing a higher disease burden among younger and middle-aged adults. [Figure 1]

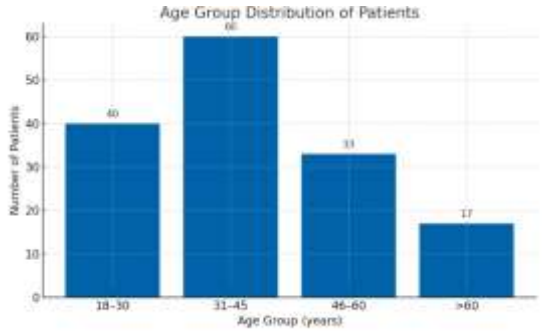

Figure 1: Age Group Distribution of Study Population

Among the 150 patients, 92 (61.3%) were male and 58 (38.7%) female, showing a statistically significant male predominance ($\chi^2 = 7.71$, $p = 0.0055$) in acute febrile illness with thrombocytopenia. [Figure 2]

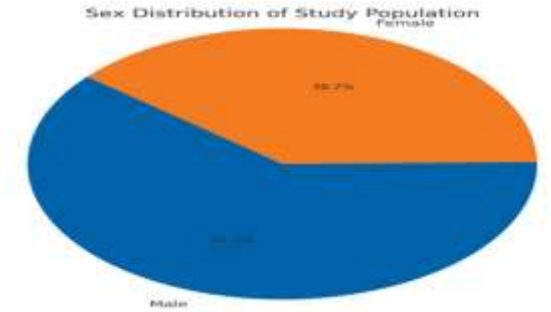

Figure 2: Sex Distribution of Study Population

Of the 150 patients, 88 (58.7%) were urban and 62 (41.3%) rural, showing a statistically significant predominance of urban cases ($\chi^2 = 4.51$, $p = 0.0338$). [Figure 3]

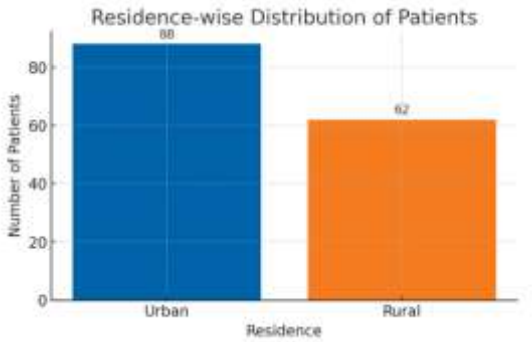

Figure 3: Residence-wise Distribution of Study Population

In 150 patients with acute febrile illness and thrombocytopenia, fever was universal (100%), followed by headache (65.3%), myalgia (60%), nausea/vomiting (48%), and abdominal pain (37.3%). Rash (29.3%) and bleeding manifestations (25.3%) were less common, while hepatomegaly (21.3%), splenomegaly (19.3%), and lymphadenopathy (12%) were the main clinical findings, reflecting the systemic nature of these illnesses. [Table 1]

Table 1: Clinical Symptom Profile

Symptom	Number of Patients (n)	Percentage (%)
Fever	150	100
Headache	98	65.3
Myalgia	90	60
Nausea/Vomiting	72	48
Abdominal Pain	56	37.3
Rash	44	29.3
Bleeding (e.g., gums, epistaxis, petechiae)	38	25.3
Hepatomegaly	32	21.3
Splenomegaly	29	19.3
Lymphadenopathy	18	12

Dengue was the leading cause (46%), followed by malaria (25.3%), enteric fever (11.3%), and unspecified viral fever (10.3%). Scrub typhus (4%), hepatitis A/E (1.3%), leptospirosis (1%), and sepsis (0.7%) were less common. The etiological distribution varied significantly ($\chi^2 = 200.86$, df = 7, $p < 0.0001$), highlighting arboviral and parasitic infections as predominant causes. [Table 2]

Table 2: Etiological distribution of cases

Etiology	Number of Patients (n)	Percentage (%)
Dengue	69	46
Malaria	38	25.3
Enteric Fever	17	11.3
Viral Fever (unspecified)	15	10.3
Scrub Typhus	6	4
Leptospirosis	2	1
Hepatitis A/E	2	1.3
Sepsis	1	0.7
Total	150	100
$\chi^2 = 200.86$, df = 7, $p < 0.0001$		

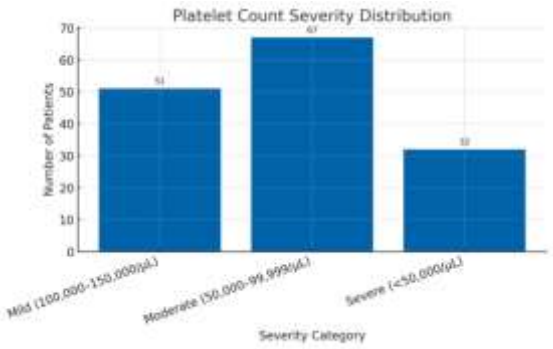

Figure 4: Platelet Count Severity Distribution

oderate thrombocytopenia (50,000–99,999/µL) was most common (44.7%), followed by mild (34%) and severe (21.3%) cases. The distribution was statistically significant (χ^2 = 12.28, p = 0.0022), indicating moderate thrombocytopenia predominance. [Figure 4]

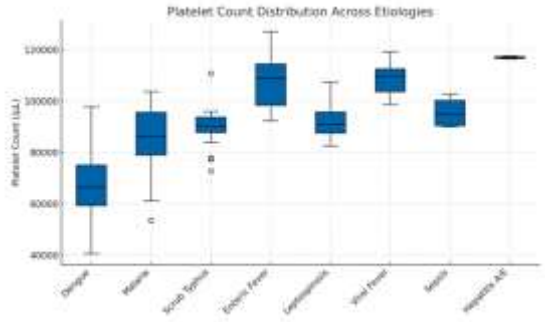

Figure 5: Platelet Count Distribution Across Etiologies

Platelet counts varied significantly across etiologies (F = 36.82, p < 0.001), being lowest in dengue (66,833/µL), followed by malaria (86,128/µL) and scrub typhus (89,649/µL). Higher counts occurred in enteric fever, leptospirosis, viral fever, and hepatitis A/E, indicating dengue as the most thrombocytopenia-prone infection. [Figure 5]

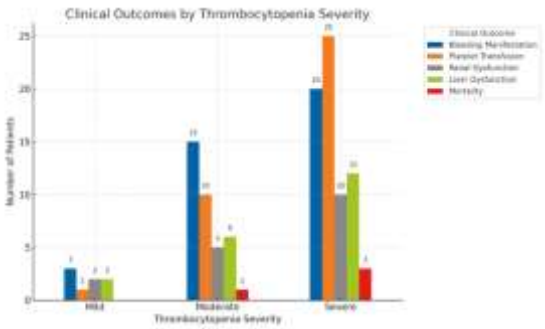

Figure 6: Correlation Between Thrombocytopenia and Clinical Outcomes

A significant association was found between thrombocytopenia severity and clinical outcomes. Bleeding (χ^2 = 33.88, p < 0.0001), platelet transfusion (χ^2 = 68.00, p < 0.0001), renal (χ^2 = 16.42, p = 0.0003) and liver dysfunction (χ^2 = 21.19, p < 0.0001), and mortality (χ^2 = 7.30, p = 0.0260) all increased with severity, indicating poorer outcomes in patients with lower platelet counts. [Figure 6]

DISCUSSION

Acute febrile illness (AFI) with thrombocytopenia is a frequent clinical presentation in tropical regions like India, where infectious diseases contribute substantially to morbidity and mortality.[1] It encompasses a wide range of infections marked by acute fever and reduced platelet count, often making diagnosis difficult due to overlapping symptoms. Common causes include dengue, malaria, leptospirosis, scrub typhus, chikungunya, enteric fever, and viral infections.[2] Early identification of etiology is vital to prevent complications such as bleeding, shock, and multiorgan failure.[3] Thrombocytopenia may result from bone marrow suppression, immune-mediated destruction, or peripheral consumption.[4] Platelet count thus serves as both a diagnostic and prognostic marker, with dengue and malaria being classic examples where platelet decline signals disease progression.[5]

In northern India, including Bareilly, climatic and environmental conditions favor vector proliferation, increasing AFI incidence. Tertiary care centers play a crucial role in diagnosing and documenting these cases.[6] The present study on "Acute Febrile Illness with Thrombocytopenia in a Tertiary Care Centre, Bareilly" aimed to assess the clinical profile, etiology, laboratory parameters, and outcomes of affected patients to guide early diagnosis and improve management.[7]

Age-wise distribution revealed a predominance in the 31–45 years group (χ^2 = 25.41, p < 0.001), aligning with previous studies showing higher susceptibility among younger adults due to greater outdoor exposure.[8,9] Males were significantly more affected (61.3% vs. 38.7%; χ^2 = 7.71, p = 0.0055), reflecting occupational exposure and health-seeking behavior rather than biological differences.[10,11] Urban patients constituted 58.7% of cases (χ^2 = 4.51, p = 0.0338), indicating a modest but significant urban predominance, possibly linked to vector ecology and reporting patterns.[12]

Clinically, all patients presented with fever, while headache (65.3%), myalgia (60%), nausea/vomiting (48%), and abdominal pain (37.3%) were frequent. Bleeding (25.3%) and rash (29.3%) were notable. Compared to Modi et al,[13] our study showed higher frequencies of systemic symptoms, possibly due to differences in regional disease patterns or case severity.

Etiologically, dengue was most common (46%), followed by malaria (25.3%), enteric fever (11.3%), viral fever (10.3%), scrub typhus (4%), hepatitis A/E (1.3%), leptospirosis (1%), and sepsis (0.7%) (χ^2 = 200.86, p < 0.0001). These findings closely align with Choudhary et al,[14] and MedPulse,[15] confirming dengue as the leading cause, though our

study showed slightly higher rates of enteric fever and viral infections, indicating regional variation.

Platelet count analysis revealed moderate thrombocytopenia (50,000–99,999/μL) in 44.7%, mild in 34%, and severe (<50,000/μL) in 21.3% (χ^2 = 12.28, p = 0.0022), reflecting a comparatively higher proportion of severe cases.[15,16] Platelet levels varied significantly across etiologies (F = 36.82, p < 0.001), with the lowest mean in dengue (66,833/μL), followed by malaria and scrub typhus, consistent with prior studies indicating dengue as the most thrombocytopenia-prone infection.[17,18]

A strong correlation was found between thrombocytopenia severity and adverse outcomes. Bleeding, platelet transfusion, liver and renal dysfunction, and mortality all rise with severity (p < 0.0003). These findings highlight platelet count as a key prognostic indicator. However, Barot et al.[19] reported no such correlation in their cohort, suggesting variability in outcomes across regions and etiologies. This discrepancy may stem from differing patient populations, disease spectra, or management practices.

Overall, our findings reinforce that dengue remains the major etiology of AFI with thrombocytopenia, predominantly affecting working-age urban males. The severity of thrombocytopenia strongly predicts bleeding risk and adverse outcomes, underscoring the importance of early platelet monitoring and targeted management strategies. Regional differences in disease patterns emphasize the need for localized public health interventions and continued surveillance to mitigate complications and mortality associated with AFI in endemic areas.[20]

CONCLUSION

Acute Febrile Illness (AFI) poses a major diagnostic challenge in resource-limited settings due to its non-specific presentation and diverse etiologies. Thrombocytopenia serves as an important clinical marker, often indicating disease severity and potential complications. The etiological pattern and platelet correlation vary regionally, influenced by climatic and environmental factors. Recognizing the lack of local data, this study was conducted in a tertiary care centre in Bareilly to identify prevalent causes of AFI with thrombocytopenia and their clinical correlations. The findings aim to enhance diagnostic accuracy, guide timely management, and support regional public health planning.

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