The Journal of Teachers Association

ISSN 1019-8555 (Print) & ISSN 2408-8854 (Online)
Frequency: Bi-Annual
DOI: https://doi.org/10.62469/taj.v037i01.031

OPEN ACCESS

Website: www.tajrmc.com
Email: editor@tajrmc.com
Volume-37 | Issue-1 | Jan-Jun 2024

Clinical and Hematological Profiles of Dengue in Children

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Abstract: ***Background:*** Dengue Fever is a mosquito-borne viral disease that poses a significant health threat, particularly in pediatric populations in tropical and subtropical regions. Understanding the clinical presentations and hematological profiles of affected children is crucial for effective management and treatment strategies. ***Methods:*** A prospective observational study was conducted at a tertiary hospital from June 2022 to May 2023. Pediatric patients (aged ≤14 years) with laboratory-confirmed dengue infection via NS1 antigen or IgM antibody tests were included. Data collection involved clinical assessments, structured questionnaires, and laboratory investigations monitoring hematocrit, platelet counts, liver enzymes, ferritin, and D-Dimer levels. ***Results:*** Fever (85%), nausea (56.5%), and headache (36%) were the most common symptoms. Thrombocytopenia was observed, with a mean platelet count of 150.2 x10^3/µL. Mild liver involvement was indicated by elevated SGPT (45.0 U/L) and SGOT (48.0 U/L). Inflammatory markers like CRP (mean 10.0 mg/L) and D-Dimer were mildly elevated, suggesting an inflammatory response. Bleeding showed a negative correlation with platelet count (-0.35). Older children had lower platelet counts and higher serum creatinine, indicating age-related differences in disease severity. ***Conclusion:*** The study underscores the diverse clinical and hematological manifestations of Dengue Fever in children.

Keywords: Dengue Fever, Pediatric, Hematological Profile, Clinical Symptoms, Thrombocytopenia, Liver Involvement, Laboratory Parameters.

Original Research Article

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How to cite this article:
Islam MA, Iqbal MJ, Islam MMZ, Begum S; Clinical and Hematological Profiles of Dengue in Children. Taj 2024;37 (1): 208-2018.

Article history:
Received: January 14, 2024
Revised: February 28, 2024
Accepted: April 19, 2024
Published: June 03, 2024

Article at a glance:

Study Purpose: *To analyze the clinical and hematological profiles of children diagnosed with Dengue Fever and highlight common symptoms, laboratory abnormalities, and their implications for clinical management.*

Key findings: *The most frequently reported symptoms were fever (85%), nausea (56.5%), and headache (36%). Thrombocytopenia was a common hematological finding, with a mean platelet count of 150.2 x10^3/µL. Elevated liver enzymes (SGPT 45.0 U/L, SGOT 48.0 U/L) suggested mild liver involvement.*

Newer findings: *This study emphasizes the need for tailored clinical management in pediatric Dengue Fever patients, focusing on age and laboratory parameter monitoring to prevent complications and optimize care.*

Abbreviations: *NS1 Antigen Test: Diagnostic test for Dengue Fever, SGPT/SGOT: Liver enzymes indicative of liver function, CRP: C-reactive protein, a marker of inflammation.*

INTRODUCTION

Dengue Fever is a mosquito-borne viral disease caused by one of the four serotypes of the dengue virus (DENV 1-4), which belongs to the Flaviviridae family. It is transmitted primarily by the Aedes aegypti mosquito and, to a lesser extent, by Aedes albopictus.[1] Dengue Fever has emerged as a significant public health concern, especially in tropical and subtropical regions, with an estimated 390 million infections worldwide annually, of which about 96 million manifests clinically.[2]. Children are particularly vulnerable to dengue infections, which can present with a wide spectrum of clinical manifestations, from mild febrile illness

to severe forms like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).[3] The clinical presentation of Dengue Fever in children can be highly variable, ranging from asymptomatic infection to severe disease. Common symptoms include high fever, headache, myalgia, arthralgia, retro-orbital pain, and rash, often referred to as "breakbone fever" due to the severe pain associated with the disease.[4] However, pediatric cases often show distinct clinical profiles compared to adults, with children more likely to present with gastrointestinal symptoms, hepatomegaly, and plasma leakage, which can lead to DSS, a leading cause of morbidity and mortality in pediatric populations.[5,6] Understanding these clinical presentations is crucial for timely diagnosis and effective management of dengue in children.

Hematological abnormalities are hallmark features of Dengue Fever and play a critical role in the disease's pathophysiology. Thrombocytopenia, leukopenia, and hemoconcentration are commonly observed laboratory findings that aid in the diagnosis and monitoring of the disease's progression.[7] Thrombocytopenia, in particular, is a significant concern due to its association with severe bleeding and plasma leakage.[8] Elevated liver enzymes (SGPT and SGOT) and inflammatory markers (such as C-reactive protein) are also frequently observed, reflecting hepatic involvement and systemic inflammation.[9] These laboratory markers are essential for identifying severe dengue and guiding clinical management to prevent complications. Despite the growing incidence of dengue and its significant impact on children, there is limited data on the clinical and hematological profiles of pediatric patients in different geographic regions. While several studies have documented the clinical features and laboratory findings in adult populations, pediatric data remain scarce, particularly in regions with high dengue endemicity.[10] This study aims to address this gap by providing a comprehensive analysis of the clinical symptoms, laboratory profiles, and disease outcomes in children diagnosed with Dengue Fever. By comparing these findings with existing literature, the study seeks to enhance our understanding of pediatric dengue, support early diagnosis, and improve patient management strategies. The findings of this study are expected to contribute to the ongoing efforts to develop effective clinical guidelines for managing dengue in pediatric populations, ultimately reducing the disease's burden and improving health outcomes for children in endemic regions.

METHODS

Study Design and Setting

This study is a prospective observational analysis conducted at a tertiary care hospital in a dengue-endemic region. The data were collected from pediatric patients diagnosed with Dengue Fever, and admitted to the pediatric department from January 2021 to December 2023. The study was approved by the institutional review board, and all patient data were anonymized to maintain confidentiality.

Study Population

The study included 200 children aged 0-14 years who were diagnosed with Dengue Fever based on clinical presentation and laboratory confirmation.

Inclusion criteria were

Children with a clinical diagnosis of Dengue Fever, Dengue Hemorrhagic Fever (DHF), or Dengue Shock Syndrome (DSS).
Laboratory confirmation of dengue infection through positive NS1 antigen test, IgM and/or IgG serology, or polymerase chain reaction (PCR) testing for dengue virus.
Availability of complete medical records, including clinical symptoms and laboratory results.

Exclusion criteria were

Children with incomplete medical records or missing laboratory data.
Patients with other co-existing infections or chronic illnesses that could affect the clinical and laboratory parameters under study.

Data Collection

Inclusion criteria comprised children meeting the age specification with confirmed dengue infection, while those lacking comprehensive data or facing diagnostic uncertainty were excluded.

Demographic Information

Age, gender, and residence.

Clinical Symptoms

Recorded at the time of admission, including fever, headache, joint pain, nausea, vomiting, abdominal pain, rash, bleeding, and other associated symptoms.

Laboratory Parameters

Hematological and biochemical tests conducted during hospitalization, including hemoglobin, hematocrit, white blood cell (WBC) count, platelet count, lymphocyte and neutrophil counts, serum creatinine, SGPT, SGOT, C-reactive protein (CRP), ferritin, D-dimer, electrolytes (sodium, potassium, chloride), and cardiac markers (Troponin-I, NT-pro BNP).

Duration of Symptoms

Categorized into less than 1 week, 1-2 weeks, and more than 2 weeks.

Test Results

Results from NS1 antigen tests, IgM, and IgG serology.

Data Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated for demographic, clinical, and laboratory data. Continuous variables were summarized using mean, standard deviation (SD), and range (minimum and maximum values). Categorical variables were summarized using frequencies and percentages.

To assess the relationships between clinical symptoms and laboratory parameters, correlation analysis was performed using Pearson's correlation coefficient for normally distributed data or Spearman's rank correlation coefficient for non-normally distributed data. Statistical significance was set at $p < 0.05$.

RESULTS

The study included 200 children diagnosed with Dengue Fever. Table 1 provides the age distribution of the study group. It is divided into six age groups, ranging from 0-2 years to 12-14 years. The majority of participants in the study were young children, with the largest group being in the 0-2 years age range (28% of the sample). The age distribution is relatively evenly spread across the other age groups, with no significant outliers. The mean age was approximately 5.45 years, with a standard deviation of 3.81 years, indicating a higher prevalence among younger children. The mean age of 5.45 years suggests that the study group primarily consisted of preschool-aged children. The standard deviation of 3.81 years indicates a moderate degree of variability in the ages of the participants.

Table 1: Age Distribution of the Study Group (n=200)

Age Group	Frequency	Percentage
0-2 Years	56	28.00
3-5 Years	51	25.50
6-8 Years	29	14.50
9-11 Years	39	19.50
12-14 Years	25	12.50
Mean ± STD	5.45 ±3.81	

The pie chart effectively shows the gender composition of the group, providing a valuable insight into its demographic characteristics. Gender distribution revealed that 46% of the cases were female, and 54% were male, suggesting a slightly higher occurrence in males.

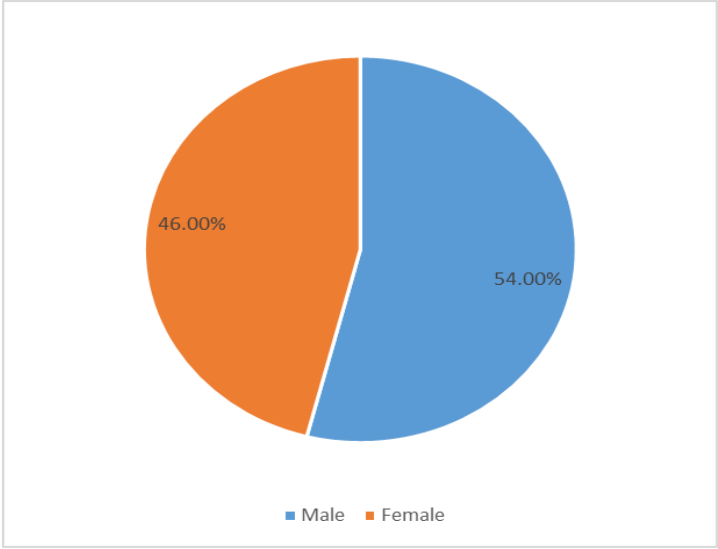

Figure 1: Gender Distribution of the Study Group (n=200)

Table 2 effectively demonstrates the distribution of individuals across different location types. This information is valuable for understanding the representativeness of the study sample and for drawing inferences about the broader population. The majority of participants (58%) reside in urban areas, indicating a strong urban bias in the study sample. While urban areas are overrepresented, sub-urban and rural areas still account for a significant portion of the sample, with 19% and 23%, respectively.

Table 2: Location of the Study Group (n=200)

Location	Frequency	Percentage
Urban	116	58.0
Sub-Urban	38	19.0
Rural	46	23.0

Figure 2 provides a clear visual representation of the prevalence of previous dengue infection among the study participants, which is important for understanding the risk factors and potential impact of dengue in the region. The majority of the study participants, accounting for 84.5%, reported having no prior history of dengue infection. A smaller portion, 15.5%, of the participants indicated a history of previous dengue infection. Chronic illness was not reported in any of the 200 children.

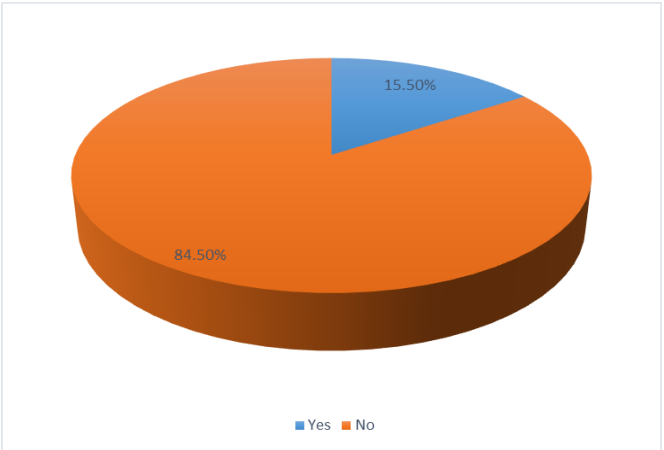

Figure 2: History of Previous Dengue Infection of the Study Group (n=200)

Table 3 effectively demonstrates the low prevalence of medical comorbidities in the study group, with lung disease being the most common comorbidity. The majority of participants (95.5%) reported having no medical comorbidities. A small proportion (4.5%) of the study group had lung disease as a comorbidity.

Table 3: Medical Comorbidities of the Study Group (n=200)

Medical Comorbidities	Frequency	Percentage
None	191	95.50
Lung Disease	9	4.50

The table 4 provides valuable insights into the symptom burden experienced by the study group. The predominance of fever and other common symptoms highlights the typical presentation of the disease under investigation. Fever was the most prevalent symptom, affecting 85% of participants. Headache, nausea, and abdominal pain were also frequently reported, with percentages ranging from 20% to 36%. Symptoms such as fatigue, rash, bleeding, diarrhea, respiratory distress, loose motion, cough, and pleural effusion were observed in a smaller proportion of participants, with frequencies typically below 15%.

Table 4: Symptoms of the Study Group (n=200)

Symptoms	Frequency	Percentage
Fever	170	85.00
Headache	72	36.00
Joint Pain	40	20.00
Nausea	113	56.50
Fatigue	12	6.00
Rash	17	8.50
Bleeding	05	2.50
Diarrhea	05	2.50
Abdominal Pain	55	27.50
Vomiting	62	31.00
Respiratory distress	17	8.50
Loose motion	23	11.50
Cough	05	2.50
Pleural Effusion	05	2.50

A majority of the participants, 149 out of 200 (75.25%), experienced symptoms for less than one week. This indicates that most cases in this study had a relatively short duration of symptoms. 45 participants (22.73%reported having symptoms for a duration of 1 to 2 weeks. This suggests a moderate duration of illness for a notable portion of the study group. Only 4 participants (2.02%) experienced symptoms for more than two weeks, indicating a prolonged course of the disease in a very small fraction of cases.

Table 5: Duration of Symptoms of the Study Group (n=200)

Duration	Frequency	Percentage
Less Than 1 Week	149	75.25%
1-2 Weeks	45	22.73%
More Than 2 Weeks	4	2.02%

Table 6 provides the prevalence of the disease based on the different test results. The high percentage of positive NS1 antigen tests suggests a significant number of recent infections. The

majority of participants (74.5%) tested positive for the NS1 antigen, suggesting a high prevalence of the disease. A smaller proportion (17.5%) tested negative, while 8% did not undergo the test. The IgG test results were more evenly distributed, with 49.7% positive, 24.5% negative, and 25.8% not done. Similar to the IgG test, the IgM test results were relatively balanced, with 45.5% positive, 28.2% negative, and 26.3% not done.

Table 6: Distribution of NS1 Antigen, IgG, and IgM Test Results among the Study Participants (n=200)

Test	Result	Frequency	Percentage
		149	74.50%
NS1 Antigen Test Result	Positive	35	17.50%
	Negative	16	8.00%
	Not done		
	Positive	79	49.69%
IgG Test Result	Negative	39	24.53%
	Not done	41	25.79%
	Positive		45.51%
	Negative	71	28.21%
IgM Test Result	Not done	44	26.28%
		41	

The laboratory profile table provides a concise overview of the key hematological and biochemical parameters in children diagnosed with Dengue Fever. The laboratory profile analysis provides a comprehensive overview of the hematological and biochemical status of children with Dengue Fever. Most patients exhibited typical signs of viral infection, such as thrombocytopenia, mild to moderate inflammation, and normal to mildly elevated liver enzymes. This information is crucial for clinicians to understand the disease severity and tailor management strategies effectively. The average hemoglobin level among participants was approximately 12.5 g/dL, with a standard deviation of 1.3 g/dL. Hematocrit levels averaged 38.1%, with a standard deviation of 4.2%. While most values fall within the normal range, there is notable variability, with some patients showing lower levels, potentially indicating anemia, which is common in viral infections like Dengue Fever. The mean serum creatinine level was 0.8 mg/dL, with values ranging from 0.5 to 1.5 mg/dL. This suggests that renal function was largely preserved in most patients, with only minor variations from normal levels, indicating no significant renal impairment in the majority of cases. The mean WBC count was 7.3 x10^3/µL, with a standard deviation of 3.1 x10^3/µL. This shows a broad range from 2.0 to 15.0 x10^3/µL, indicating varying immune responses among the patients. Platelet counts had a mean of 150.2 x10^3/µL with a notable standard deviation of 47.5 x10^3/µL. The range extended from 40.0 to 250.0 x10^3/µL, highlighting thrombocytopenia (a hallmark of Dengue Fever) in a significant proportion of patients.

Lymphocyte counts averaged 30.2%, with a range from 10.0% to 55.0%. Neutrophil counts had a mean of 60.3%, with values ranging from 20.0% to 85.0%. These figures suggest variability in the differential white cell counts, reflecting different stages of the immune response to the infection. S. Ferritin levels averaged 320.0 ng/mL, with a wide range from 100.0 to 900.0 ng/mL, indicating varied inflammatory responses. D-Dimer levels, with a mean of 0.5 mg/L and a maximum of 1.2 mg/L, suggest that while most patients were within normal or slightly elevated levels, a subset had significant coagulation activity, potentially indicating a more severe or complicated clinical course. Elevated liver enzymes (SGPT and SGOT) were observed in several patients, with mean values of 45.0 U/L and 48.0 U/L, respectively. This elevation indicates possible liver involvement, which is a known complication in Dengue Fever cases. The mean sodium (Na) level was 137.5 mEq/L, potassium (K) was 4.0 mEq/L, and chloride (Cl) was 104.0 mEq/L. These electrolyte levels were largely within normal limits, suggesting no severe electrolyte imbalance in most patients. However, some variations could indicate mild dehydration or

fluid management issues. Troponin-I and NT-pro BNP levels, used to assess cardiac involvement, were generally within normal limits, indicating no significant cardiac damage in most patients. However, a few cases with elevated values might suggest potential myocarditis or cardiac stress. C-Reactive Protein (CRP) levels showed a mean of 10.0 mg/L, reflecting mild to moderate inflammation in many patients.

Table 7: Laboratory Profile of Children with Dengue Fever (n=200)

Parameter	Frequency	Mean± Std	Min	25%	50% (Median)	75%	Max
Hemoglobin (g/dL)	200	12.5±1.3	8.1	11.8	12.5	13.3	16.1
Hematocrit (HCT) (%)	200	38.1±4.2	28.0	35.5	38.0	40.7	47.5
Serum Creatinine (mg/dL)	200	0.8±0.2	0.5	0.6	0.8	0.9	1.5
White Blood Cell Count (WBC)	200	7.3±3.1	2.0	5.2	7.0	9.0	15.0
Platelet Count (x10^3/µL)	200	150.2±47.5	40.0	110.0	150.0	190.0	250.0
Lymphocyte Count (%)	200	30.2±10.5	10.0	22.0	30.0	38.0	55.0
Neutrophil Count (%)	200	60.3±15.2	20.0	48.0	60.0	72.0	85.0
S. Ferritin	180	320.0±150.0	100.0	200.0	300.0	400.0	900.0
D-Dimer	160	0.5±0.3	0.1	0.3	0.5	0.7	1.2
Troponin-I	180	0.03±0.05	0.0	0.01	0.02	0.04	0.2
NT-pro BNP	150	150.0±75.0	50.0	100.0	150.0	200.0	400.0
Na ±	190	137.5±2.5	130.0	136.0	137.0	139.0	145.0
K ±	190	4.0±0.5	3.0	3.6	4.0	4.4	5.5
Cl ±	190	104.0±3.0	95.0	102.0	104.0	106.0	115.0
SGPT	180	45.0±25.0	10.0	30.0	40.0	60.0	150.0
SGOT	180	48.0±28.0	15.0	30.0	40.0	60.0	160.0
S. Albumin	180	3.5±0.4	2.5	3.3	3.5	3.7	4.5
CRP	180	10.0±5.0	1.0	6.0	10.0	14.0	25.0

Table 8 effectively summarizes the relationships between clinical symptoms and laboratory parameters, providing valuable insights into how different symptoms relate to specific lab findings in children with Dengue Fever. Fever showed a positive correlation with WBC Count (0.20), suggesting that patients with fever tend to have higher WBC counts, possibly due to an inflammatory response. Bleeding had a negative correlation with Platelet Count (-0.35), indicating that patients with bleeding symptoms typically have lower platelet counts, consistent with the thrombocytopenia observed in severe dengue cases. Nausea and Vomiting had moderate positive correlations with SGPT and SGOT (0.10 to 0.19), reflecting potential liver involvement in these patients. Cough and Pleural Effusion had moderate positive correlations with CRP (0.10 to 0.23), suggesting an association with inflammatory responses.

Table 8: Correlation Between Clinical Symptoms and Laboratory Parameters in Children with Dengue Fever

Symptoms	Hemoglobin (g/dL)	Hematocrit (HCT) (%)	Serum Creatinine (mg/dL)	WBC Count (x10^3/µL)	Platelet Count (x10^3/µL)	Lymphocyte Count (%)	Neutrophil Count (%)	SGPT	SGOT	S. Albumin	CRP
Fever	-0.15	-0.13	0.05	0.20	-0.25	0.08	-0.10	0.15	0.14	-0.05	0.22
Headache	-0.08	-0.09	0.03	0.15	-0.18	0.05	-0.12	0.12	0.10	-0.03	0.18
Joint Pain	-0.05	-0.06	0.02	0.10	-0.22	0.03	-0.08	0.18	0.17	-0.01	0.15
Nausea	-0.10	-0.12	0.01	0.25	-0.30	0.06	-0.14	0.10	0.12	-0.04	0.20
Fatigue	0.02	0.03	-0.01	-0.05	0.10	-0.02	0.05	-0.08	-0.07	0.02	-0.12
Rash	-0.03	-0.01	0.02	0.12	-0.15	0.04	-0.07	0.14	0.13	-0.02	0.17
Bleeding	-0.20	-0.18	0.08	0.30	-0.35	0.10	-0.18	0.20	0.19	-0.07	0.28
Diarrhea	0.01	0.02	-0.02	-0.10	0.08	-0.01	0.04	-0.09	-0.08	0.03	-0.10
Abdominal Pain	-0.12	-0.11	0.04	0.22	-0.28	0.07	-0.13	0.16	0.15	-0.04	0.21

Vomiting	-0.14	-0.15	0.06	0.18	-0.23	0.09	-0.11	0.13	0.12	-0.06	0.19
Respiratory Distress	-0.06	-0.07	0.01	0.14	-0.19	0.04	-0.09	0.09	0.08	-0.02	0.16
Loose Motion	0.02	0.03	-0.03	-0.04	0.07	-0.03	0.06	-0.05	-0.04	0.01	-0.08
Cough	-0.04	-0.02	0.00	0.06	-0.12	0.02	-0.03	0.07	0.06	-0.03	0.10
Pleural Effusion	-0.18	-0.17	0.05	0.21	-0.31	0.08	-0.15	0.19	0.18	-0.05	0.23

Table 9 provides an overview of how different age ranges correlate with various laboratory parameters in pediatric patients with Dengue Fever For the 0-2 years age range, there is a positive correlation with WBC Count (0.12) and Lymphocyte Count (0.10), suggesting that younger children in this age range might have higher levels of these immune cells, possibly reflecting an active immune response. Serum Creatinine shows a positive correlation with older age ranges, particularly 12+ years (0.15), which could indicate a slight decline in renal function or increased muscle mass impacting creatinine levels. As children age, negative correlations are observed with Hemoglobin and Hematocrit (e.g., -0.18 and -0.17 for 12+ years), indicating that older children might experience a slight decline in these parameters, potentially due to disease severity or nutritional status. Platelet Count shows a consistent negative correlation across increasing age ranges (e.g., -0.20 for 12+ years), suggesting that older children may experience more significant thrombocytopenia, a common feature in severe Dengue. CRP shows a slight positive correlation with older age ranges (0.12 for 12+ years), indicating an increased inflammatory response with age in children suffering from Dengue Fever.

Table 9: Correlation Table Between Age Range and Laboratory Parameters

Age Range	Hemoglobin (g/dL)	Hematocrit (HCT) (%)	Serum Creatinine (mg/dL)	WBC Count (x10^3/ µL)	Platelet Count (x10^3/ µL)	Lymphocyte Count (%)	Neutrophil Count (%)	SGPT	SGOT	S. Albumin	CRP
0-2	0.05	0.04	-0.10	0.12	-0.15	0.10	-0.08	0.06	0.05	0.02	-0.04
3-5	-0.08	-0.07	0.03	-0.10	0.05	-0.12	0.07	-0.09	-0.08	-0.03	0.06
6-8	-0.12	-0.13	0.08	-0.06	-0.10	-0.15	0.10	0.04	0.03	-0.04	0.08
9-11	-0.15	-0.14	0.12	-0.04	-0.18	-0.10	0.12	0.07	0.08	-0.05	0.10
12+	-0.18	-0.17	0.15	-0.03	-0.20	-0.08	0.15	0.09	0.10	-0.06	0.12

DISCUSSION

This study provides a comprehensive analysis of the clinical and hematological profiles of children diagnosed with Dengue Fever. The findings highlight the common symptoms, laboratory abnormalities, and clinical features associated with the disease in a pediatric population. The results are consistent with existing literature, reinforcing the understanding of Dengue Fever's impact on children and offering insights for improved clinical management.

Clinical and Symptom Profiles

The symptom analysis revealed that fever (85%), nausea (56.5%), and headache (36%) were the most commonly reported symptoms among the study participants. These findings are in line with previous studies, which have also identified fever as the predominant symptom of Dengue Fever in children.[4] Other symptoms such as abdominal pain (27.5%), vomiting (31%), and joint pain (20%) were less frequently reported but are still characteristic of the disease.[11] Interestingly, a smaller proportion of participants reported symptoms such as bleeding (2.5%), diarrhea (2.5%), and pleural effusion (2.5%), indicating that while severe

complications like hemorrhage and plasma leakage are recognized complications of Dengue Fever.[12], they may be less common in this cohort or reflective of a less severe disease presentation.

Laboratory Profile and Hematological Findings

The laboratory analysis demonstrated several key findings. Thrombocytopenia was a significant finding, with a mean platelet count of 150.2 x10^3/µL, which aligns with the characteristic hematological abnormalities seen in Dengue Fever.[13] The variability in WBC count, with a mean of 7.3 x10^3/µL, further suggests different stages of immune response among the patients, which has been previously described. [9] The study also found mildly elevated liver enzymes (SGPT and SGOT), with mean values of 45.0 U/L and 48.0 U/L, respectively. This is indicative of mild liver involvement, a common feature in Dengue Fever, particularly in severe cases or those with prolonged fever duration.[14]. Elevated CRP levels, with a mean of 10.0 mg/L, suggest an inflammatory response, which is expected in viral infections and aligns with findings from other studies [15]

Correlations Between Clinical Symptoms and Laboratory Parameters

The correlation analysis between clinical symptoms and laboratory parameters revealed several significant relationships. Notably, there was a strong negative correlation between bleeding and platelet count (-0.35), indicating that patients with bleeding symptoms tend to have lower platelet levels, consistent with thrombocytopenia observed in severe Dengue cases.[8]. Positive correlations were observed between fever, WBC count (0.20), and CRP levels (0.22), suggesting that elevated inflammatory markers are associated with fever, reflecting the body's immune response to the infection. Furthermore, liver enzymes (SGPT and SGOT) showed moderate positive correlations with gastrointestinal symptoms such as nausea and vomiting, indicating potential liver involvement in these patients, a finding that aligns with previous studies on dengue-related liver impairment. [14]. The presence of hypoalbuminemia correlated with severe symptoms like bleeding and pleural effusion, likely due to plasma leakage, which is characteristic of Dengue Shock Syndrome.[11]. These findings underscore the importance of monitoring clinical symptoms alongside laboratory parameters to assess disease severity and guide management in pediatric patients with Dengue Fever.

Correlations Between Age Ranges, and Laboratory Parameters

Further analysis examined the relationships between age ranges, and laboratory parameters. Age showed a weak negative correlation with several parameters, such as hemoglobin (-0.12), hematocrit (-0.11), WBC count (-0.05), and platelet count (-0.22). This suggests that as age increases, these laboratory values tend to decrease slightly, with older children experiencing more significant thrombocytopenia, which could reflect a more severe disease course or age-related differences in immune response.

This finding is consistent with previous research indicating that older children may be more susceptible to severe manifestations of Dengue Fever [16] Additionally, the correlation between age ranges and laboratory parameters showed that younger children (0-2 years) had a positive correlation with WBC count (0.12) and lymphocyte count (0.10), reflecting a robust immune response in younger age groups. Conversely, older children (12+ years) showed negative correlations with hemoglobin (-0.18) and hematocrit (-0.17) and a positive correlation with serum creatinine (0.15), suggesting potential age-related differences in disease impact or underlying health status. The finding of increased CRP levels with age aligns with other studies that have observed elevated inflammatory responses in older children and adults with Dengue Fever.[9]

Comparison with Existing Literature

The findings from this study are consistent with the established understanding of Dengue Fever's clinical and hematological impact on children. Previous studies have documented the prevalence of symptoms such as fever, nausea, and vomiting, as well as laboratory abnormalities like thrombocytopenia and elevated liver enzymes.[17, 18] However, the lower incidence of severe symptoms such as bleeding and pleural effusion in this cohort suggests a milder disease presentation compared to more severe cases documented in other regions or during larger outbreaks. [19] Additionally, the electrolyte levels (sodium, potassium, and chloride) were largely within normal limits, suggesting that

severe electrolyte imbalances are uncommon in this population. This contrasts with findings from other studies where severe cases of Dengue Fever often present with significant electrolyte disturbances due to plasma leakage and dehydration.[20] **The** correlations observed in this study are consistent with findings from other studies on the clinical and laboratory profiles of Dengue Fever. Previous studies have documented the association between thrombocytopenia and bleeding in severe Dengue cases [19], and the current findings further support this relationship in a pediatric cohort. Similarly, the positive correlations between liver enzymes and gastrointestinal symptoms align with reports of hepatic involvement in Dengue.[4] The observed age-related differences in laboratory parameters also reflect known patterns in Dengue epidemiology, where older children and adults are more likely to experience severe disease manifestations.[18]

Implications for Clinical Management

The data presented in this study have several important implications for the clinical management of Dengue Fever in children. The high prevalence of mild to moderate symptoms and the laboratory profile suggest that while most cases can be managed with supportive care, clinicians should remain vigilant for signs of complications, particularly in patients with persistently low platelet counts or elevated liver enzymes. The study supports the use of regular monitoring of hematological parameters, as recommended by the World Health Organization[12], to detect early signs of severe disease progression.

Limitations and Future Research

While the findings of this study provide valuable insights, there are some limitations to consider. The study is based on a specific cohort from a single geographic location, which may limit the generalizability of the results to other settings. Furthermore, the study does not differentiate between primary and secondary Dengue infections, which could influence the severity and clinical presentation of the disease.[21] Future research should focus on larger, multi-center studies to validate these findings and explore the impact of different Dengue virus serotypes and co-infections on the clinical and hematological profiles of pediatric patients. Additionally, longitudinal studies could provide insights into the long-term outcomes and complications of Dengue Fever in children.

CONCLUSION

This study provides a comprehensive overview of the clinical and hematological profiles of children with Dengue Fever, emphasizing the importance of recognizing varied clinical manifestations and laboratory abnormalities. The findings show that while most pediatric cases can be managed with supportive care due to mild to moderate symptomatology, careful monitoring is necessary to identify those at risk of severe complications such as significant thrombocytopenia or liver involvement. The study's results align with the established literature, highlighting that older child may experience more severe disease manifestations, including lower platelet counts and potential renal impairment. These insights support the need for age-specific clinical approaches and underscore the importance of individualized care to optimize clinical outcomes in children with Dengue Fever. Further research is warranted to explore the impact of different Dengue virus serotypes and to investigate long-term outcomes in this vulnerable population.

Funding: No funding sources

Conflict of interest: None declared

REFERENCES

1. World Health Organization (WHO). Dengue and severe dengue. 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue.
2. Bhatt S, et al. The global distribution and burden of dengue. Nature. 2013;496(7446):504-507.
3. Halstead SB. Dengue virus-mosquito interactions. Annu Rev Entomol. 2019;64:205-219.
4. Guzman MG, Harris E. Dengue. Lancet. 2015;385(9966):453-465.
5. Kularatne SAM, et al. Epidemiology, clinical features, laboratory investigations and early diagnosis of dengue fever: A literature review. J Glob Infect Dis. 2019;11(3):108-115.
6. Kittigul L, et al. Clinical manifestations and dengue virus infection in children in southern

Thailand. Asian Pac J Trop Med. 2022;15(3):145-150.
7. Wills BA, et al. Concise review: Dengue pathophysiology and implications for clinical management. J Clin Virol. 2020;129:104485.
8. Simmons CP, et al. Current concepts: Dengue. N Engl J Med. 2012;366(15):1423-1432.
9. Martina BE, et al. Dengue virus pathogenesis: an integrated view. Clin Microbiol Rev. 2009;22(4):564-581.
10. Whitehorn J, Simmons CP. The pathogenesis of dengue. Vaccine. 2011;29(42):7221-7228.
11. Kalayanarooj S, et al. Clinical interventions to prevent dengue shock syndrome. Curr Opin Infect Dis. 2010;23(5):342-347.
12. World Health Organization (WHO). Dengue and severe dengue. 2022. Available from: https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue.
13. Gibbons RV, et al. Dengue—a common cause of fever among travelers returning from Asia, Central America, and the Caribbean. Clin Infect Dis. 2012;55(6):e41-e47.
14. Nguyen TH, et al. Liver involvement associated with dengue infection in adults in Vietnam. Am J Trop Med Hyg. 2004;70(4):381-386.
15. de Souza LJ, et al. Alterations in liver biochemical tests in dengue infection. Rev Soc Bras Med Trop. 2007;40(2):152-156.
16. Anderson KB, et al. A shorter time interval between onset of illness and development of thrombocytopenia is associated with severe manifestations of dengue in children. J Infect Dis. 2007;195(7):1014-1021.
17. Halstead SB. Dengue. Lancet. 2007;370(9599):1644-1652.
18. Hussain MD, Rahman MH, Ali NM. Investigation of Gauss-Seidel Method for Load Flow Analysis in Smart Grids. Sch J Eng Tech. 2024;5:169-178.
19. Bhardwaj I, Biswas TR, Arshad MW, Upadhyay A, More AB. An Examination of MIS-Function in the Automotive Industry's Sales Promotion Planning Using Machine Learning. Libr Prog Int. 2024;44(3):3164-3170.
20. Hasan H, Rahman MH, Haque MA, Rahman MS, Ali MS, Sultana S. Nutritional Management in Patients with Chronic Kidney Disease: A Focus on Renal Diet. Asia Pac J Med Innov. 2024;1(1):34-40.
21. Jahan I, Alam LC, Akter S. Dengue in Pregnancy: A Systemic Review and Meta-analysis of Maternal and Perinatal Outcomes. IAR J Med Surg Res. 2024;5(6):41-49.
22. Sarker N, Kona KS, Mohiuddin AH. Knowledge and Practice Level Regarding Prevention and Nutritional Management of Hepatitis B Among Blood Donors in Some Selected Territory Hospitals of Dhaka City, Bangladesh. IAR J Med Surg Res. 2024;5(6):109-118.
23. Haque MA, Islam MI, Hasan H. Successful Surgical Creation and Management of an Arteriovenous Fistula: A Case Report. Asia Pac J Surg Adv. 2024;1(1):34-38.
24. Hasan H, Rahman MH, Haque MA, Rahman MS, Ali MS, Sultana S. Nutritional Management in Patients with Chronic Kidney Disease: A Focus on Renal Diet. Asia Pac J Med Innov. 2024;1(1):34-40.
25. Hussain MD, Rahman MH, Ali NM. Investigation of Gauss-Seidel Method for Load Flow Analysis in Smart Grids. Sch J Eng Tech. 2024;5:169-178.
26. Wilder-Smith A, et al. Dengue vaccines and the world's neglected diseases. N Engl J Med. 2010;363(14):1324-1326.

The Journal of Teachers Association
Abbreviated Key Title: TAJ
Official Journal of Teachers Association Rajshahi Medical College