



## THE SPECTRUM OF GASTROINTESTINAL MANIFESTATIONS IN DENGUE FEVER

## General Medicine

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## ABSTRACT

**Background:** Dengue fever is a major public health problem in tropical and subtropical regions and is increasingly recognized as a multisystem disease. Gastrointestinal manifestations are common in dengue infection and may serve as early indicators of disease severity. However, these manifestations are often under-recognized, leading to delayed diagnosis and management. **Objectives:** To evaluate the spectrum and frequency of gastrointestinal manifestations in patients with dengue infection and to assess the association of GI Manifestation with severity of Dengue illness. **Methods:** A hospital-based retrospective observational study was conducted at a tertiary care center over a period of eight months. A total of 34 adult patients with serologically confirmed dengue infection were included. Clinical features with emphasis on gastrointestinal symptoms, laboratory parameters including platelet count and liver function tests, ultrasonography findings, and duration of hospital stay were analyzed using descriptive statistics. **Results:** Among the 34 patients, males constituted 61.8% and females 38.2%. Gastrointestinal manifestations were observed in 82.4% of patients. The most common symptoms were vomiting (64.7%) and abdominal pain (58.8%), followed by nausea (41.2%) and diarrhea (29.4%). Thrombocytopenia was common, with 50% of patients having platelet counts below 50,000/mm<sup>3</sup>. Elevated liver transaminases were noted in 47.1% of cases, indicating significant hepatic involvement. Ultrasonographic abnormalities included acalculous cholecystitis (17.6%), ascites (14.7%), hepatomegaly (11.8%), and hepatosplenomegaly (8.8%). The mean duration of hospital stay was 4.53 ± 0.96 days. **Conclusion:** Gastrointestinal manifestations were frequent in patients with dengue infection. GI manifestations were associated with laboratory and imaging abnormalities. Early recognition of gastrointestinal symptoms, along with supportive investigations, is essential for timely diagnosis, appropriate management, and prevention of severe dengue complications.

## KEYWORDS

Dengue Fever; Gastrointestinal Manifestations; Hepatic Involvement; Thrombocytopenia; Ultrasonography

## INTRODUCTION

Dengue is one of the most rapidly spreading mosquito-borne viral diseases worldwide and represents a major public health concern, particularly in tropical and subtropical regions such as India. It is caused by the dengue virus, a single-stranded RNA virus belonging to the Flaviviridae family, and is transmitted primarily by the bite of the *Aedes aegypti* mosquito [1]. The global incidence of dengue has increased dramatically over recent decades, driven by urbanization, population growth, climate change, and inadequate vector control, with an estimated hundreds of millions of infections occurring annually [2]. Clinically, dengue infection demonstrates a wide spectrum of manifestations, ranging from asymptomatic infection and mild undifferentiated febrile illness to severe dengue characterized by plasma leakage, hemorrhage, and organ dysfunction [3]. Classical dengue fever commonly presents with acute onset fever, headache, retro-orbital pain, myalgia, arthralgia, photophobia, nausea, and vomiting; however, gastrointestinal manifestations are increasingly being recognized as prominent and clinically significant features of the disease [4]. Gastrointestinal involvement in dengue may occur due to direct viral invasion, immune-mediated injury, endothelial dysfunction, and plasma leakage affecting the gastrointestinal tract and associated organs, particularly the liver and gallbladder [5]. Abdominal pain, persistent vomiting, diarrhea, gastrointestinal bleeding, hepatomegaly, and jaundice are now considered important warning signs indicating progression toward severe dengue, as emphasized in World Health Organization (WHO) guidelines [3]. Hepatic involvement is one of the most frequently observed gastrointestinal manifestations, with elevated transaminases being common even in uncomplicated dengue, while severe cases may progress to acute hepatitis, acute liver failure, or fulminant hepatic failure [6]. Other less common but clinically relevant gastrointestinal complications include acalculous cholecystitis, acute pancreatitis, ascites, and pleural effusion, which can mimic surgical abdomen and lead to diagnostic dilemmas [7].

Gallbladder wall edema detected on ultrasonography has been identified as an early indicator of plasma leakage and severe disease [8]. Gastrointestinal bleeding, presenting as hematemesis, melena, or hematochezia, reflects coagulopathy, thrombocytopenia, and mucosal injury, and is associated with increased morbidity and mortality [9]. Importantly, gastrointestinal symptoms often precede hemodynamic instability and shock, making their early recognition crucial for timely intervention and improved outcomes [10]. Despite the high burden of dengue in endemic regions, gastrointestinal manifestations are frequently under-recognized or attributed to other causes, leading to

delayed diagnosis and inappropriate management [11]. Understanding the spectrum and frequency of gastrointestinal involvement in dengue infection is therefore essential, particularly in hospitalized patients, as these manifestations may serve as predictors of disease severity and prognosis. Evaluating gastrointestinal symptoms alongside laboratory parameters such as liver function tests and imaging findings can aid in risk stratification and early identification of severe dengue cases. In this context, studies focusing on gastrointestinal manifestations provide valuable insights into disease behavior, help refine clinical assessment, and contribute to improved patient management strategies in endemic settings such as India

## Methodology

## Study Design

The study was conducted as a retrospective observational study aimed at evaluating the spectrum of gastrointestinal manifestations among patients diagnosed with dengue infection.

## Study Setting

The study was carried out at Sri Siddhartha Medical College Hospital and Research Centre, Agalakote, Tumkur, Karnataka.

## Study Duration

The study was conducted over a period of eight months, from March 2024 to November 2024.

## Participants – Inclusion and Exclusion Criteria

## Inclusion Criteria:

- Patients aged more than 18 years
- Patients with laboratory-confirmed dengue infection based on positive dengue serology

## Exclusion Criteria:

- Patients with established chronic liver disease
- Patients diagnosed with acute pancreatitis
- Patients with cholelithiasis
- Patients who were already receiving hepatotoxic drugs

These criteria were applied to minimize confounding factors that could independently influence gastrointestinal symptoms or liver function abnormalities.

## Study Sampling

A consecutive sampling method was used in the study. All patients meeting the inclusion criteria and admitted during the study period

were included until the required sample was obtained. This approach helped reduce selection bias and ensured that the study population reflected the real-world clinical spectrum of dengue infection presenting to the hospital.

### Study Sample Size

The sample size consisted of all eligible dengue-positive patients who fulfilled the inclusion criteria during the study period. Since this was a retrospective observational study, no formal sample size calculation was performed. The final sample size was determined by the number of confirmed dengue cases with complete clinical, laboratory, and imaging records available for analysis during the specified duration.

### Study Parameters

The parameters assessed included demographic details such as age and sex, clinical symptoms related to gastrointestinal involvement (including abdominal pain, nausea, vomiting, diarrhea, jaundice, hematemesis, and melena), laboratory parameters with special emphasis on liver function tests (serum bilirubin, AST, ALT, and alkaline phosphatase), and ultrasonography findings such as hepatomegaly, gall bladder wall edema, ascites, and pleural effusion. Complications related to gastrointestinal involvement were also documented.

### Study Procedure

Medical records of patients diagnosed with dengue infection during the study period were retrieved from hospital archives. Dengue diagnosis was confirmed based on positive serological tests as documented in patient records. Clinical notes were reviewed to identify gastrointestinal symptoms at presentation and during hospitalization. Laboratory reports were analyzed to assess liver function abnormalities, and ultrasonography findings were recorded where available. Patients with confounding gastrointestinal or hepatobiliary conditions as per exclusion criteria were excluded from the analysis.

### Study Data Collection

Data were collected using a structured data collection proforma specifically designed for the study. Information was extracted from inpatient case files, laboratory databases, and radiology reports. Variables collected included demographic data, presenting symptoms, gastrointestinal manifestations, laboratory values, imaging findings, duration of hospital stay, and documented complications. All data were anonymized to maintain patient confidentiality.

### Data Analysis

The collected data were entered into a Microsoft Excel spreadsheet and analyzed using appropriate statistical methods. Descriptive statistics were used to summarize demographic variables, frequency of gastrointestinal symptoms, laboratory abnormalities, and imaging findings. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized using means and standard deviations where applicable. The association between gastrointestinal manifestations and disease severity was assessed descriptively.

### Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee of Sri Siddhartha Medical College Hospital and Research Centre prior to data collection. As the study was retrospective in nature, informed consent was waived. Confidentiality of patient information was strictly maintained throughout the study, and data were used solely for academic and research purposes.

## RESULTS

A total of **34 dengue serology-positive patients** were included in the present study. The results are presented under demographic characteristics, clinical features, laboratory parameters, ultrasonography findings, and hospital outcomes, with special emphasis on gastrointestinal manifestations.

**Table 1. Sex Distribution of Study Participants (n = 34)**

| Sex    | Frequency (n) | Percentage (%) |
|--------|---------------|----------------|
| Male   | 21            | 61.8           |
| Female | 13            | 38.2           |

There was a clear **male predominance (61.8%)** among dengue patients, suggesting increased exposure or healthcare-seeking behavior among males in the study population.

**Table 2. Presence of Type 2 Diabetes Mellitus (T2DM)**

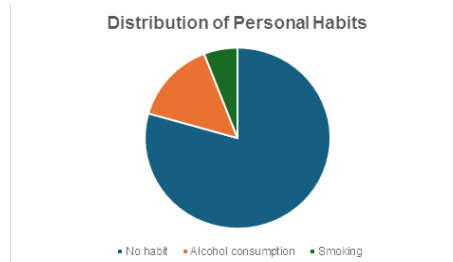
| T2DM Status | Frequency (n) | Percentage (%) |
|-------------|---------------|----------------|
| Yes         | 3             | 8.8            |
| No          | 31            | 91.2           |

Most patients (91.2%) did not have diabetes mellitus, indicating that gastrointestinal manifestations in dengue occurred largely independent of diabetic status.

**Table 3. Distribution of Personal Habits**

| Habit               | Frequency (n) | Percentage (%) |
|---------------------|---------------|----------------|
| No habit            | 27            | 79.4           |
| Alcohol consumption | 5             | 14.7           |
| Smoking             | 2             | 5.9            |

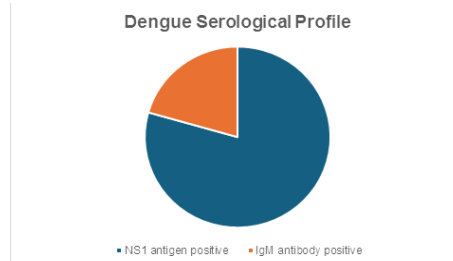
The majority of patients had **no addictive habits**, reducing the likelihood of confounding liver enzyme abnormalities due to alcohol or smoking.



**Table 4. Dengue Serological Profile**

| Serology              | Frequency (n) | Percentage (%) |
|-----------------------|---------------|----------------|
| NS1 antigen positive  | 27            | 79.4           |
| IgM antibody positive | 7             | 20.6           |

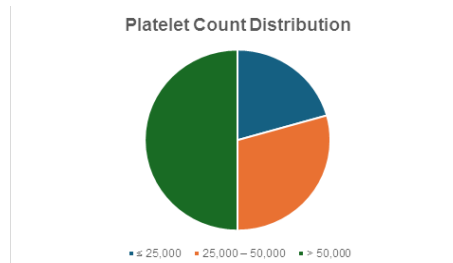
Most patients were **NS1 antigen positive**, indicating presentation during the **early phase of dengue infection**, when gastrointestinal manifestations were already evident.



**Table 5. Platelet Count Distribution**

| Platelet Count (cells/mm <sup>3</sup> ) | Frequency (n) | Percentage (%) |
|-----------------------------------------|---------------|----------------|
| ≤ 25,000                                | 7             | 20.6           |
| 25,000 – 50,000                         | 10            | 29.4           |
| > 50,000                                | 17            | 50.0           |

Half of the patients maintained platelet counts above 50,000/mm<sup>3</sup>, while **50% had significant thrombocytopenia**, highlighted hematological involvement along with gastrointestinal symptoms.

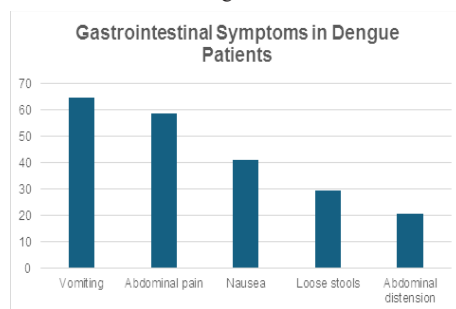


**Table 6. Gastrointestinal Symptoms in Dengue Patients**

| GI Symptom           | Frequency (n) | Percentage (%) |
|----------------------|---------------|----------------|
| Vomiting             | 22            | 64.7           |
| Abdominal pain       | 20            | 58.8           |
| Nausea               | 14            | 41.2           |
| Loose stools         | 10            | 29.4           |
| Abdominal distension | 7             | 20.6           |

**Vomiting and abdominal pain** were the most common

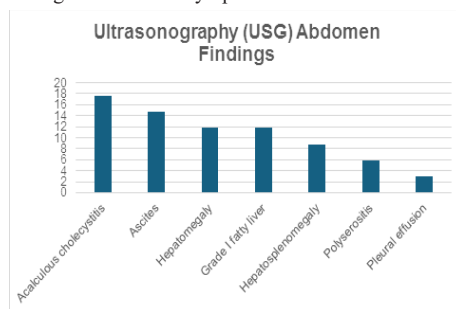
gastrointestinal manifestations, emphasizing their role as early and prominent clinical features of dengue infection.



**Table 7. Liver Function Test (LFT) Abnormalities**

| LFT Status            | Frequency (n) | Percentage (%) |
|-----------------------|---------------|----------------|
| SGOT/SGPT elevated    | 16            | 47.1           |
| SGOT/SGPT normal      | 12            | 35.3           |
| Completely normal LFT | 6             | 17.6           |

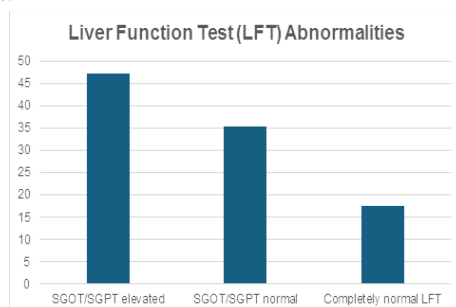
Nearly **half of the patients (47.1%)** showed elevated transaminases, confirming that **hepatic involvement was common** among dengue patients with gastrointestinal symptoms.



**Table 8. Ultrasonography (USG) Abdomen Findings**

| USG Finding              | Frequency (n) | Percentage (%) |
|--------------------------|---------------|----------------|
| Acalculous cholecystitis | 6             | 17.6           |
| Ascites                  | 5             | 14.7           |
| Hepatomegaly             | 4             | 11.8           |
| Grade I fatty liver      | 4             | 11.8           |
| Hepatosplenomegaly       | 3             | 8.8            |
| Polyserositis            | 2             | 5.9            |
| Pleural effusion         | 1             | 2.9            |

Gallbladder wall edema and ascites were common ultrasonographic findings, indicating **plasma leakage and progression toward severe dengue**.



**Table 9. Gastrointestinal Involvement**

| GI Involvement | Frequency (n) | Percentage (%) |
|----------------|---------------|----------------|
| Present        | 28            | 82.4           |
| Absent         | 6             | 17.6           |

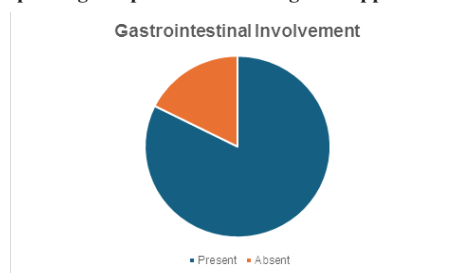
A large majority (**82.4%**) of dengue patients had at least one gastrointestinal manifestation, confirming the **high burden of GI involvement** in dengue infection.

**Table 10. Duration of Hospital Stay**

| Parameter     | Mean $\pm$ SD (days) |
|---------------|----------------------|
| Hospital stay | 4.53 $\pm$ 0.96      |

The mean duration of hospital stay was approximately **4.5 days**, indicating that patients with gastrointestinal manifestations often

required **prolonged inpatient monitoring and supportive care**.



## DISCUSSION

The present study evaluated the spectrum of gastrointestinal manifestations in adult patients with dengue infection and demonstrated a high prevalence of gastrointestinal involvement, reinforcing the concept that dengue is a multisystem disease with significant gastrointestinal and hepatobiliary involvement. In this study of 34 dengue serology-positive patients, gastrointestinal manifestations were observed in 82.4% of cases, with vomiting (64.7%) and abdominal pain (58.8%) being the most common symptoms. These findings highlight the clinical importance of gastrointestinal symptoms as prominent presenting features in dengue infection. A male predominance was observed in the present study, with males constituting 61.8% of patients, which is comparable to the male predominance reported by Kulkarni et al., [12] where males accounted for 61% of the study population and by Mazumder et al., [13] where 56.3% of affected children were males. This gender distribution has been attributed to greater outdoor exposure and occupational risk among males in endemic regions. In the present study revealed, 8.8% had type 2 diabetes mellitus and 79.4% reported no addictive habits, minimizing confounding factors that could influence liver function abnormalities. Serologically, 79.4% of patients were NS1 antigen positive, indicating early presentation of dengue infection, which correlates with the early onset of gastrointestinal symptoms observed in participants.

Thrombocytopenia was common, with 20.6% of patients having platelet counts  $\leq 25,000/\text{mm}^3$  and an additional 29.4% having counts between 25,000 and 50,000/ $\text{mm}^3$ , reflecting the hematological involvement frequently associated with dengue infection. Gastrointestinal symptoms in the present study were notably frequent, with vomiting reported in 64.7% and abdominal pain in 58.8% of patients, findings that are comparable to those reported by Mazumder et al., observed vomiting in 72% and abdominal pain in 58% of pediatric dengue patients [13]. Similarly, Neupane et al. [14] reported nausea in 68.9%, vomiting in 56.3%, and abdominal pain in 25.2% of adult dengue patients, with at least one gastrointestinal or hepatic manifestation present in 92.4% of cases. Although the prevalence of abdominal pain in the present study was higher than that reported by Neupane et al., [14] both studies emphasize vomiting and abdominal pain as key gastrointestinal features of dengue. Liver functional abnormalities were the major finding in the present study, with elevated transaminases (SGOT/SGPT) observed in 47.1% of patients. This finding is consistent with the observation by Neupane et al., [14] reported hyper-transaminasemia in 79.8% of patients, and supports the role of hepatic injury as a common manifestation of dengue infection. While the prevalence of transaminase elevation was lower in the present study compared to Neupane et al., the difference may be explained by variations in disease severity, population characteristics, and timing of presentation. Ultrasonographic findings in the present study further highlighted gastrointestinal and hepatobiliary involvement, with acalculous cholecystitis observed in 17.6%, ascites in 14.7%, hepatomegaly in 11.8%, and hepatosplenomegaly in 8.8% of patients. These findings are comparable to those reported by Mazumder et al., [13] documented ascites in 19% and hepatomegaly in 23% of pediatric dengue patients, both of which were significantly associated with dengue severity ( $p < 0.001$ ). The presence of ascites and gallbladder wall edema in the present study supports the concept of plasma leakage as a key pathophysiological mechanism in dengue and underscores the importance of imaging in patients presenting with abdominal symptoms.

The high frequency of gastrointestinal involvement in the present study contrasts with the lower prevalence reported by Tiwary et al., [15] found gastrointestinal manifestations in only 15.9% (35 out of 219) of dengue patients admitted during the 2013–2014 epidemic.

However, Tiwary et al. [15] specifically focused on atypical gastrointestinal presentations such as cholecystitis, hepatitis, appendicitis, and pancreatitis, which may explain the lower overall prevalence compared to the present study, where common gastrointestinal symptoms such as vomiting and abdominal pain were included. Importantly, the present study reinforces the findings of Tiwary et al. that dengue can present with a wide range of gastrointestinal manifestations, including hepatobiliary involvement, which may mimic surgical abdomen and pose diagnostic challenges. The mean duration of hospital stay in the present study was  $4.53 \pm 0.96$  days, which is comparable to the hospital stay reported by Kulkarni et al. in patients without underlying liver disease ( $4.83 \pm 2.88$  days) [2]. Kulkarni et al. also demonstrated that patients with cirrhosis had significantly prolonged hospital stays ( $13 \pm 5$  days) and higher mortality, emphasizing that underlying liver disease adversely affects dengue outcomes. Although patients with chronic liver disease were excluded from the present study, the observed hospital stay highlights the need for inpatient monitoring in dengue patients with gastrointestinal manifestations. The prognostic significance of gastrointestinal symptoms has been emphasized in previous studies; Mazumder et al. [13] reported that gastrointestinal bleeding, ascites, hepatomegaly, hypoalbuminemia, hypocalcaemia, and electrolyte imbalance were significantly associated with severe dengue, while Neupane et al. [14] demonstrated that vomiting and abdominal pain were predictive of severe dengue on multivariate analysis. In the present study, although formal severity stratification was not performed, the high prevalence of vomiting, abdominal pain, liver enzyme elevation, and imaging evidence of plasma leakage suggests that gastrointestinal manifestations may serve as early warning signs of disease progression. At a broader level, the importance of gastrointestinal manifestations in dengue has also been supported by Halsey et al., [16] demonstrated that gastrointestinal manifestations varied by dengue virus serotype, with DENV-3 infections showing a higher prevalence of gastrointestinal and musculoskeletal manifestations compared to other serotypes. This highlights that viral factors, in addition to host factors, may influence the pattern and severity of gastrointestinal involvement. Overall, the findings of the present study, in conjunction with existing literature, emphasize that gastrointestinal manifestations are common, clinically significant, and potentially prognostic in dengue infection. Early recognition of symptoms such as vomiting and abdominal pain, along with laboratory and imaging indicators of hepatic and plasma leakage involvement, is crucial for timely diagnosis, risk stratification, and management of dengue patients, particularly in endemic regions.

## CONCLUSION

The present study demonstrates, the gastrointestinal manifestations are frequent, among patients with dengue infection and constitute an important component of the clinical spectrum of the disease. Constellation of presentation varies from vomiting and abdominal pain, along with significant laboratory abnormalities including thrombocytopenia and elevated liver enzymes, and ultrasonographic evidence of hepatobiliary involvement and plasma leakage. These findings highlight that gastrointestinal involvement in dengue is common and may serve as an early warning indicator of disease severity, often necessitating hospitalization and close monitoring. In dengue-endemic regions, clinicians should maintain a high index of suspicion for dengue in patients presenting with acute febrile illness and gastrointestinal manifestations.

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