

# The Alarming Resurgence of Dengue Fever with Unusual Clinical Manifestations and Deadly Consequences of 2023 Outbreak in Bangladesh

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## Abstract:

**Background:** Dengue fever has become a significant concern in Bangladesh in recent years. The country is currently experiencing the most significant and deadliest outbreak in 2023. In this article, we will delve into the current dengue situation in Bangladesh, analyzing its clinical profile and grave consequences.

**Materials and methods:** This multicentric cross-sectional study analyzed 499 confirmed dengue patients admitted between May 1, 2023, and September 30, 2023, in the Department of Medicine, Popular Medical College and Hospital, and Sir Salimullah Medical College and Mitford Hospital, Dhaka. Patients were categorized into dengue Groups A, B, and C. We tabulated and expressed categorical variables (gender, clinical manifestations, comorbidity, radiological and laboratory findings) as frequencies and percentages and explored relationships between demographics, clinical manifestations, and severity. The chi-square test compared proportions, with  $p < 0.05$  considered significant. Duration of illness and hospital stay were analyzed using the Mann-Whitney U test.

**Results:** Among 499 patients, the 21-40 age group with a male predominance was most affected. Predominant symptoms

were fever and gastrointestinal issues. Bleeding, myalgia, and rash were less common. Group C displayed a shift towards Dengue Shock Syndrome (DSS) rather than Dengue Hemorrhagic Fever (DHF), with 125 patients experiencing shock. Group B exhibited significant ultrasonographic findings, such as ascites, hepatomegaly, and splenomegaly, while Group C had more pronounced radiological findings of pleural effusion and pneumonia, predominantly unilateral right-sided pleural effusion. In both Groups B and C, liver transaminases, serum ferritin, and serum lipase were consistently elevated. Tragically, 9 (1.80%) patients, all in Group C, did not survive.

**Conclusions:** In summary, our study on the current dengue outbreak in Bangladesh indicates a worrying shift to severe Dengue Shock Syndrome, more prevalent than hemorrhagic fever. Prominent gastrointestinal symptoms, less bleeding, and higher mortality in Group C emphasize the crisis.

**Key words:** Resurgence of dengue fever, Unusual clinical manifestations, GI predominant symptoms, Right sided pleural effusion, Splenomegaly, Deadliest outcome

(*J Bangladesh Coll Phys Surg* 2023; 41: 12-20)

DOI: <https://doi.org/10.3329/jbcps.v41i40.69677>

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Received: 15 Oct., 2023

Accepted: 19 Oct., 2023

## Introduction:

Dengue fever, caused by the dengue virus (DENV), has seen a staggering 30-fold increase in incidence over the last five decades, becoming a rapidly spreading global health concern<sup>1,2</sup>. This rise in disease burden is accompanied by a surge in atypical manifestations, often overlooked. While the symptomatic course is generally uncomplicated, many cases exhibit uncommon, life-threatening presentations. Amidst this increasing disease burden, clinicians must be acutely aware of these unusual manifestations, enabling early diagnosis and timely intervention. This research delves into the 2023 resurgence of Dengue Fever, exploring bizarre clinical manifestations and deadly outcomes in Bangladesh. Between 1990 and 2019, more than half of the estimated global dengue infections occurred in South Asia, and dengue deaths showed a steep 140% rise from 1990 to 2019<sup>3</sup>. The 2023 outbreak is the deadliest in Bangladesh, with a death rate 0.50%<sup>4</sup>.

In Bangladesh and other Southeast Asian countries, all four DENV serotypes (DENV 1-4) circulate, contributing to the global rise in DENV infections<sup>5</sup>. The WHO Southeast Asia and Western Pacific regions bear nearly 75% of the global disease burden. The emergence of DENV-4 poses a substantial public health threat to Bangladesh, especially regarding secondary infections. The magnitude of dengue infections, estimated at 50 million annually, is alarming, with over 2.5 billion people living in endemic countries<sup>2</sup>.

The current surge in Bangladesh, marked by unusual seasonality and an early sharp increase, deviates from historical trends<sup>6</sup>. The 2022 outbreak peaked in October, a departure from established patterns. This recent study projects year-round dengue transmission in Bangladesh by the end of the century, emphasizing the need for adaptive strategies. Evidence of dengue spreading in non-endemic regions is seen in consecutive outbreaks, with a significant proportion of cases reported outside Dhaka city<sup>3,4</sup>.

As of October 2023, all 64 districts of Bangladesh are affected<sup>7</sup>, with 60.90% of cases reported outside Dhaka city<sup>4</sup>. Globally, each year, up to 400 million people get infected with dengue. Approximately 100 million people get sick from infection, and 40,000 die from severe dengue.<sup>8</sup> Bangladesh has a case fatality rate of 0.50% in 2023 outbreak<sup>4</sup>.

Bangladesh is in the grip of a Dengue nightmare. The WHO expresses deep concern, urging immediate attention to unravel the complexities of the 2023 outbreak in Bangladesh.

### **Materials and methods:**

#### *Ethics statement:*

Informed written consent was taken from patients. They were free to withdraw from the study at any time. It was assured that all information and records would be kept confidential and that the procedures would be helpful for both the physician and the patients to make a rational approach to care management. The privacy of the patients was strictly maintained.

#### *Study setting and design:*

This is a descriptive observational, record-based study done in the Department of Medicine, Popular Medical College and Hospital, and Sir Salimullah Medical College and Mitford Hospital, Dhaka, from May 1, 2023 to

September 30, 2023. Non-purposive sampling was used. A total of 499 adult patients (>18-years-old) were included as per both clinical and laboratory-confirmed cases - either by positive nonstructural protein1 (NS1) antigen or positive anti-dengue immunoglobulin M (IgM) antibody. Dengue with co-morbid conditions that may affect the outcome, such as diabetes mellitus, hypertension, Chronic Kidney Disease (CKD), and Chronic Liver Disease (CLD), were also included. In individuals with CKD and/or CLD, the emergence and subsequent spontaneous resolution of pleural effusion and/or ascites during the course of dengue fever were characterized as manifestations of dengue-induced plasma leakage. Those who had ascites due to CKD and/or CLD were initially assessed and dealt with other parameters. Pregnant patients were excluded from the study.

Data were entered in a standard proforma prepared by literature review and expert opinion. Dengue infection was classified categorized into dengue Groups A, B, and C according to the National Guideline for Clinical Management of Dengue Syndrome – revised edition 2018. A detailed clinical history, physical examination, and baseline investigations were undertaken and followed up till the patient was discharged from the hospital or the death of the patient. All clinical and laboratory details were carefully reviewed with daily assessment during the hospital stay as per the pre-tested questionnaire.

The study includes demographic variables, including age, sex, and clinical diagnosis variables, namely diarrhoea, abdominal pain, vomiting, rash, lethargy, restlessness, giddiness, shock, pleural effusion, pneumonia, ascites, hepatomegaly, splenomegaly, gall bladder edema, and investigational variables mainly complete blood count, AST, ALT, S. lipase, S. ferritin. Out of the above clinical diagnosis, unusual manifestations of dengue, such as right-sided pleural effusion, early presentation of shock, and high case fatality rate, are considered for further study.

#### *Statistical analysis*

Data collected from the dengue patients were analyzed using Microsoft Excel and MedCalc Software Ltd. The patient's data were tabulated according to categorical variables, including sex, clinical manifestations, comorbidity, radiological findings of DF, and diagnostic

and biochemical laboratory findings of DF. Continuous variables such as age, AST, ALT, and lipase were also categorized. Categorical variables were expressed as frequencies and percentages. The chi-square test was performed to compare proportions among different groups. Any variable with  $p < 0.05$  on chi-square analysis was considered statistically significant. This data was used to find the relationship between demography, clinical manifestations, and laboratory parameters with the severity of dengue patients. Continuous data, such as duration of illness until hospitalization and duration of hospital stay, were expressed as median (interquartile range) and were analyzed using the Mann-Whitney U two-tailed test. Odds ratio (OR) with a 95 % confidence interval (CI) was calculated to measure the degree of association of the tourniquet test with bleeding manifestation, and significance was taken at  $P$  value  $< 0.05$ .

### Result:

#### a. Baseline characteristics of the study population:

In this comprehensive multicenter investigation, a total of 499 patients were enrolled over a five-month period spanning from May 1 to September 31, 2023. The patient

distribution revealed that 64 individuals (12.83%) were classified under Group A for Dengue fever, 228 patients (45.69%) in Group B, and 207 (41.48%) in Group C. Demographic analysis indicated that 46% of the patient cohort belonged to the age group 21-40 years, followed by 27% in the 41-60 age bracket, 20% in the >60-year age category, and 7% in the 18-20 age range. Gender distribution reflected 58.32% male patients and 41.68% female patients.

Dengue diagnostic markers were assessed, with 403 patients testing positive for Dengue NS1 antigen and 99 for Dengue IgM antibody. Additionally, three cases exhibited dual positivity for both NS1 antigen and IgM antibody. Past dengue infection, as determined by Dengue IgG serology, was identified in 105 patients. The duration of illness until hospitalization exhibited no significant variation across the groups. However, Group B and Group C patients demonstrated prolonged hospital stays compared to Group A. The median (IQR) duration of hospitalization was 4 (3-5) days for Group B and 6 (4-8) days for Group C, with this disparity proving statistically significant ( $Z$ -score:  $-7.69073$ ,  $p$ -value  $< 0.00001$ ). [Table-01]

**Table-I**

#### *Baseline characteristics and distribution of study population*

Characteristics	Total patients N=499 N (%)	Group distribution of dengue fever		
		Group A (64)	Group B (228)	Group C (207)
		n (%)	n (%)	n (%)
<b>Gender</b>				
Male	291 (58.32)	41 (14.1)	135 (46.39)	115 (39.52)
Female	208 (41.68)	23 (11.6)	93 (44.71)	92 (44.23)
<b>Age</b>				
18-20 years	38 (7%)	6 (9.38%)	16 (7.02%)	16 (7.77%)
21-40 years	226 (46%)	54 (84.37%)	111 (48.68%)	61 (29.47%)
41-60 years	131 (27%)	4 (6.25%)	67 (29.39%)	60 (28.99%)
>60 years	101 (20%)	0	34 (14.91%)	67 (32.38%)
Duration of illness until hospitalization (in days) Median (IQR)	5 (4-7)	5 (4-7)	5 (4-7)	6 (4-8)
Duration of hospital stay (in days) Median (IQR)	4 (4-6)	3 (3-4)	4 (3-5)	6 (4-8)
<b>Laboratory confirmation</b>				
Dengue NS1 antigen positive	403 (80.76%)	15 (23.43%)	188 (82.46%)	164 (79.23%)
<b>Dengue serology</b>				
Dengue IgM antibody Positive	99 (45%)	9 (14.06%)	40 (17.54%)	50 (24.15%)
Dengue IgG antibody Positive	105 (47.73%)	13 (20.31%)	46 (20.18%)	56 (27.05%)

The prevalence of hypertension and diabetes mellitus was notably high across all groups, while chronic kidney disease (CKD) and chronic liver disease (CLD) exhibited a lower prevalence. Group B and Group C patients presented with a higher burden of comorbidities compared to Group A, with the chi-square test revealing a statistically significant difference in proportions among these groups ( $\chi^2 = 15.252$ ,  $df = 1$ ,  $p = 0.0001$ ). [Table-II]

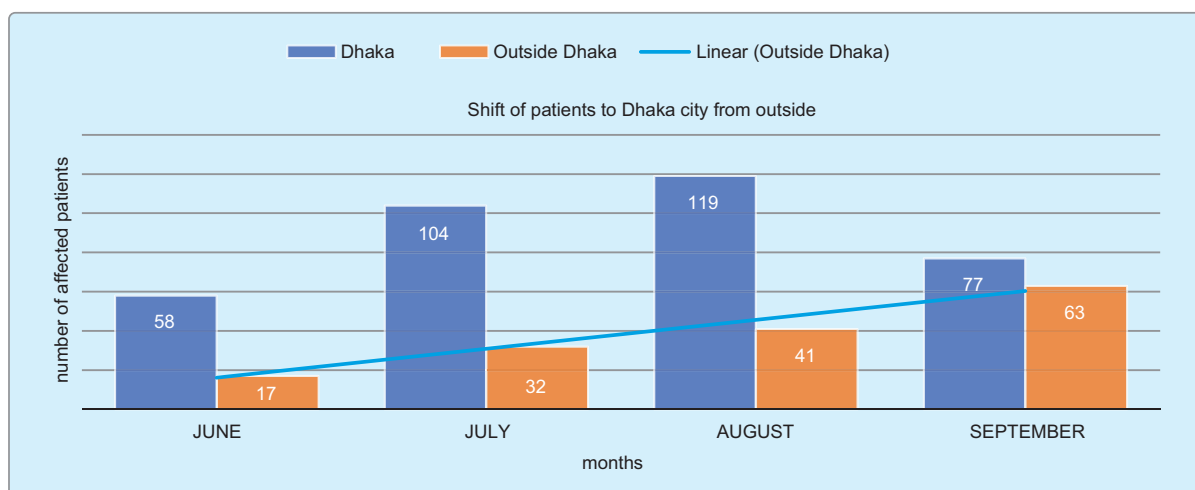
Furthermore, an intriguing migration pattern was observed from June to September 2023, with dengue patients from diverse geographical locations of the country converging toward Dhaka city for treatment purposes. [Figure-01]

b. Presenting complains of the study population:

All 499 patients either exhibited fever or had a documented history of fever, accounting for 100% of the total sample. Apart from fever, the most predominant presentation was GI symptoms in our study in the following order: vomiting ( $n=204$ , 40.88%), abdominal pain ( $n=192$ , 38.48%), and diarrhoea ( $n=184$ , 36.87%). Among the 64 Group A patients, the most striking presenting problem was febrile diarrhea (25%), followed by lethargy (21.88%), rash (17.19%), vomiting (14.06%), abdominal pain (12.5%). In 228 Group B cases, diarrhea and abdominal pain were also the most common complaints among all (35.53% and 35.09%, respectively),

**Table-II**

<i>Comorbidities in study population</i>				
	HTN n(%)	DM n(%)	CKD n(%)	CLD n(%)
Group A	15 (23.43%)	13 (20.31%)	2 (3.12%)	0
Group B	89 (39.03%)	79 (34.65%)	16 (7.02%)	5 (2.19%)
Group C	91 (43.96%)	88 (42.51%)	28 (13.52%)	18 (8.70%)
Total	195 (39.07%)	180 (36.07%)	46 (9.21%)	23 (4.60%)



**Fig.-1:** Shift of dengue patients to hospitalize in the Dhaka city from outside

followed by lethargy (27.19%), vomiting (23.68%), bleeding manifestations (21.93%), rash (15.35%), giddiness (13.60%) and restlessness (19.30%). Out of 207 Group C patients, 125 (60.39%) were admitted with shock on presentation. Along with this, vomiting, lethargy, abdominal pain, restlessness, and diarrhoea were the five other most common presenting complaints (68.12%, 56.04%, 50.24%, 46.48%, and 42.03%, respectively). The rest of the symptoms comprised of bleeding manifestations (35.27%), rash (17.39%), and myalgia (14.25%) [Table-III]. The tourniquet test (TT) as a predictor of bleeding manifestation was analyzed using the odds ratio. Among Group B patients, there was no significant in the odds of bleeding manifestation between the TT positive and negative patients (OR= 1.31, 95% CI [0.65-2.61], p= 0.452). However, for Group C patients, the odds of bleeding manifestation with positive TT have been found to be significant (OR 2.64, 95% CI [1.41-4.94], p= 0.0023).

c. Laboratory tests of the study population:

Hematological parameters exhibited distinct patterns across the studied groups. Low platelet count was more pronounced in groups B and C, with 38.60% of group B and 39.61% of group C displaying a range of 10,000-20,000/iL. Notably, <10,000/iL platelet count was observed in 14.47% of Group B and 30.43% of Group C, whereas only 34.38% of patients in group A experienced platelet counts falling below 20,000/iL.

Concerning total white blood cell (WBC) count, leucopenia was prevalent in 46.86% of group C patients,

contrasted by 24.12% in group B. Leucocytosis was noted in 22.22% of group C and 12.28% of group B. The average hematocrit remained relatively stable at 38.82% across the entire study population. The average hematocrit levels in Groups A, B, and C were respectively 39.99%, 38.88%, and 38.39%, indicating effective fluid management during hospitalization.

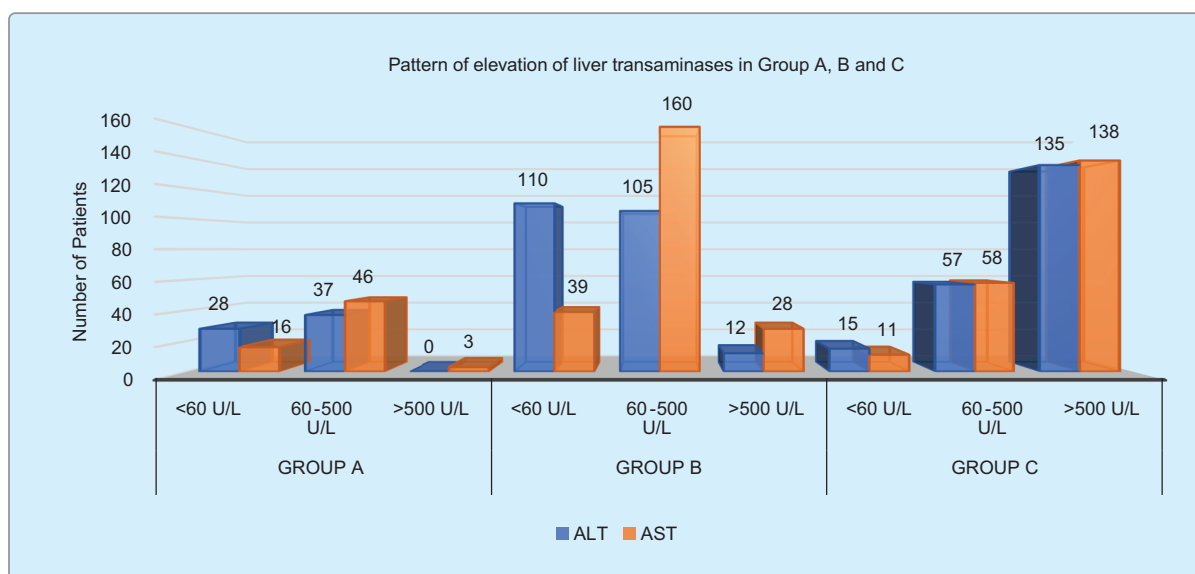
Liver function tests, encompassing aspartate transaminase (AST) and alanine transaminase (ALT), demonstrated consistent elevation in groups B and C. Elevated AST was observed in 94.69% (n=196) of group C and 82.46% (n=188) of group B, while ALT elevation occurred in 51.32% (n=117) of group B and 92.75% (n=192) of group C. Notably, transaminase elevation up to 500 U/L was more prevalent in group B, indicating a proportion difference of 46% (CI 30.49-46.26), with statistical significance ( $\chi^2 = 71.96$ , df=1, p <0.0001). Conversely, transaminase levels exceeding 500 U/L were more frequent in group C, as evidenced by statistically significant differences in ALT proportions ( $\chi^2 = 174.28$ , df= 1, p <0.0001) and AST proportions ( $\chi^2 = 135.85$ , df= 1, p <0.0001) between Group B and Group C. [Figure-02]

For group B and group C, S. lipase was done in 192 patients, who complaints of abdominal pain and 45.31% (n=87) had raised S. lipase level. S. ferritin level was done for 212 patients based on clinical suspicion and 51% (n=108) had raised ferritin level above 500ng/mL.

d. Radiology and imaging study of the Group B and Group C patients:

**Table-III**

<i>Presenting complains of the study population</i>				
	Total (499) (n%)	Group A (64) n(%)	Group B (228) n(%)	Group C (207) n(%)
GI Symptoms				
Vomiting	204 (40.88%)	9 (14.06%)	54 (23.68%)	141 (68.13%)
Abdominal pain	192 (38.48%)	8 (12.5%)	80 (35.09%)	104 (50.24%)
Diarrhoea	184 (36.87%)	16 (25%)	81 (35.53%)	87 (42.03%)
Lethargy	192 (38.48%)	14 (21.88%)	62 (27.19%)	116 (56.04%)
Restlessness	146 (29.26%)	6 (9.38%)	44 (19.30%)	96 (46.48%)
Giddiness	94 (18.83%)	6 (9.38%)	31 (13.60%)	57 (27.54%)
Rash	82 (16.43%)	11 (17.18%)	35 (15.35%)	36 (17.39%)
Bleeding	123 (24.65%)	0	50 (21.93%)	73 (35.27%)
Shock	125 (25.05%)	0	0	125 (60.39%)



**Fig.-2:** Pattern of elevation of liver transaminases in Group A, B and C

Chest radiographs were conducted on 331 subjects from groups B and C, revealing pleural effusion in 283 instances. Among these, 37% (n=105) occurred in group B, while 63% (n=178) were observed in group C. Notably, unilateral pleural effusion, predominantly on the right side, was prevalent in 90% of cases (n=254), exhibiting statistical significance (p value <0.001) compared to the 10% (n=29) incidence of bilateral effusion. Pneumonia was diagnosed in 144 patients, with 70% (n=101) belonging to Group C and 30% (n=43) to Group B.

Ultrasonography of the whole abdomen (n=377) identified gall bladder wall edema as the predominant feature in 51% of cases (n=194) across both groups. Ascites was

the second most prevalent feature, observed in 38.2% (n=144) of cases. Splenomegaly was identified in 18.3% (n=69) of cases, while hepatomegaly was present in 17.5% (n=66) of cases. Comparison between groups B and C revealed that pleural effusion and pneumonia, as evident in chest radiographs, were more pronounced in group C, with a proportion difference of 39% (CI 30.50-46.63). The chi-square test demonstrated statistical significance ( $\chi^2 = 71.96$ , df =1, p <0.0001). Ultrasonographic findings, including gall bladder edema, ascites, hepatomegaly, and splenomegaly, were more prevalent in group B than in group C, with statistical significance ( $\chi^2 = 4.71$ , df =1, p =0.0299). [Table-04]

**Table-IV**

Radiology and imaging findings			
	Total N (%)	Group Bn (%)	Group Cn (%)
Chest x-ray (n=331)			
Pleural effusion	283	105 (37%)	178 (63%)
Unilateral	254 (90%) (p-value <0.0001)	93	161
Bilateral	29 (10%)	12	17
Pneumonia	144	43 (30%)	101 (70%)
Ultrasound of whole abdomen (n=377)			
GB wall edema	194 (51%)	96	98
Ascites	144 (38.2%)	93	51
Splenomegaly	69 (18.3%)	36	33
Hepatomegaly	66 (17.5%)	11	55

Within the cohort of 499 patients, a mortality rate of 1.80% (n=9) was observed, exclusively confined to group C. The deceased individuals comprised 4 patients >60 years, 3 in the 41-60 age, and 2 within the 21-40 age range. Gender distribution reflected 5 male and 4 female fatalities. Comorbid conditions were prevalent, with 6 patients exhibiting hypertension, 4 with diabetes, and 3 each manifesting chronic kidney disease (CKD) and chronic liver disease (CLD). 5 patients had a history of past dengue infection, evident by dengue IgG antibody positivity. The mean duration of illness preceding hospitalization was 5.11 days, and the average hospital stay was 4.89 days. Hematological parameters revealed that 7 patients experienced a nadir platelet count below 10,000/iL, while 8 individuals exhibited elevated transaminase levels exceeding 500 U/L. Notably, one of them had ascites and all deceased subjects exhibited pleural effusion, that appeared during the dengue illness.

#### **Discussion:**

In the context of the ongoing Dengue outbreak in Bangladesh, this study provides a comprehensive analysis of the demographic and clinical shifts observed in Dengue cases. The research delves into the age distribution, changing patterns in affected demographics, prevalent symptoms, and the study also shed light on clinical manifestations, laboratory findings, and radiological outcomes.

Dengue epidemiology is undergoing a noteworthy demographic transition, as observed in our study encompassing a diverse age spectrum. The 21-40 years age group constituted the majority at 46%, followed by 27% in the 41-60 years bracket and 20% in the >60 years category. Despite the global predominance of dengue incidents in the 15-49 years age group<sup>9</sup>, our data reflects a changing trend in Bangladesh. In Bangladesh, from 2000 to 2019, the proportion of young adult cases decreased from 80% to 50%<sup>3</sup>. Similar transitions have been reported in Singapore, Indonesia, Thailand<sup>10</sup> and also in Sri Lanka (2018), and Ethiopia (2017)<sup>3</sup>.

Consistent with global observations, our study affirms a notable male preponderance, aligning with findings in six culturally and economically diverse Asian countries<sup>3</sup>. Furthermore, our investigation unveils a statistically significant association between severe forms of dengue and higher comorbidities (hypertension, diabetes mellitus, cardiac or pulmonary ailments, chronic kidney

disease, chronic liver disease). Notably, Group B and Group C patients exhibited a more pronounced relationship with comorbidities than Group A, substantiating findings from the 2019 outbreak study<sup>11</sup>. These insights underscore the evolving landscape of dengue demographics and the intricate interplay of age, gender, and comorbidities in shaping disease severity and outcomes.

Beyond fever, our study underscores the prominence of gastrointestinal (GI) symptoms, notably vomiting, abdominal pain, and diarrhea, aligning with patterns observed during the country's significant 2019 dengue outbreak<sup>3,11,12</sup>. Diarrhea, an emerging facet in dengue, is substantiated by studies in Peshawar<sup>13</sup> and another study in India<sup>14</sup>. Bleeding manifestations, observed in 24.65% of our cohort, parallel the 2019 outbreak's low incidence<sup>3,12</sup>. Shock, noted in 25.05%, exhibits an increasing trend from the 2019 outbreak<sup>3</sup>, indicating a potential epidemiological shift towards Dengue Shock Syndrome (DSS) rather than Dengue hemorrhagic fever (DHF) in Bangladesh.

Elevated liver transaminases were distinctive among groups, with transaminase elevation up to 500 U/L predominant in Group B, while >500 U/L was more pronounced in Group C. Aspartate transaminase (AST) consistently exceeded alanine aminotransferase (ALT) levels, a pattern corroborated by studies in 2019 in Bangladesh<sup>11</sup> and in 2020 in Sri Lanka<sup>15</sup>. Pancreatitis, evident in 45.31% with abdominal pain, demonstrated transient elevation of serum lipase, a phenomenon observed in 28.8% during the 2019 study<sup>11</sup>. This raised level spontaneously returned to normal without any specific intervention for pancreatitis. This highlights the occurrence of pancreatitis in Dengue Fever (DF) without necessitating specific interventions.

In chest x-rays, our most predominant finding was pleural effusion, followed by pneumonia. Unilateral right-sided PE was a significant finding, which had been supported by a study conducted in the pediatric group in 2019<sup>16</sup>. Progressive change during the first week and improvement during the second week were observed in most of these cases with abnormal CXRs, which correlates with a study in Taiwan<sup>17</sup>. In our study, Pleural effusion and pneumonia were more significantly present in group C than in group B. Respiratory complications could be an indicator to check the severe forms of

dengue<sup>18</sup>. Ultrasonographic findings of gall bladder edema, ascites, hepatomegaly, and splenomegaly were more in our group B patients, and a data analysis in 2022 revealed that abnormal ultrasonographic findings increased with disease severity<sup>19</sup>. Splenomegaly was also a more prominent ultrasonographic finding than hepatomegaly in our study, supported by a recent study in Pakistan in 2022, where splenomegaly was present in 31% and 8.4% hepatomegaly<sup>19</sup>.

Thrombocytopenia was common in all cases. We did not find any significant relationship between PE or ascites with thrombocytopenia (<50,000/iL). This contradicts the once-established fact that plasma leakage coincides with the most extreme depression of the platelet count<sup>16,17</sup>. Regarding CKD/CLD, we only had 46 CKD and 23 CLD patients in our study population (N=499), the correlation of thrombocytopenia with the rest of the cases with plasma leakage without CKD and/or CLD did not show any significant relationship.

Out of 499 patients, 9 (1.80%) patients died, and all of them belonged to group C with elderly and male excess with predominant pulmonary complications. Though, we had very few data on deaths, so no significant result could be reached from this study but still these findings emphasizing the significance of comorbidities, age, and specific clinical parameters in the prognosis of patients with the studied condition. However, recently, the death rate has been gradually increasing among those >70 years of age globally, with the trend being reversed for males than women. Patients with higher comorbidities showed severe forms of dengue having higher mortality. Increased risk of lung complications in the severe cases of dengue having higher mortality<sup>18,20</sup> had a correlation with our findings.

### Conclusions:

In conclusion, our study on the current dengue outbreak in Bangladesh reveals a concerning shift toward severe manifestations. Notably, shock cases (Group C) surpassed those with hemorrhagic fever (DHF), signifying a shift towards Dengue Shock Syndrome (DSS). Gastrointestinal symptoms are prominent, while bleeding manifestations are less frequent. Ultrasonographic and radiological findings differed significantly between severity groups. Right sided pleural effusion was markedly raised. Elevated liver transaminases, ferritin, and lipase were consistent

markers of severity. Alarmingly, a 1.80% mortality rate in our study, exclusively in Group C, underscores the urgent need for intensified management strategies amid this deadly dengue surge.

**Conflict of Interest:** None

### Abbreviations:

ALT: Alanine aminotransferase, AST: Aspartate aminotransferase, CFR: Case fatality rate, CI: Confidence interval, CKD: Chronic kidney disease, CLD: Chronic liver disease, DF: Dengue fever, DHF: Dengue hemorrhagic fever, DM: Diabetes mellitus, DSS: Dengue shock syndrome, GI: gastrointestinal, IgM antibody: Immunoglobulin M antibody, IgG antibody: Immunoglobulin G antibody, HTN: Hypertension, NS1 antigen: Nonstructural protein1 antigen, OR: Odds ratio, PE: Pleural effusion, TT: Torniquet test, WBC: White blood cell, WHO: World Health Organization

### Acknowledgement:

1. Dr. Farzana Afroz Raka, Senior Medical Officer, Department of Medicine, Popular Medical College, Dhaka
2. Dr. Antora Barua, Senior Medical Officer, Department of Medicine, Popular Medical College, Dhaka
3. Dr. Khalid Al Hadi, Senior Medical Officer, Department of Medicine, Popular Medical College, Dhaka
4. Dr. Srizon Roy Tirtho, Assistant Registrar, Department of Medicine, Sir Salimullah Medical College and Mitford Hospital, Dhaka

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