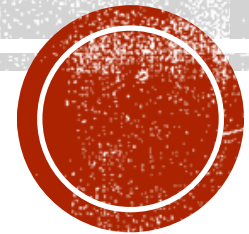


THROMBOCYTOPENIA: IS ASSOCIATED FACTOR, NOT AN INDICATOR OF SEVERITY IN DENGUE PATIENTS

Dr. Tahera Khatun
Junior Consultant
Department of Medicine
Kurmitola General Hospital



BACKGROUND

- Dengue fever, a mosquito-borne viral infection, presents a significant global health challenge, affecting millions annually with its range of clinical manifestations.
- The disease, caused by the dengue virus (DENV), has seen a notable shift in its presentation and epidemiology, reflecting its evolving nature and the changing dynamics of vector-borne diseases worldwide.
- Thrombocytopenia, a hallmark of dengue infection, is characterized by a significant reduction in platelet count, and its role in the pathophysiology of dengue has been a subject of extensive research and debate.



BACKGROUND

- Traditionally, thrombocytopenia in dengue has been viewed as a critical indicator of disease severity, guiding clinical management and prognosis. However, recent studies have challenged this perspective and the clinical management of thrombocytopenia in dengue further complicate the picture.
- The pathogenesis of thrombocytopenia in dengue is multifactorial, involving direct viral effects, immune-mediated platelet destruction, and bone marrow suppression.
- The role of therapeutic platelet transfusion, traditionally employed in cases of severe thrombocytopenia, has been questioned, with studies suggesting its potential risks .



RATIONALE

- Thrombocytopenia in dengue represents a complex clinical challenge, with its significance in disease severity and management still under debate.
- As the global burden of dengue continues to rise, particularly in Bangladesh addressing these uncertainties becomes increasingly crucial for developing effective management strategies and improving patient outcomes.
- This manuscript aims to contribute to this ongoing discourse, exploring the role of thrombocytopenia in dengue and challenging the conventional view of its significance in assessing disease severity.



OBJECTIVE

- The primary objective was to determine the occurrence and pattern of thrombocytopenia in dengue patients and its correlation with the severity of disease and clinical outcome.

- The secondary objective was to observe and determine the followings-
 - ✓ Sociodemographic pattern
 - ✓ Clinical presentations
 - ✓ Association with comorbid conditions and coinfections
 - ✓ Effects on biochemical parameters
 - ✓ Fluid management



METHOD

- Method: Observational study
- Study site: Kurmitola General Hospital, Dhaka cantonment, Dhaka.
- Study duration: July to December, 2023
- Sample size: 1000
- Sampling technique: Purposive



CRITERIA

Inclusion criteria:

Included 1000 female patients diagnosed with dengue fever, confirmed through NS1 antigen or Dengue IgM tests.

The study included the patients age more than 12 years.

Exclusion Criteria:

Exclusion criteria were set to omit patients with any pre-existing disease like ITP, SLE, carcinoma and pregnant mothers, ensuring a more homogenous study group and minimizing confounding factors.



STATISTICAL ANALYSIS

- We used SPSS Version 25. This involved both descriptive and inferential statistics to identify significant patterns and correlations, particularly between thrombocytopenia and dengue severity.
- The study adhered to ethical standards, with informed consent obtained from all participants. Patient confidentiality was strictly maintained.
- Data collected included demographics, clinical symptoms, comorbidities, coinfections, laboratory findings, and treatment outcomes.



RESULTS

Table 1: Distribution of baseline characteristics among the participants (N=1000)

Variables	Frequency	Percentage
Age		
≤20	100	10%
21-30	400	40%
31-40	280	28%
41-50	90	9%
51-60	60	6%
61-70	70	7%
Religion		
Muslim	980	98%
Hindu	20	2%
Residence		
Urban	850	85%
Semi-urban	140	14%
Rural	10	1%

- The age distribution of the participants varied, with the majority falling within the 21-30 age group, accounting for 40% of the total sample.
- In terms of religious affiliation, the vast majority of the participants were Muslim, making up 98% of the sample.
- Regarding the residence of the participants, a significant portion, 85%, resided in urban areas.



Table 2: Distribution of clinical symptoms among the participants (N=1000)

Clinical Symptoms	Frequency	Percentage
Fever	1000	100%
Vomiting	420	42%
Loose motion	320	32%
Abdominal Pain	270	27%
Body ache	170	17%
Shock	70	7%
Cough	60	6%
Superficial Bleeding (Gum bleeding)	50	5%
Deep Bleeding (Profuse Menstrual Bleeding)	50	5%
Lethargy	40	4%
Rash	20	2%
Encephalitis	10	1%

- Fever was universally present in all participants, accounting for 100%.
- Vomiting was the second most common symptom, experienced by 42%.
- Loose motion and abdominal pain, reported in 32% and 27% of the cases, respectively.



Table 3: Distribution of mean $\pm$ SD biochemical parameters among the participants (N=1000)

Variables	Mean $\pm$ SD
Platelet Count	35730122.99 $\pm$ 332344273.6
Platelet Count Lowest	54617.65 $\pm$ 51575.196
CBC: HB	14.8303 $\pm$ 17.91082
TC	2692.4983 $\pm$ 3279.6731
Neutrophil Count	289.5547 $\pm$ 860.28399
HCT	33.846 $\pm$ 7.2839
SGPT	280.83 $\pm$ 689.935
SGOT	169.19 $\pm$ 117.036
Creatinine	1.0724 $\pm$ 0.95153
Total Protein	4.914 $\pm$ 0.4776
Albumin	2.711 $\pm$ 0.6431
HbA1C	6.696 $\pm$ 1.2723

- The mean platelet count was observed to be 35730122.99 $\pm$ 332344273.6, while the lowest platelet count recorded averaged at 54617.65 $\pm$ 51575.196, indicating significant thrombocytopenia in the cohort.
- The hematocrit (HCT) value was 33.846 $\pm$ 7.2839.
- Liver function tests showed elevated levels, with SGPT (Serum Glutamic-Pyruvic Transaminase) at 280.83 $\pm$ 689.935.



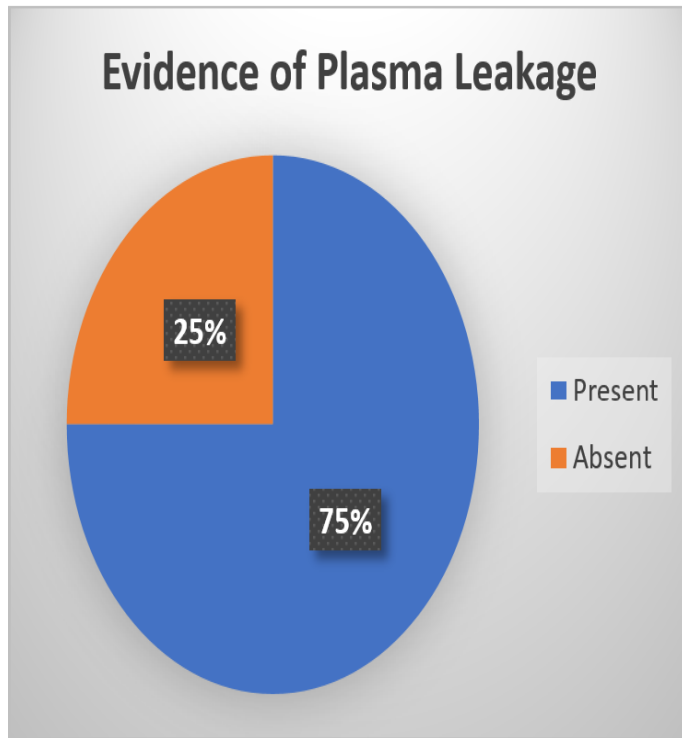


Figure 2: Distribution of participants by evidence of plasma leakage (N=1000)

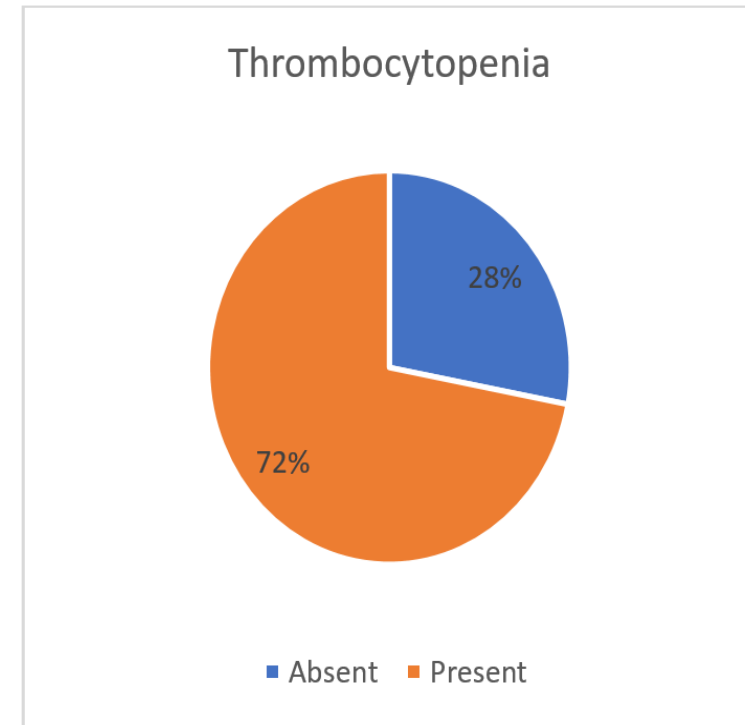


Figure 3: Presence of thrombocytopenia by hospital recorded platelet count (N=1000)



Table 4: Distribution of comorbidities and coinfection among the participants (N=1000)

Variables	Frequency	Percentage
Comorbidities		
Diabetes	110	11%
Hypertension	120	12%
Chronic kidney Disease	10	1%
Hypothyroidism	20	2%
Asthma	20	2%
No comorbidities	720	72%
Coinfection		
No coinfection	930	93%
Enteric Fever	20	2%
Urinary Tract Infection	50	5%

- 72% of the participants did not have any comorbidities. However, diabetes was observed in 11%, hypertension in 12%.
- In terms of coinfections, a significant majority of the patients, 93%, did not have any coinfection. However, 2% of the participants were diagnosed with enteric fever, and another 5% had a urinary tract infection.



Table 5: Distribution of patient management method among the participants (N=1000)

Management Method	Frequency	Percentage
0.9% NaCl Saline	950	95%
Cholera Saline	50	5%
Plasma Expander	110	11%
Platelet Transfusion	0	0%
Blood Transfusion	0	0%

- The predominant treatment approach was the use of 0.9% NaCl fluid replacement, utilized in 95% of the cases.
- Additionally, plasma expanders were administered in 11% of the cases.
- Notably, there were no instances of platelet transfusion or blood transfusion among the participants.



Table 6: Distribution of hospital outcome among the participants (N=1000)

Hospital Outcome	Frequency	Percentage
Need for ICU	90	9%
Mortality	30	3%
Recovery	970	97%

- A significant majority, 97% experienced recovery.
- However, 9% of the patients required admission to the Intensive Care Unit (ICU). Mortality was recorded at 3%, underscoring the potential severity and life-threatening nature of dengue fever.



Table 7: Mortality in patients with normal platelets count (N=1000)

Hospital Outcome	Thrombocytopenia Present (n=720)		Thrombocytopenia Absent (n=280)		p-value
	n	%	N	%	
Recovery	720	100%	250	89.29	<0.001
Mortality	0	0%	30	10.71	

In the group among patients with thrombocytopenia, all patients (100%, n=720) recovered. Interestingly, in the non-thrombocytopenia group, 10.71% (n=30) mortality cases was found. The statistical analysis revealed a significant association between thrombocytopenia and hospital outcomes, with a p-value of <0.001.



Table 8: Dengue severity risk factors(N=1000)

Dengue Severity risk factors	Thrombocytopenia Present (n=720)		Thrombocytopenia Absent (n=280)		p-value
	N	%	n	%	
Plasma Leakage	570	79.17%	180	64.29%	0.216
Shock	30	4.17%	40	14.29%	0.095
Bleeding Manifestation	70	9.72%	30	10.71%	0.684
Vomiting	250	34.72%	170	60.71%	0.034
Cough	40	5.56%	20	7.14%	0.821

Among patients with thrombocytopenia, 79.17% (n=570) exhibited plasma leakage, compared to 64.29% (n=180) in patients without thrombocytopenia, although this difference was not statistically significant (p=0.216). Shock was present in 4.17% (n=30) of patients with thrombocytopenia and in 14.29% (n=40) of those without, with a p-value of 0.095. Bleeding manifestations were observed in 9.72% (n=70) of thrombocytopenic patients and 10.71% (n=30) of non-thrombocytopenic patients (p=0.684). Notably, vomiting was significantly more common in patients without thrombocytopenia (60.71%, n=170) compared to those with thrombocytopenia (34.72%, n=250), with a p-value of 0.034. Cough was reported in 5.56% (n=40) of thrombocytopenic patients and 7.14% (n=20) of non-thrombocytopenic patients (p=0.821).



OBSERVATIONS

- The presence of mortality in patients with normal platelets count in our study refute the conventional perception of thrombocytopenia as a marker of severity in dengue fever. This finding suggests the need for a more nuanced understanding of thrombocytopenia's role in dengue prognosis.
- The majority of our patients not having comorbidities (82%) aligns with the demographic profile of dengue affecting younger, otherwise healthy individuals. However, the presence of comorbid conditions like diabetes and hypertension in a minority of patients is a crucial consideration for clinical management, as comorbidities can complicate the disease course.
- The predominant use of 0.9% NaCl fluid replacement in our study reflects the standard practice in dengue management, focusing on fluid balance to prevent shock and other complications . The absence of platelet and blood transfusions is in line with current recommendations that advocate for conservative management of thrombocytopenia in dengue patients.



OBSERVATIONS

- Plasma leakage, a critical indicator of severe dengue, was observed in 79.17% of patients with thrombocytopenia and 64.29% of those without, a difference that was not statistically significant ($p=0.216$).
- The presence of shock, a severe complication, was actually less frequent in patients with thrombocytopenia (4.17%) compared to those without it (14.29%), although this was not statistically significant ($p=0.095$).
- Interestingly, bleeding manifestations, another severe dengue indicator, were almost equally present in both groups ($p=0.684$).
- These findings indicate that while thrombocytopenia is a common feature in dengue patients, its presence alone may not be a definitive indicator of disease severity, as traditionally perceived.



LIMITATIONS

- The study was conducted in a single hospital and only in female patients. So, the results may not represent the whole community.
- Data predominantly from urban population.



CONCLUSION

- The study findings offer a comprehensive understanding of dengue fever in an urban population, with a particular focus on the role of thrombocytopenia.
- Our data revealed that high recovery rate in dengue patients with thrombocytopenia compared to 10.71% mortality rate in patients with normal platelets count.
- The study highlighted that thrombocytopenia does not necessarily correlate with other severe clinical manifestations such as plasma leakage and shock.
- The study emphasize the need for a nuanced approach to managing dengue fever, considering multiple factors of severity in dengue patients not only thrombocytopenia.



ACKNOWLEDGEMENT

Prof. Dr.Md. Asadul Kabir ,Professor of Medicine, Department of Medicine, Dhaka Medical College Hospital.

Dr. Md. Abdullahel Kafee , Associate Professor, Department of Medicine, Kurmitola General Hospital.

Dr. Mahmudul Hossain, Assistant Professor of Endocrinology, Kurmitola General Hospital.

Dr. Bikash Chandra Mandal, Medical officer, National Institute of Diseases of Chest & Hospital.

Dr Mounis Arju Rahman Allo, Indoor medical officer, Department of medicine, Kurmitola General Hospital.

Dr. Uma Dhar, Junior Consultant (Medicine), OSD, DGHS.



