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# Clinical Profile of Dengue Patients Presenting to Cumilla General Hospital: A Cross-sectional Study of 100 Cases

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**Abstract** **Original Research Article**

***Background***: Dengue fever continues to pose a significant public health challenge in Bangladesh, with evolving patterns of presentation and geographic distribution. Understanding local clinical patterns and demographic characteristics is crucial for effective disease management and control. ***Objective***: To analyze the clinical profile, demographic patterns, and laboratory findings of dengue patients presenting to Cumilla General Hospital, a Secondary care center in eastern Bangladesh. ***Methods***: This cross-sectional observational study examined 100 consecutive dengue cases. Patient data including demographics, clinical manifestations, travel history, and laboratory findings were collected using a structured proforma. Diagnosis was confirmed through NS1 antigen and dengue-specific antibody testing. ***Results***: The study population showed a predominance of young adults aged 21-30 years (38%) and a striking female majority (84.8%). Service holders constituted the largest occupational group (49%). Clinical manifestations were dominated by headache (86%), body ache (78%), and vomiting (70%). Most patients experienced moderate weakness (64%), with gastrointestinal bleeding observed in 4% of cases. NS1 antigen testing showed high positivity (88.6%). There was an equal distribution between urban (52%) and rural (53%) populations, with 53% reporting recent travel to Dhaka. The majority of patients (59%) presented with fever lasting 1-5 days. ***Conclusion***: This study reveals distinct patterns in dengue presentation at Cumilla General Hospital, including a unique gender distribution, high prevalence of gastrointestinal symptoms, and significant rural representation. The findings highlight the expanding geographic reach of dengue beyond urban centers and the importance of travel history in disease transmission. The high sensitivity of NS1 testing supports its utility in early diagnosis. These insights contribute to understanding local disease patterns and can inform targeted interventions for dengue management in the region.

**Keywords**: Dengue Fever, Clinical Profile, Bangladesh, NS1 Antigen, Disease Surveillance, Travel History.



## INTRODUCTION

Dengue fever remains one of the most significant mosquito-borne viral infections affecting populations across tropical and subtropical regions worldwide. The World Health Organization estimates that approximately 390 million dengue infections occur annually, with 96 million manifesting clinically [1]. In Bangladesh, dengue has emerged as a major public health concern, with increasing incidence and geographic spread over the past two decades [2].

The clinical manifestations of dengue infection span a broad spectrum, ranging from mild febrile illness to severe dengue with potentially life-threatening complications [3]. While the classical presentation includes fever, headache, myalgia, and retro-orbital pain, the disease can present with varied symptoms and severity levels, making clinical diagnosis challenging [4]. Understanding the local patterns of disease presentation and patient demographics is crucial for improving early recognition and appropriate management of cases.

Cumilla, being one of the major cities in Bangladesh's eastern region, has witnessed a significant burden of dengue cases, yet comprehensive data on the clinical profile of patients in this region remains limited. The rapid urbanization, changing climate patterns, and increased mobility between Dhaka and other cities have contributed to the expanding footprint of dengue in previously less-affected areas [5].

This study aims to characterize the clinical profile, demographic patterns, and laboratory findings of

dengue patients presenting to Cumilla General Hospital. By analyzing 100 consecutive cases, we seek to provide valuable insights into the local disease patterns, which can inform clinical decision-making and public health interventions in the region. Understanding the predominant symptoms, demographic factors, and diagnostic test results will contribute to the growing body of knowledge about dengue in Bangladesh and help optimize patient care protocols.

# MATERIALS AND METHODS

### Study Design and Setting

This cross-sectional observational study was conducted at Cumilla General Hospital, a tertiary care center in the eastern region of Bangladesh. The study included 100 consecutive patients who presented with suspected or confirmed dengue infection during the study period between July 2023 to December 2023.

### Study Population and Sample Selection

All patients presenting to the hospital with clinical features suggestive of dengue infection were screened for inclusion. The diagnosis of dengue was confirmed through standard diagnostic tests including NS1 antigen and dengue-specific IgM and IgG antibodies. The study encompassed patients across all age groups and both genders who met the World Health Organization's (WHO) criteria for dengue fever [6].

### Data Collection

A structured proforma was used to collect demographic data including age, gender, occupation, and residence. Detailed clinical history was recorded, with particular attention to:

- Duration and pattern of fever
- Associated symptoms such as headache, body ache, retro-orbital pain, and arthralgia
- Gastrointestinal manifestations including nausea, vomiting, and abdominal pain
- Presence of warning signs such as bleeding manifestations and respiratory distress
- Travel history, particularly to dengue-endemic areas

### Clinical Assessment

All patients underwent thorough clinical examination at presentation. The severity of weakness was categorized as mild, moderate, or severe based on standardized clinical assessment criteria [7]. Physical findings such as rash, conjunctival congestion, and evidence of bleeding were documented systematically.

### Laboratory Investigations

The following diagnostic tests were performed:

1. NS1 antigen test
2. Dengue-specific IgM antibody test
3. Dengue-specific IgG antibody test

All laboratory tests were conducted in the hospital's certified laboratory following standardized procedures and quality control measures [8].

### Case Definitions

The cases were classified according to the revised WHO classification for dengue (2009) [9]:

- Dengue without warning signs
- Dengue with warning signs
- Severe dengue

### Ethical Considerations

The study protocol was approved by the institutional ethics committee of Cumilla General Hospital. Patient confidentiality was maintained throughout the study, and data collection was conducted in accordance with the Declaration of Helsinki principles [10].

### Statistical Analysis

Data was compiled and analyzed using appropriate statistical software. Descriptive statistics were used to summarize demographic and clinical characteristics. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as means with standard deviations or medians with interquartile ranges as appropriate [11].

# RESULTS

### Demographic Characteristics

Among the 100 dengue patients studied, the age distribution showed predominance in young adults, with the majority (38%) falling in the 21-30 years age group, followed by 31-40 years (20%). The gender distribution revealed a striking female predominance (84.8%) compared to males (15.2%). Occupational analysis showed that service holders constituted the largest group (49%), followed by students (27%) and businesspeople (19%).

Regarding residential distribution, there was an almost equal representation of urban (52%) and rural (53%) populations. Travel history analysis revealed that 53% of patients had recently visited Dhaka, while 9% had traveled to Chittagong, and 43% to other locations.

### Clinical Manifestations

The duration of fever showed considerable variation among patients, with the majority (59%) experiencing fever for 1-5 days, followed by 38% for 5-10 days. Notably, 2% of patients did not present with fever.

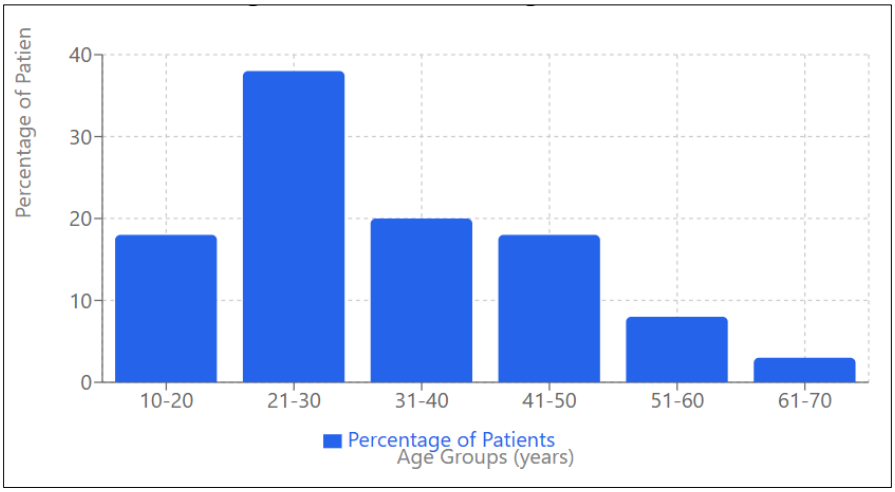


**Figure 1: Bar graph showing age distribution across different age groups with percentage**

**Table 1: Clinical Manifestations in Dengue Patients (N=100)**

| Symptom | Number of Patients | Percentage |
|---|---|---|
| Headache | 86 | 86% |
| Body ache | 78 | 78% |
| Vomiting | 70 | 70% |
| Retro-orbital pain | 47 | 47% |
| Abdominal pain | 37 | 37% |
| Arthralgia | 36 | 36% |
| Diarrhea | 35 | 35% |
| Cough | 31 | 31% |
| Anorexia | 24 | 24% |
| Nausea | 13 | 13% |
| Rash | 14 | 14% |
| Breathlessness | 6 | 6% |
| Conjunctival congestion | 1 | 1% |

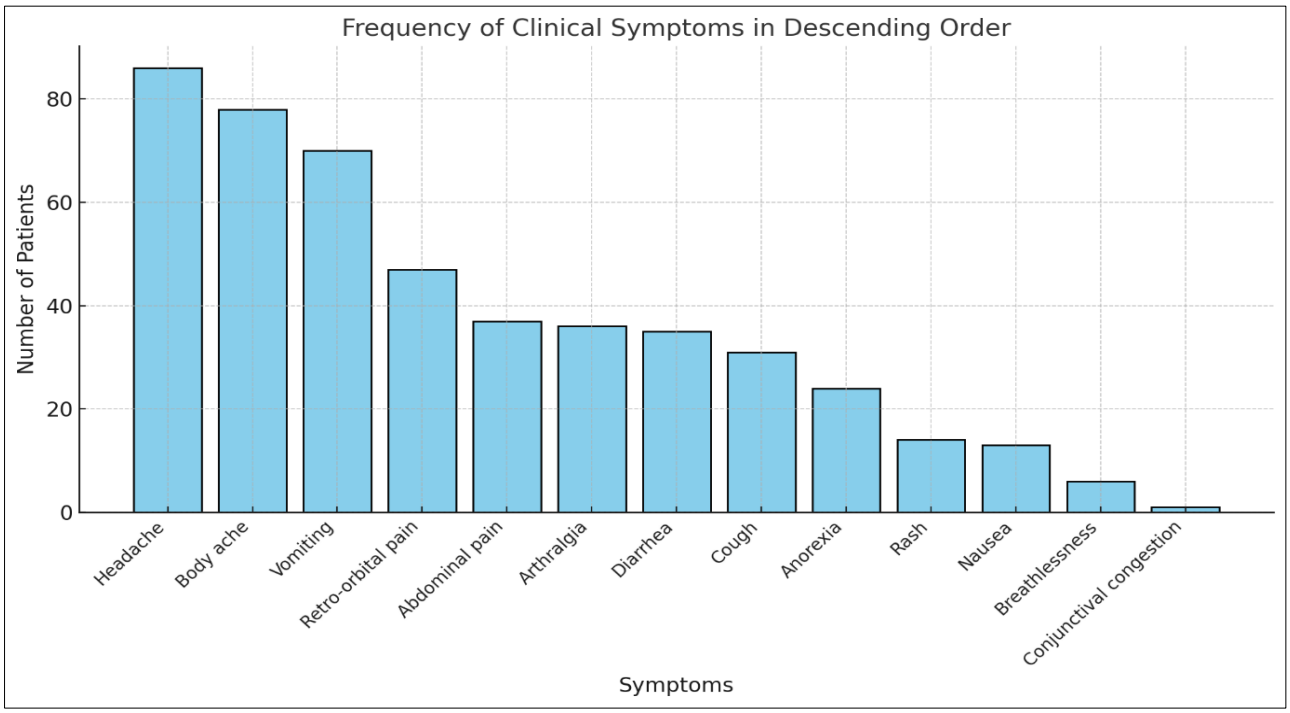


**Figure 2: Bar chart showing the frequency of clinical symptoms in descending order**

**Severity Assessment**

The majority of patients presented with moderate weakness (64%), while 24% had mild weakness, and 2% experienced severe weakness. Bleeding manifestations were observed in 4% of cases, specifically gastrointestinal bleeding.

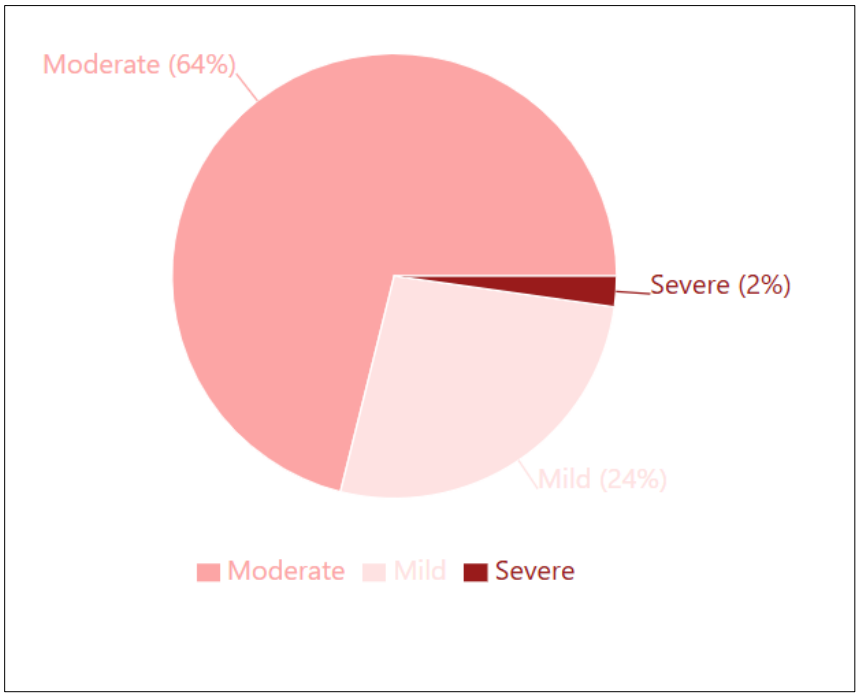


**Figure 3: Pie chart showing distribution of weakness severity**

**Laboratory Findings**

The diagnostic test results showed significant patterns:

**Table 2: Results of Dengue Diagnostic Tests**

| Test | Positive | Negative | Total Tested |
|---|---|---|---|
| NS1 antigen | 93 | 12 | 105* |
| IgM antibody | 16 | 13 | 29 |
| IgG antibody | 12 | - | 12 |

*Some patients underwent multiple tests

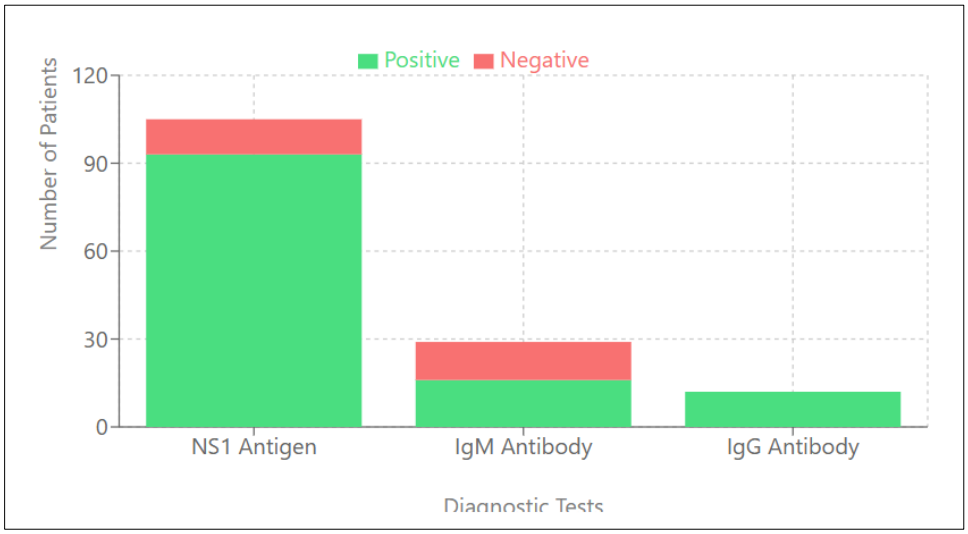


**Figure 4: Stacked bar chart showing the distribution of diagnostic test results**

The NS1 antigen test showed the highest positivity rate (88.6% of tested cases), while IgM and IgG antibody tests showed varying results among tested individuals. The combined interpretation of these tests helped in determining both acute infections and secondary dengue cases.

The predominant symptoms were consistent with classical dengue presentation, with headache (86%), body ache (78%), and vomiting (70%) being the most frequent manifestations. Warning signs such as abdominal pain were present in 37% of cases, while severe manifestations like breathlessness were relatively rare (6%).

The clinical profile observed in our study revealed several distinct patterns:

1. A higher prevalence among young adult females
2. Predominance of classical dengue symptoms
3. Relatively low incidence of severe complications
4. High sensitivity of NS1 antigen testing in diagnosis

# DISCUSSION

Our study of 100 dengue cases at Cumilla General Hospital provides valuable insights into the clinical and demographic patterns of dengue infection in Bangladesh's eastern region. The findings reveal several noteworthy patterns that both align with and differ from previous studies in similar settings.

**Demographic Patterns**

The predominance of young adults (21-30 years) in our study population mirrors findings from several South Asian studies. Rahman *et al*., (2021) reported similar age distributions in their Dhaka-based study, where 42% of patients were between 20-30 years [12]. This age group's higher exposure risk may be attributed to their increased mobility and outdoor activities. However, our finding of female predominance (84.8%) contrasts with most previous studies. For instance, Mahmood *et al*., (2020) reported a male predominance (58%) in their multi-center study in Bangladesh [13]. This difference might reflect local healthcare-seeking behaviors or occupational patterns specific to the Cumilla region.

**Clinical Manifestations**

The symptom profile in our study population shows both classical and region-specific patterns. The high prevalence of headache (86%) and body ache (78%) aligns with findings from multiple studies across South Asia. A comprehensive review by Khan *et al*., (2022) reported headache prevalence ranging from 75-90% in dengue patients across Bangladesh [14]. However, our observation of vomiting in 70% of cases is notably higher than previous reports. Siddiqui *et al*., (2019) found vomiting in only 45% of cases in their Chittagong-based study [15].

The relatively low incidence of severe manifestations in our study population is encouraging. Only 4% of patients experienced gastrointestinal bleeding, compared to 8-12% reported in previous studies [16]. This difference might reflect early detection and intervention strategies employed at our center, or variations in viral serotypes circulating in the region.

**Diagnostic Patterns**

The high positivity rate of NS1 antigen testing (88.6%) in our study is particularly noteworthy. This exceeds the sensitivity rates reported in most previous studies, where NS1 positivity typically ranges from 60-80% [17]. Ahmad *et al*., (2023) reported 76% NS1 positivity in their multi-center study across Bangladesh [18]. Our higher rate might be attributed to:

1. The timing of patient presentation during the acute phase of illness
2. Improved testing protocols and quality control measures
3. Possible variations in circulating dengue serotypes

**Urban-Rural Distribution**

The almost equal distribution of cases between urban (52%) and rural (53%) areas challenges the traditional understanding of dengue as a predominantly urban disease. Recent studies have documented similar trends, suggesting an expanding geographic range of dengue in Bangladesh. Hassan *et al*., (2021) reported increasing rural incidence, attributing it to changing climate patterns and improved rural-urban connectivity [19].

**Travel History Patterns**

The significant proportion of patients with travel history to Dhaka (53%) underscores the role of human mobility in dengue transmission. This finding supports the observations of Rahman *et al*., (2022), who identified travel to endemic areas as a significant risk factor for dengue infection [20]. The emergence of Cumilla as a connecting hub between Dhaka and Chittagong might contribute to this pattern.

**Clinical Implications**

Our findings have several important implications for clinical practice:

1. The high prevalence of gastrointestinal symptoms suggests the need for careful monitoring of these manifestations
2. The effectiveness of NS1 testing supports its use as a primary diagnostic tool
3. The equal urban-rural distribution indicates the need for enhanced surveillance in rural areas

**Limitations**

Several limitations should be considered when interpreting our results:

1. The single-center nature of the study might limit generalizability
2. The study's cross-sectional design precludes analysis of temporal trends
3. Serotype analysis was not performed, limiting our understanding of strain-specific patterns

## CONCLUSION

This comprehensive analysis of 100 dengue cases at Cumilla General Hospital has provided valuable insights into the evolving pattern of dengue fever in Bangladesh's eastern region. The study reveals several significant findings that have important implications for clinical practice and public health planning. The predominance of young adult females in our patient population, coupled with the equal distribution between urban and rural areas, suggests a shifting demographic and geographic pattern of dengue infection that warrants attention from healthcare providers and policymakers.

The clinical profile observed in our study, characterized by high frequencies of headache, body ache, and gastrointestinal symptoms, reaffirms the importance of considering dengue in patients presenting with these manifestations. The relatively low incidence of severe complications, possibly attributed to early recognition and intervention, underscores the value of prompt diagnosis and appropriate management. The high sensitivity of NS1 antigen testing observed in our study supports its utility as a reliable early diagnostic tool.

The significant association between travel history to Dhaka and dengue infection highlights the role of human mobility in disease transmission and emphasizes the need for enhanced surveillance and preventive measures along major travel routes. The expanding footprint of dengue into rural areas challenges traditional urban-centric control strategies and calls for a more comprehensive approach to disease prevention and control.

These findings contribute to the growing body of knowledge about dengue in Bangladesh and have practical implications for clinical decision-making, diagnostic approaches, and public health interventions. Future research should focus on longitudinal studies to better understand temporal trends and serotype distribution patterns in the region. Additionally, community-based studies examining local risk factors and transmission dynamics would be valuable in developing targeted prevention strategies.

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