

Clinical Profile and Treatment Patterns of Dengue Patients Admitted to a Tertiary Care Hospital in Bangladesh: a Hospital-Based Observational Study

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Abstract

In Bangladesh, dengue is a serious public health issue that spreads quickly through mosquitoes and usually necessitates hospitalization for supportive care. The purpose of this hospital-based observational study was to assess the clinical presentation, treatment methods, hospitalization trends, and sociodemographic profile of 205 dengue patients who were admitted to a tertiary care hospital in Dhaka. Young adults, aged 21 to 30 years, accounted for the highest percentage of cases, indicating their significant affliction. Dengue hemorrhagic fever (10.24%) and dengue shock syndrome (2.93%) were the next most common causes of hospitalization, after dengue fever (86.82%). Patients from outside of Dhaka constituted a larger percentage of severe cases and had longer hospital stays; part of the variation in hospitalization duration was explained by demographic characteristics ($R^2 = 0.2505$). High fever (82.93%), nausea and vomiting (45.37%), headache (40%), bleeding (21.95%), and shock (8.78%) were the most frequent clinical symptoms. The mainstay of treatment was fluid therapy, with 45.36% of patients receiving normal saline along with dextrose preparations and 32.68% receiving 5% DNS. When clinically necessary, antihistamines, antibiotics, and antiemetics were taken in addition to paracetamol (82.93%), multivitamin supplements (90.73%) and Carica papaya leaf extract (75.6%). To enhance outcomes and direct dengue control methods in Bangladesh, the data from this research highlights current hospitalization trends and stresses the significance of prompt, supportive care in the clinical management of dengue cases.

Key words: Dengue infection, hospitalization, clinical profile, fluid therapy, prescription pattern, Bangladesh.

Introduction

Dengue is an infectious disease characterized by fever, transmitted to humans through the bite of the *Aedes aegypti* mosquito carrying the dengue virus. This disease exhibits swift propagation within communities in tropical and subtropical areas (Guzmán and Kourí, 2002; Oliver and Simon, 2020). The prevalence of dengue has emerged as a significant global issue, transcending national boundaries, with around 50% of the global population vulnerable to the disease. It is estimated that roughly 400 million cases of dengue infection

are reported annually. Bangladesh got its first dengue outbreak in the 1960s, labeled as “Dacca fever” (Mamun *et al.*, 2019; Sharmin *et al.*, 2015). Observing the past clinical spectrum, the spread of infection with serotype changes over time; among the four serotypes (DENV1, DENV2, DENV3, DENV4), DENV2 and DENV3 mainly contribute to the spread of infection (Kayesh *et al.*, 2023; Shirin *et al.*, 2019). Recently, it has been observed that dengue causes a devastating loss to humans with a prolonged course of hospitalization, resulting in significant morbidity and mortality (Sharmin *et al.*, 2015).

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The majority of the people with dengue remain asymptomatic or have minor dengue symptoms such as high fever, headache, muscle and joint pain, rash, and swollen glands, and a few experience a range of fatal dengue symptoms, ranging from extreme abdominal pain to hemorrhagic shock (Bhatt *et al.*, 2013). As per the current clinical scenario, there is no antiviral drug or vaccine approved by the WHO for the treatment of classical dengue fever (DF) or dengue hemorrhagic fever (DHF) (Halstead, 2012; Sabchareon *et al.*, 2012). Given the ongoing devastating situation of dengue, the government of Bangladesh has taken immense measures to control the spread of the vectors. Still, environmental issues and lack of awareness contribute to the spread of infections. Considering the depth of the problem and the treatment of patients with DF and DHF/DSS, the authority of The Ministry of Health and Family Welfare (MoHFW) of Bangladesh has established a significant number of specialized dengue units in government and private hospitals across the country. To spread awareness among people and prevent malpractice in clinical settings of infection management, the Directorate General of Health Services (DGHS) has established a cell to release regular updates about current scenarios and patterns of spreading infections across the country.

This paper emphasizes a hospital-based observational survey conducted at the dedicated dengue unit of Dhaka Medical College Hospital from June 2023 to July 2023. The paper's outlines explore the length of patients' hospital stays, their ratio of improvement to severity or casualty across age groups, and treatment patterns in conjunction with other clinical factors and demographics. In addition to analysis, pertinent suggestions are recommended to ensure rational practice and optimal patient care in managing infected patients in hospital settings from the perspective of Bangladesh.

Epidemiological background

Global epidemiology: As per recent trends in the spread of the dengue virus across the globe, the disease has established its footprints in over 100

countries, with an estimated 400 million dengue virus infections occurring yearly. Over the millennial period, the four serotypes of the dengue virus, with distinct genetic and antigenic properties, are globally relevant and responsible for human disease (Katzelnick *et al.*, 2015; Vasilakis and Weaver, 2008). The incidence of dengue has resulted in significant impacts within WHO territories of the Americas since the onset of 2023, surpassing the previous records of the total cases registered in 2022, and Brazil, Peru, and Bolivia are affected the worst. However, Asia accounts for approximately 70% of the disease burden worldwide (Bhatt *et al.*, 2013; Oliver and Simon, 2020). The transmission of the dengue virus may be facilitated in developing nations due to a combination of factors, including low economic standing, high population density, and an environment conducive to mosquito survival (Figueiredo, 2007; Saswat *et al.*, 2015).

Epidemiology in Bangladesh: As of the end of September 2023, over 20,000 individuals have been infected with the dengue virus across all districts of Bangladesh since the start of the current year. Dhaka city accounts for approximately half of the recorded dengue cases, with a case fatality rate (CFR) of 0.3% among hospitalized individuals. In contrast, areas outside Dhaka city had a CFR of 0.5%, according to the information accessed from the website of MoHFW Update on dengue situation. However, hospitalization is necessary for severe cases. However, it is worth noting that approximately 50% of infected people can recover without being admitted to specialized dengue healthcare facilities. Bangladesh has experienced a significant surge in dengue incidence during August and September of 2023. The predominant serotype observed in the sample population is DENV-2, followed by DENV-3, and DENV-1 and DENV-4 account for a minor proportion, and a portion of the cases exhibit co-infection with both DENV-2 and DENV-3 according to the IEDCR report. According to the World Health Organization's classification of variable endemicity of DF and DHF in nations of the Southeast Asia (SEA) region, Bangladesh is designated as Category A, considering the significant public health issues,

predominant contribution to hospitalization and death in children, higher prevalence of disease occurrence with the presence of all four serotypes in urban areas, and the expansion of dissemination to rural regions. The World Health Organization (WHO) and its collaborating partners have prepared a comprehensive strategy to address dengue, assisting the government in implementing disease control measures. The government of Bangladesh has implemented steps in response to the evolving situation, aligning with the policy recommended by the WHO.

Clinical manifestations of dengue: A broad array of clinical manifestations is represented by dengue virus infection. It ranges from asymptomatic to undifferentiated febrile illness, or dengue fever (DF), or it may extend to dengue hemorrhagic fever (DHF), including dengue shock syndrome (DSS) (Martina *et al.*, 2009). Dengue fever (DF) frequently manifests in adults and adolescents, typically presenting as a mild fever accompanied by one or more exacerbated clinical conditions, such as abrupt onset of high fever, severe headache, myalgia, arthralgia, and rash (Gubler, 2021). Dengue hemorrhagic fever (DHF) is characterized by vascular leakage, a predominant clinical marker thought to result from disruptions in endothelial function (Martina *et al.*, 2009). Individuals under 15 exhibit a higher susceptibility to DHF. However, adults are also susceptible to this condition (Gubler, 2021). In addition to plasma leakage and high fever, the clinical spectrum of DHF is associated with more severe circumstances that can arise, such as instances of hemorrhaging, thrombocytopenia, and hemoconcentration, which can ultimately lead to the development of shock referred to as Dengue Shock Syndrome (DSS) (Guzmán and Kourí, 2002). In the view of the revised classification, probable dengue represents the presence of fever in conjunction with any two of the following clinical situations, namely nausea and vomiting, rash, aches and pain, leukopenia, a positive tourniquet test, or any warning sign. Criteria for denotation of dengue warning signs are associated with abdominal pain, persistent vomiting, clinical fluid accumulation, mucosal bleeding, lethargy, liver

enlargement greater than 2 cm, and an exaggerated level of hematocrit concurrent with a rapid lowering of the platelet count. Severe dengue is characterized by severe plasma leakage, hemorrhage and severe organ impairments (Martina *et al.*, 2009).

Treatment protocol and management of dengue

Currently, no established and specific therapeutic intervention is available to treat dengue fever. The primary emphasis lies on managing and alleviating pain symptoms. Paracetamol is widely regarded as a safe medication for pain management in case of dengue fever; however, NSAIDs such as ibuprofen and aspirin should be avoided due to their potential to increase the risk of bleeding. Tramadol is recommended for the treatment of dengue fever and is considered a safe option (Deen *et al.*, 2006). Antiemetic medications are indicated to reduce persistent vomiting in the case of dengue (Katzelnick *et al.*, 2015). Fluid management and proper hydration are clinically effective in reducing hospitalization duration and help ensure rapid recovery from dengue infection (Harris *et al.*, 2003). Antihistamines and platelet-activating factor antagonists have been identified as a viable option for the treatment of allergic responses associated with dengue infection (Chandima *et al.*, 2015; Mullol *et al.*, 2008; Nettis *et al.*, 2013). Antibiotics are indicated to prevent secondary infections in patients with dengue. Furthermore, these medications are employed in patients with dengue fever to address concurrent bacterial infections and mitigate the risk of nosocomial diseases (Siregar *et al.*, 2021). The primary objective of hospitalization for individuals with dengue fever is to effectively manage the phase of the disease characterized by plasma leakage. Generally, hospitalization is deemed necessary only after at least 4 days of fever. However, those with dengue who experience symptoms such as vomiting or a significantly reduced appetite, resulting in moderate to severe dehydration, may necessitate admission to the hospital (Kalayanarooj *et al.*, 2017).

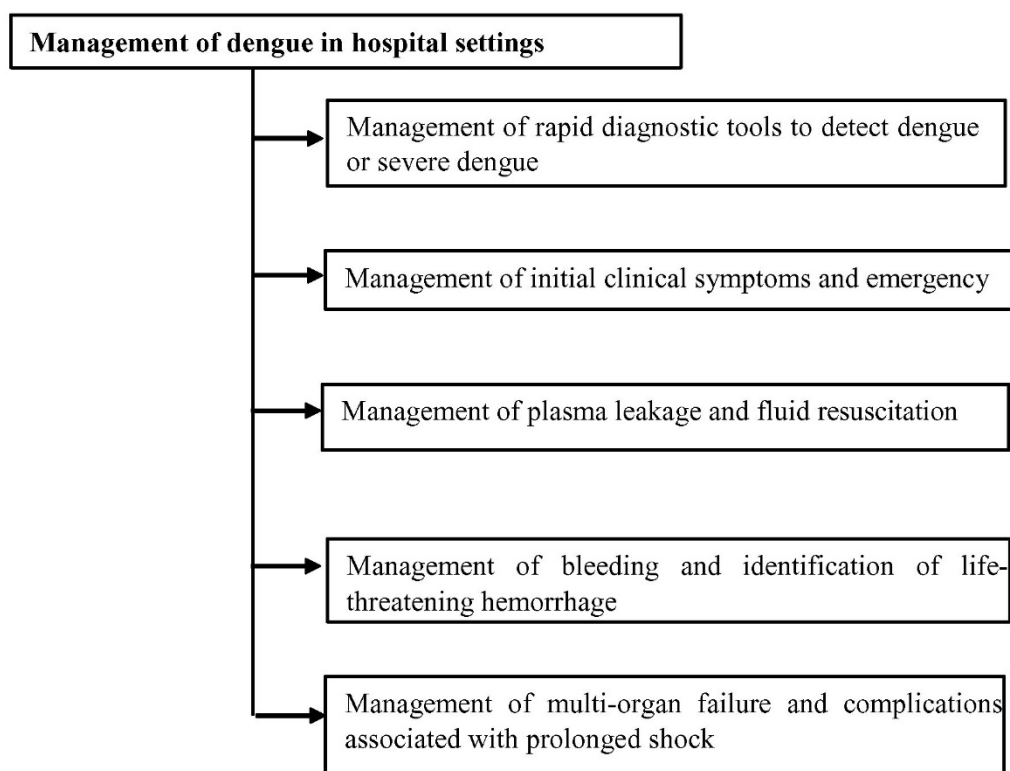


Figure 1. Management of dengue in hospital settings (Kalayanarooj *et al.*, 2017).

A significant proportion of individuals afflicted with dengue fever experience a full recovery without the need for hospitalization. However, it is important to note that a subset of patients may progress to a more severe form of the disease, necessitating prompt hospitalization to mitigate the potential exacerbation of symptoms and subsequent deterioration in quality of life. Hence, the expeditious identification of the dengue serotype serves as the primary means to initiate therapeutic intervention. Gaining a comprehensive understanding of the clinical emergency of the patient will help to implement a physiological body fluid management protocol effectively in a hospital setting. In situations where patients experience multiple organ failure, initiating life support measures is imperative (Kalayanarooj *et al.*, 2017; Ngo *et al.*, 2001).

Hospitalization scenario of dengue cases in Bangladesh

Most individuals diagnosed with dengue experience a non-severe clinical event and can

recover without needing hospitalization. As per the updated database of the Health Emergency Operation Center and Control Room, DGHS, Ministry of Health and Family Welfare, Government of Bangladesh, Dhaka city is equipped with a total of 57 healthcare facilities, encompassing both the government and private sectors, dedicated to the provision of medical services for the treatment and management of dengue cases. In areas beyond the urban confines of Dhaka, healthcare services are administered to the dengue-infected individuals at district general hospitals and thana health complexes of respective regions in coordination with the national guideline for clinical management of dengue syndrome. These healthcare facilities containing designated dengue units are focused explicitly on the management of dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). According to the DGHS clinical database, the release rate from hospitals is 95%, while the case fatality rate (CFR) is roughly 0.5% at the national level.

Objective of the study

The study's objectives were to determine the clinical and sociodemographic characteristics of hospitalized dengue patients at a Bangladeshi tertiary care facility, analyze their treatment and hospitalization trends, and pinpoint variables linked to length of stay.

Methodology

This hospital-based observational, cross-sectional study was carried out in the Department of Medicine at Dhaka Medical College Hospital in Bangladesh during June and July of 2023. Using a successive non-probability sampling strategy, all patients who were clinically diagnosed with dengue illness and admitted during the study period were included until data collection was finished. There were 205 hospitalized dengue cases in all. The total number of eligible admissions during the study period and the viability of full data collection were used to calculate the sample size. A systematic questionnaire and a review of hospital records were used to gather data on sociodemographic traits, clinical symptoms, diagnostic results, treatment trends, and length of hospital stay. The institutional authorities authorized the execution of this research for academic reasons, and all participants or their legal guardians provided informed consent for participation. This study utilized Microsoft Excel (2016), Microsoft Word (2016), and GraphPad Prism for the presentation and summarizing of data. IBM SPSS (25) was utilized for the analysis of group statistics, specifically for comparing the means or averages of data among research groups. This study

utilized multiple linear regression to predict associations among the groups of interest, employing the statistical tools 'R' (version 4.3.1) and IBM SPSS (version 25). Results were shown with 95% confidence intervals, and a p-value of less than 0.05 was deemed statistically significant.

Results and Discussions

Prevalence Findings on the hospitalization scenario among dengue cases

Distribution of the age groups: The frequency of age groups hospitalized at Dhaka Medical College Hospital between June and July 2023 due to various types of dengue virus infections is represented in table 1. The table shows the pattern and frequency of disease among the age groups who required admission to the hospital. Most hospitalized patients ranged from 21 to 30 years old, totaling 67 among the study population of 205 dengue cases. Dengue fever (DF) has the highest prevalence (86.82%) among hospitalized patients, followed by Dengue Hemorrhagic Fever (DHF; 10.24%) and Dengue Shock Syndrome (DSS; 2.93%).

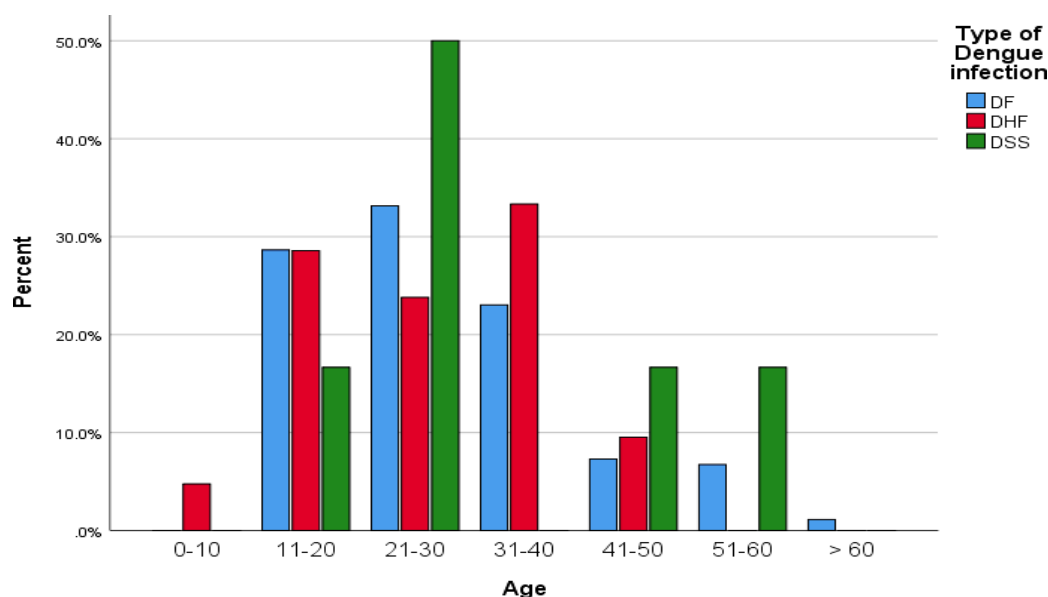
Distribution of the community groups: Table 2 represents the dissemination of dengue infection across the nation within various community groups, delineated into two distinct parts. One representation component pertains to the Dhaka district, while the remaining portion encompasses the remainder of the country, referred to as 'Outside Dhaka.' Patients with DHF and DSS, who were admitted to DMCH, Dhaka, predominantly came from areas outside the Dhaka district.

Table 1. Distribution of age groups and prevalence of the types of infection among hospitalized dengue cases, DMCH, from June to July 2023.

Age groups (years)	DF n=178	DHF n=21	DSS n=6
0-10	0	1 (4.76%)	0
11-20	51 (28.65%)	6 (28.57%)	1 (16.66%)
21-30	59 (33.15%)	5 (23.80%)	3 (50%)
31-40	41 (23.03%)	7 (33.33%)	0
41-50	13 (7.3%)	2 (9.52%)	1 (16.66%)
51-60	12 (6.74%)	0	1 (16.66%)
>60	2 (1.12%)	0	0

Table 2. Distribution of community groups among hospitalized dengue cases.

Community groups	DF	DHF	DSS
Dhaka	82 (46.06%)	11 (52.38%)	2 (33.33%)
Outside Dhaka	96 (53.93%)	10 (47.61%)	4 (66.67%)
Total patients	178	21	6

**Figure 2. Distribution of age groups and prevalence of infection types among hospitalized dengue cases at DMCH from June to July 2023.**

Length of hospital stay and types of dengue infection: The data for the study population residing in Dhaka city are being analyzed to find out whether there is a significant difference in hospitalization duration across dengue infection types. Table 3 shows the distribution of dengue patients by means of scores in the length of hospital stay, standard deviation (SD), and standard error (SE) according to the types of dengue infections. Although the table shows that patients diagnosed with DF have a mean score of 5.70, and the patients diagnosed with DHF and those who developed dengue shock syndrome (DSS) have a mean score of 7.38 days in the length of hospital stay. The t-test (Table 4) showed no statistically significant difference in the length of hospital stay between DF and DHF/DSS patients ($p = 0.057$, 95% CI). Therefore, no conclusions about a difference in hospitalization duration based on infection type can be drawn.

Comparison among Community Groups in terms of duration of hospitalization: The individuals admitted to the hospital due to different forms of dengue infections were part of community groups living both in Dhaka and its surrounding areas. Nonetheless, their experiences during hospitalization differed. Multiple linear regression was utilized to predict the changes in their hospitalization patterns. The length of the hospital stay has been analyzed using the location inside Dhaka as a baseline for the study. When comparing dengue patients from Dhaka hospitalized at Dhaka Medical College Hospital during the time course between June and July 2023 with those outside of Dhaka, it is observed that the latter group had a significantly longer average hospital stay using statistical tools. It is found that the average hospitalization course is 1.922 times longer for them upon setting dengue fever (DF) as a baseline of analysis (Table 4). The significance of the study on the association of length of stay with

demographics has been explained through multiple R-squared values at 0.2505, indicating that the result can explain 25.05% of the dependent variables of interest. The F-statistic is located at 16.71 on 4 and 200 degrees of freedom, and the resultant p-value is

significant for the multiple linear regression for predicting the association between the length of hospitalization and demographic location with other variables.

Table 3. Distribution of dengue patients by means of scores in the length of hospital stay.

Types of dengue infection	No. of patients (N)	Mean of the length of hospital stay	Standard deviation (SD)	Standard Error (SE)
Dengue Fever (DF)	82	5.70	2.743	0.303
Dengue hemorrhagic fever (DHF) and Dengue shock syndrome (DSS)	13	7.38	4.032	1.118

Table 4. Result of multiple linear regression for predicting the association between demographic characteristics and length of hospital stay.

Coefficients	Estimate	Std. Error	t value	p-value
(Intercept)	3.05872	0.62482	4.895	0.0000 ***
Age	0.10223	0.01897	5.388	0.0000 ***
Dengue DF	-	-	-	-
Dengue DHF	-0.19395	0.74149	-0.262	0.79392
Dengue DSS	3.87169	1.33415	2.902	0.00412 **
Location inside Dhaka	-	-	-	-
Location outside Dhaka	1.92194	0.45618	4.213	0.0000 ***

Multiple R-squared: 0.2505

F-statistic: 16.71 on 4 and 200 df, p-value: 0.0000

Prevalence of the Clinical manifestations of hospitalized patients: In the course of examining a number of 205 patients hospitalized for the treatment and management of dengue infections at Dhaka Medical College Hospital, Dhaka, from June to July 2023, it was noted that there was considerable variability in their clinical manifestations, which occasionally presented challenges in distinguishing them from symptoms associated with other viral fevers. However, some patients initially exhibited mild signs but subsequently developed severe problems. This is the reason why hospitalization was deemed necessary. The study findings revealed that a significant majority of patients had a high fever (more than 104°F), with a prevalence of 82.93%. The second most prevalent symptoms were nausea and vomiting, accounting for 45.37% of cases. Following this, headache was the third most commonly reported symptom, affecting 40% of individuals. A few patients exhibited additional symptoms, such as body

aches or pain, allergic reactions, hemorrhage, or pressure-related symptoms (a fall or shock). Pre-existing allergies were also observed in a limited number of cases (Table 5). Upon analyzing the clinical symptoms exhibited by the patients, it was observed that the spectrum of symptoms displayed significant variation among individuals. In the perspective of Bangladesh, the clinical spectrum of patients exhibits significant variability among the types of dengue infection (Kayesh *et al.*, 2023; Mamun *et al.*, 2019). Nevertheless, many patients exhibited symptoms such as fever, nausea and vomiting, and headache. A small proportion of individuals exhibited additional clinical symptoms, such as aches, allergic reactions, hemorrhages, and symptoms associated with shock. These findings suggest a correlation between the results obtained and the existing data found in articles published in various scientific journals (Sharmin *et al.*, 2015; Shirin *et al.*, 2019).

Table 5. Prevalence findings on the clinical manifestations of hospitalized patients.

Clinical symptoms	Frequency	Prevalence (n=205)
High fever	170	82.93%
Headache	82	40%
Body pain	41	20%
Nausea and vomiting	93	45.37%
Allergic reactions	24	11.70%
Hemorrhage	45	21.95%
Pressure fall or shock	18	8.78%
Pre-existing allergy	9	4.4%
Comorbidities	3	1.46%

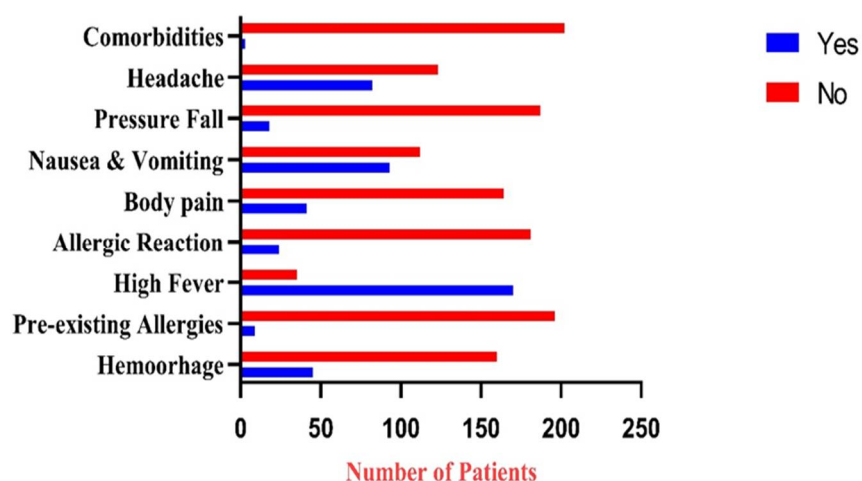


Figure 3. Presentation on the spectrum of the clinical manifestations of hospitalized dengue patients.

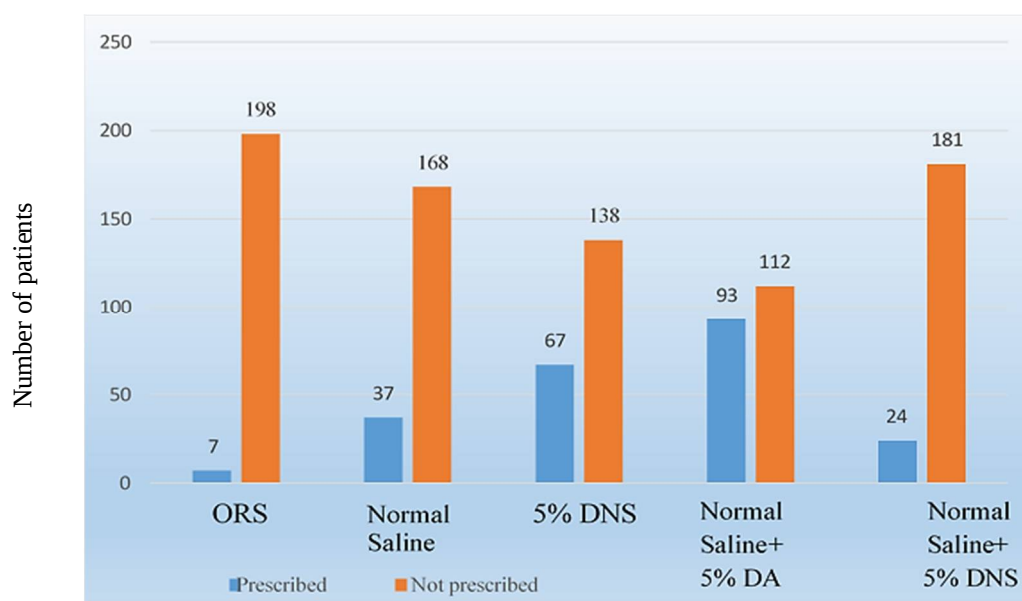


Figure 4. Presentation on the spectrum of the saline preparations prescribed for body fluid management of hospitalized patients.

Prevalence findings on hospitalization pattern:

The study revealed that the 11-20 and 21-30 (years) age groups had the highest proportions of individuals admitted to the hospital due to dengue fever (DF). The incidence of dengue hemorrhagic fever (DHF) was observed to be significantly clustered within the 31-40 (years) age group, whereas the dengue shock syndrome (DSS) exhibited a high degree of clustering within the 21-30 (years) age group. Our research found that the community group categorized as 'Outside Dhaka' had a higher prevalence of dengue shock syndrome (DSS) and dengue fever (DF) than the community group 'Dhaka.' These occurrences could be attributed to the transfer of patients from peripheral district hospitals to tertiary healthcare facilities. The analysis of hospitalization duration in patients with dengue fever (DF) and dengue hemorrhagic fever (DHF)/dengue shock syndrome (DSS) did not yield statistically significant results, precluding any definitive conclusions. However, a significant disparity exists in relation to the length of time and the type of infection. The study established an association between the duration of hospitalization and the demographic component location. The community group categorized as 'Location outside Dhaka' had a slightly higher hospitalization length than the group 'Location inside Dhaka.' The underlying factors contributing to this relationship may be intricate and challenging to comprehend. However, specific factors suggest that the relationship between the severity and serotypes of the disease and the administration of an improper treatment protocol to patients significantly contributes to the length of hospitalization.

Prevalence findings on the prescribing pattern of hospitalized dengue patients: The patients suffering from various types of dengue infection were hospitalized at DMCH, Dhaka, to manage their physiological body fluid levels. Due to these considerations, several saline preparations, oral rehydration solutions, coconut water, fruit juice, and water were employed. The study analysis revealed that normal saline and 5% DNS preparations significantly affected prescription frequency. 5% DNS was prescribed for around 32.68%, and normal

saline in combination with 5% DA accounted for 45.36% of the patient population (Table 6). Nevertheless, it is worth mentioning that the fluid management algorithm showed variability depending on the specific forms of dengue infections. For the symptomatic treatment of hospitalized dengue patients, multivitamin supplements and carica papaya extract syrup were prescribed in high proportions (90.73% and 75.61%, respectively). On the other hand, a limited number of patients received prescriptions for additional drug classes, such as antihistamines (32.7%), antibiotics (21.95%), antiemetics (20%), antispasmodics (10.73%), antitussive agents (5.366%), and medications for their comorbidities, based on their individual needs (Table 7). After the saline preparations, analgesic and antipyretic groups accounted for 94.64% of the total, notably paracetamol (oral), paracetamol (suppositories), and tramadol combinations.

The study revealed that the management of physiological fluid using saline preparations had a significant role in the treatment plan. The normal saline in combination with both 5% DA and 5% DNS was prescribed frequently to a number of patients hospitalized for dengue cases. The other saline combination preparations, including ORS were prescribed to a small cohort of individuals. The findings of the previous study supported the observations of the current study (Harris *et al.*, 2003; Ngo *et al.*, 2001). The utilization of pharmaceutical interventions observed in the study exhibited considerable diversity and posed challenges in distinguishing among the types of dengue infection. However, a certain category of drugs played a significant role in the frequency of prescriptions. The spectrum of drugs includes the group of analgesics and antipyretics, multivitamin supplements, and *Carica papaya* leaf extract syrup. The WHO's comprehensive recommendations for managing dengue situations support the use of these drugs. In our investigation of prescription patterns, antibiotics and antihistamines emerged as the most frequent groups. The use of antibiotics is supported through the previous study conducted (Siregar *et al.*, 2021). Antihistamines were prescribed to a considerable

extent in the symptomatic therapy. The use of antihistamines in the symptomatic management of dengue is supported through the established scientific journals (Chandima *et al.*, 2015; Nettis *et al.*, 2013).

A limited number of patients received the additional categories of drugs, including antiemetics, antispasmodics, antitussive agents, and drugs for comorbidities.

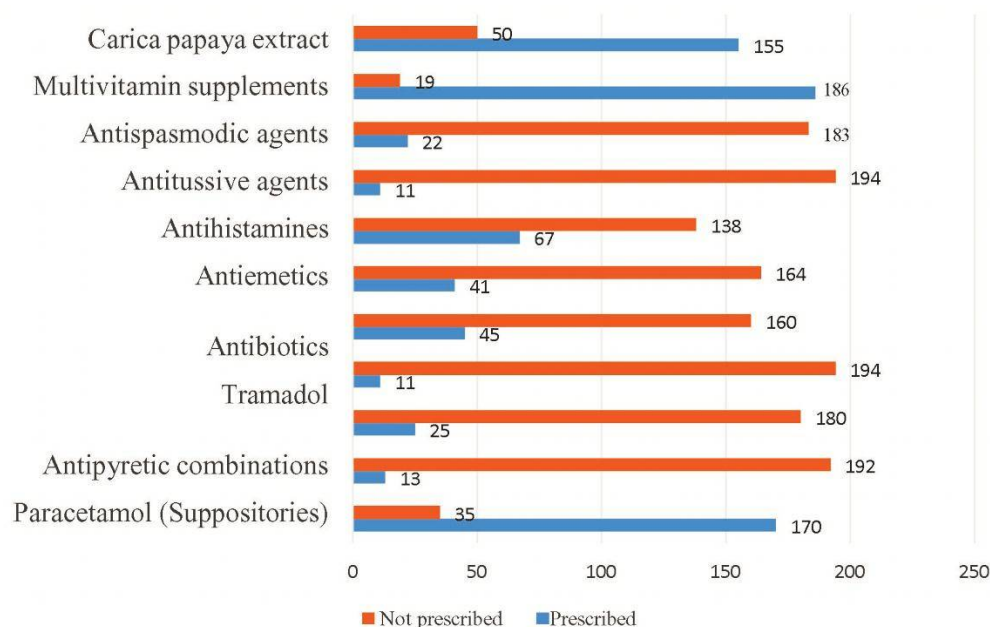


Figure 5. Presentation on the spectrum of the individual/group of drugs prescribed for the Symptomatic management of hospitalized patients.

Table 6. Types of saline preparations prescribed for body fluid management of hospitalized dengue patients.

Types of saline preparations	Frequency	Prevalence (n=205)
5% DNS	67	32.68%
Normal saline and 5% DA	93	45.36%
Normal saline and 5% DNS	24	11.70%
Normal saline	37	18.04%
ORS	7	3.42%

Table 7. Types of drugs or medications prescribed for the symptomatic management of hospitalized dengue patients.

Medications	Frequency	Prevalence (n=205)
Paracetamol(oral)	170	82.93
Paracetamol (suppositories)	13	6.34%
Tramadol	11	5.37%
Antipyretic and analgesic combinations	25	12.2%
Multivitamin supplements	186	90.73%
Carica papaya leaf extract syrup	155	75.6%
Antihistamines	67	32.7%
Antiemetics	41	20%
Antispasmodics	22	10.73%
Antibiotics	45	21.95%
Antitussive agents	11	5.366%

Limitations of the study: There are several limitations to this study. First, the results may not be as applicable to other healthcare settings in Bangladesh because the study was limited to a single tertiary care facility. Second, since only hospitalized patients were included, selection bias may be introduced by using a hospital-based cross-sectional design and consecutive sampling. Third, incomplete documentation or recollection bias may have affected the study's reliance on patient interviews and medical data. Notwithstanding these drawbacks, the study offers insightful information about hospitalization and treatment procedures for dengue patients in Bangladesh today.

Conclusion

The dengue outbreak in Bangladesh during the investigational year has had serious negative effects on the human population. The pick took place throughout the months of August and September. The country has been dealing with similar circumstances since 2019; thus, this current scenario is not new. From this perspective, there is a lack of information about the management of hospitalized dengue cases. Also, the clinical demographic data is severely limited. On the other hand, the patterns of sickness prevalence have changed. In comparison to other years, the case fatality rate has significantly increased. The results of this study assist in understanding the present approach to treating hospitalized dengue patients. Hospitalization prevalence statistics offer important information on the severity of the illness and the relationship between clinical and demographic characteristics. The study also highlights the pattern of usage of body fluid supplements in the hospitalized dengue cases. Given the growing severity of dengue infections, it is imperative to continually assess the treatment protocols employed in tertiary healthcare facilities for dengue patients.

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Appendix

Survey Form

A. Patient's information

ID No.

1. Age	0-10/11-20/21-30/31-40/41-50/51-60/61-70/>70
2. Sex	Male/ Female
3. Residence	Dhaka city/outside the Dhaka city
4. Hospitalization information	Yes / No
5. Date of admission	
6. Have you previously been diagnosed with a dengue infection:	Yes/No
7. Prior history of hospitalization for dengue infection:	Yes/No
8. Have you received a referral from local healthcare or a consultant?	Yes/ No

B. Diagnostic reports of the patients

9. Date of diagnosis for dengue infection	
10. Types of dengue infection	DF/ DHF/ DSS/ Undifferentiated

C. Clinical manifestations of the patients

Generalized Questions during interview	Response
11. Have you experienced a high fever?	Yes/No
12. Have you experienced a headache?	Yes/No
13. Have you experienced aches or body pain?	Yes/No
14. Have you experienced nausea and/or vomiting?	Yes/No
15. Have you experienced any allergic reactions?	Yes/No
16. Does the disease increase the pre-existing allergic response?	Yes/No
17. Have you experienced any hemorrhagic symptoms/bleeding?	Yes/No
18. Have you experienced a severe pressure fall or any symptoms of shock?	Yes/No

D. Treatment module and data collection of prescription patterns

19. Have you been subjected to any treatment module before hospitalization?	Yes/No
20. Have you been subjected to any strategy of body fluid management before hospitalization?	Yes/No

21. Use of oral saline preparation and/Normal ORS	Yes/No
22. Use of intravenous infusion saline preparation	Yes/ No

23. Use of antibiotics in prescription	Yes/No
24. Use of antipyretic and analgesic	Yes/ No
25. Use of antiemetic drugs	Yes/ No
26. Use of antihistamines	Yes/ No
27. Use of antitussive agents	Yes/No
28. Use of antispasmodic agents	Yes/No
29. Use of multivitamin supplements	Yes/No
30. Use of papaya extract	Yes/No
31. Use of drugs treating comorbidities	Yes/No