Bangladesh Journal of Medicine (BJM)
ISSN : 1023 - 1986
eISSN : 2408 - 8366

ORIGINAL ARTICLE

GASTROINTESTINAL MANIFESTATIONS AND LABORATORY PARAMETERS OF DENGUE PATIENT IN A DENGUE CORNER AT A SPECIALIZED HOSPITAL, BANGLADESH

PARASH ULLAH[1], SHAMIM ARA KEYA[2], FAZLE RABBI CHOWDHURY[3], FARHANA SALAM[4]

Abstract:

Background: *Dengue is an important tropical infection caused by Dengue virus and its epidemics are becoming more frequent over the time. Gastrointestinal (GI) manifestation is one of the most common manifestations and mostly missed due to lack of awareness and knowledge. This study was conducted to find out the gastrointestinal manifestations, laboratory parameters and its correlation with the severity of dengue fever.* ***Methods:*** *It was a cross-sectional observational study, conducted on 100 serologically confirmed dengue virus infected patients admitted in DNCC Dedicated Covid-19 Hospital. Patients were examined clinically, and laboratory data was collected in respect of GI manifestations. Statistical analysis was done using SPSS software version 25.* ***Results:*** *The study participants were 100 consecutive cases of dengue syndrome, out of which 38% cases were dengue fever (DF), 12% were Dengue haemorrhagic fever (DHF), 22% were Dengue Shock syndrome (DSS) and 28% were Dengue expanded syndrome (DES). Mean age was 29.66 ± 19.69 years and age range were from 03 to 85 years, 62% were males and 38% were females, male to female ratio was1.6:1, and 44% patients were from Dhaka city. Gastrointestinal manifestations were anorexia 92%, nausea 90% & abdominal pain and vomiting were 84% followed by diarrhoea 56%. GI bleeding manifesting were 38%, among them, hematemesis, melena and gum bleeding were found 14%, 26% and 16% respectively. Others manifestations like ascites, hepatomegaly, acalculous cholecystitis and jaundice were found 52%, 26%, 42% and 10% respectively. Of these, GI manifestations diarrhoea correlated with severity of Dengue fever.* ***Conclusion:*** *Gastrointestinal manifestations are very common in Dengue fever. Atypical Gastrointestinal manifestations should be handled very cautiously.*

Keywords: *Dengue fever, Gastrointestinal Manifestations, Liver Enzymes, Hepatomegaly, Dengue severity.*

Received: 03.12.2024 *Accepted: 14.12.2027*
DOI: https://doi.org/10.3329/bjm.v36i1.78156.

Citation: *Ullah P, Keya SA, Chowdhury FR, Salam F. Gastrointestinal Manifestations and Laboratory Parameters of Dengue Patient in a Dengue Corner at a Specialized Hospital, Bangladesh . Bangladesh J Medicine 2025; 36: 37-42.*

Introduction:

The origin of the word dengue is not exactly clear, but there is a theory that it derived from the Swahili phrase "Ka-dinga pepo", meaning "cramp-like seizure caused by an evil spirit". The Swahili word "dinga" may possibly origin in the Spanish word "dengue" meaning fastidious or careful, which would describe the gait of a person suffering the bone pain of dengue fever.[1]

The first record of a case of probable dengue fever is in a Chinese medical encyclopaedia from the Jin Dynasty (265–420 AD). The first recognized Dengue epidemics

1. Department of Gastroenterology, Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh.
2. Consultant and Head, Department of Pathology, Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh.
3. Associate Professor, Department of Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
4. Assistant Professor, Department of Surgery, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh.

Address of Correspondence: Dr.Dr. Parash Ullah, Department of Gastroenterology, , Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh, Email: drparashullah@gmail.com ORCID ID- https://orcid.org/0000-0001-6397-9736

occurred almost simultaneously in Asia, Africa, and North America in the 1780s. The first confirmed case report dates from 1789 and is by Benjamin Rush, who coined the term "breakbone fever" because of the symptoms of myalgia and arthralgia.[1]

Dengue is one of the most common and widespread arthropod mediated viral infection. It is caused by flavivirus and spread by the Aedes aegypti mosquito. More than 2.5 billion people reside in the risky areas for dengue infection in the world.[2] In Asia, Dengue has appeared as an important public health issue since 1950. Worldwide South East Asian countries contribute more than half of dengue global risk. Bangladesh, India, Pakistan, and Sri Lanka are the most vulnerable counties among them.[3,4]

Bangladesh is situated in the tropical and sub-tropical areas have become a suitable habitat for the dengue infections. Dengue occurs in sporadically at Dhaka and other parts of the country before 2000.[2] Dengue outbreaks from 2000-2017, both types of the vectors (*Aedes aegypti* and *Aedes albopictus*) were identified in Bangladesh.[5]

Dengue fever has a wide range of clinical manifestations and range from an asymptomatic or mild febrile illness (viral syndrome), dengue fever (DF), dengue haemorrhagic fever (DHF) to dengue shock syndrome (DSS) and atypical manifestations or Expanded Dengue Syndrome (EDS) like hepatitis and gastrointestinal involvement which could be challenging for clinicians.[6,7] Atypical gastrointestinal manifestations like hepatitis, acute pancreatitis, acute cholecystitis etc. are increased with rising disease burden due to rapid urbanization, growing population and inappropriate sanitary measures.[7,8,9]

Hasan et al. (2021), in a study found the gastrointestinal (GIT) features as abdominal pain (86.5%), anorexia and/or vomiting (69.6%), and Diarrhoea (26.2%) and these findings were more frequent than typical rash and other pain symptoms. Compared to outbreaks of 2008, 2016, and 2018, increasing trends in GIT symptoms e.g. anorexia, abdominal pain, and diarrhoea were observed. While a negative trend in haemorrhagic manifestations (skin rash, melena, and conjunctival haemorrhage/ haemorrhagic sclera) and arthralgia/ joint pain were found.[10] So, this study is aimed to identify the recent spectrum of gastrointestinal symptoms, signs and laboratory parameters of dengue patients in our settings.

Methods:

This was a descriptive cross-sectional study conducted in DNCC Dedicated Covid-19 Hospital (Dengue corner), Mohakhali, Dhaka, Bangladesh during the period from August 2023 to January, 2024. All the patients presented with serologically positive dengue cases and fulfilling the inclusion criteria were selected as the study population. In this study, we enrolled around 100 cases within speculated time. Non-randomized purposive sampling was employed as sampling technique and a predesigned structured questionnaire was used for data collection. Patients of any age irrespective of sex and patients with dengue syndrome, NS1 or IgM positive with or without IgG positive. Patients with Malaria. meningitis and Enteric fever and other causes of fever except dengue, decompensated chronic liver disease, acute pancreatitis or cholangitis, cholelithiasis or cholecystectomy, previously diagnosed bleeding disorder were excluded

Following admission in the DNCC Dedicated Covid-19 Hospital (dengue corner), patients was sort out according to inclusion and exclusion criteria. All the patients were counselled regarding the study aim, objectives, and usefulness of the study. Written informed consent was collected from each patient and interviews were taken by the researcher himself with a structured questionnaire. History regarding demographic profile, co-morbid disease and clinical presentation, gastrointestinal manifestations were taken. Patients were followed up daily during their hospital stay and their clinical and laboratory parameters were collected. The most extreme (highest or lowest) laboratory parameters were taken for analysis.

During data collection, highest standard ethical measures were ensured and maintained throughout the study. Following data collection, it was checked and verified. Collected data were encoded and analysed in SPSS software 25 for windows 7. It was described and presented as mean ± standard deviation. Frequencies and percentages were calculated for gender, disease nature (DF, DHF, DSS, EDS), dengue serology, gastrointestinal symptoms, and atypical GI manifestations. Test of significance was applied for GI manifestations to find out any relationship with the severity of dengue infection. A P value of <0.05 was considered as statistically significant.

Results:

Table I

Demographic profile of study population (n=100)

Variables	n (%)	
Age	Range (years)	03-85 (years)
	Mean ± SD	29.66 ± 19.69
Sex	Male	62 (62%)
	Female	38 (38%)
Residence	Dhaka city	44 (44%)
	Outside of Dhaka City	56 (56%)
Clinical manifestations	Dengue fever (DF)	38 (38%)
	Dengue haemorrhagic fever (DHF)	12 (12%)
	Dengue Shock syndrome (DSS)	22 (22%)
	Dengue expanded syndrome (DES).	28 (28%)
Severity of Dengue syndrome	Non severe dengue	38 (38%)
	Severe dengue	62 (62%)

Table I shows the demographic profile of study population. The mean age was 29.66 ± 19.69 years. 62% were males and male to female ratio was 1.6:1. 44% patients were from Dhaka city and 56% came from outside of Dhaka city. Severe Dengue was 62%, among them, 12(12%) were Dengue Haemorrhagic Fever (DHF) and 22(22%) were Dengue Shock Syndrome (DSS) and the rest 28 (28%) were Dengue Expanded Syndrome (DES).

Table II

Diagnosis of dengue cases (n=100)

Test	Positive	Negative	Not detected
NS1	86	8	6
IgM	20	54	26
IgG	10	64	26
IgM +IgG	10		

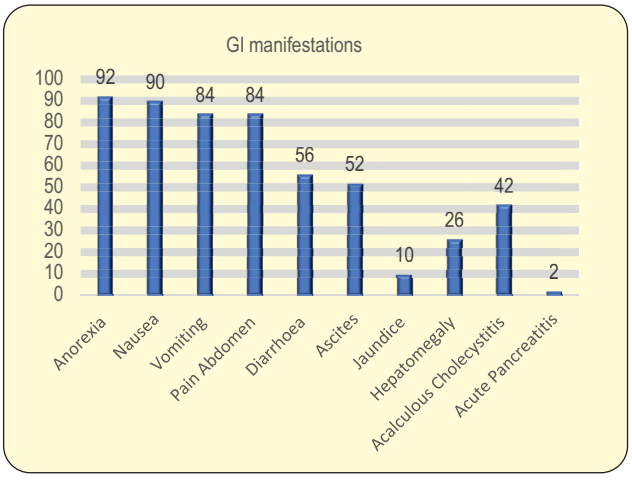

Fig.- 1: *Distribution of various GI manifestations in Dengue fever (n=100)*

Table II shows the diagnostic tools for Dengue patients. Most of the patients were NS1 (86%) positive, followed by anti-dengue IgM antibody positive 20%. 10% patients had both IgM and IgG positive.

Most common gastrointestinal presentation were anorexia 92%, nausea 90%, Vomiting and abdominal pain were 84%, followed by diarrhoea 56%. Ascites, jaundice, hepatomegaly and acalculus cholecystitis were noted in 52%, 10%, 263% and 42% respectively. Acute Pancreatitis was found in 02 cases.

Table III

Gastrointestinal bleeding manifesting among the study population

Manifestations		Percentage
GI bleeding	Hematemesis	14 (14%)
manifesting	Melena	20(20%)
38 (38%)	Gum Bleeding	16 (16%)
	Per Rectal bleeding	12 (12%)

GI bleeding was found in 38% cases. Among bleeding manifesting, hematemesis, melena, gum bleeding and per rectal bleeding were found in 14%, 20%, 16% and 12% patients respectively. Most of the bleeding manifestations were overlapped with each other.

Table IV

GI manifestations and laboratory parameters with severity of dengue (n=100).

GI manifestation	Non severe dengue DF, (n=38)	Severe dengue (n=62)			P value
		DHF, n=12	DSS, n=22E	DES, n=28	Total, n=62	
Anorexia	34	10	22	26	58	0.465
Nausea	34	10	20	26	56	0.890
Vomiting	30	8	20	26	54	0.280
Pain abdomen	30	8	20	26	54	0.280
Diarrhoea	12	8	16	20	44	0.0001*
Ascites	18	6	12	16	34	0.467
Jaundice	2	0	0	8	8	0.216
Hepatomegaly	12	4	0	10	14	0.319
Acalculous cholecystitis	18	6	4	14	24	0.394
GI Bleeding	12	8	6	12	26	0.300
SGPT	30	10	14	28	54	0.280
SGOT	38	12	20	28	60	0.613

* Statistically Significant, P value <0.05, Chi-Square test was applied

Table IV denotes the Gastrointestinal and related biochemical parameters in both severe and non-severe dengue cases. In this study only diarrhoea is statistically significant (p <0.05) among severe dengue patients.

Discussion:

In this study, 100 serologically confirmed dengue patient were enrolled and the clinical and laboratory profile related to gastrointestinal involvements during the period of august 2023 to January 2024 at DNCC dedicated Covid-19 Hospital in Dhaka, Bangladesh were observed.

The study population in this study were in between 3-85 year and the mean age 29.66±19.69. Prashanth VN et al, conducted a study on 100 patients in Bangalore, India and they found the age distribution between 18-70 years and mean age 32.98±12.4 years.[8] Tanveer Hussain et al, also conducted a study in Pakistan on 100 patients and they found the study populations in between 13-72 years.[11] So, these findings are consistent with other related studies.

In the present study, male was 62%, female was 38% and male to female ratio was 1.6:1. These findings are matched with the study of Tanveer Hussain et al, where they found 58% male and 42% female.[11] Male predominant may be due to the more exposure of male to mosquito bite during outdoor activities and female has relatively less infection may be due to the traditional wearing of full slip cloth as well as less time spending at outside.[12]

Dengue is a widely spread infectious disease. In our study, it was found that 44% patients were from Dhaka city and 56% admitted from outside of Dhaka city. Recent study revealed that 56% patients from urban areas and 44% from rural areas.[8] According to WHO, dengue virus infection gradually shifted to rural areas.[13] DGHS reported that, more than 100,000 cases were hospitalized due to dengue, and among them, about 50% were from Dhaka City in 2019.[14]

The participants of this study, categorized into DF, DHF and DSS and EDS according to WHO guidelines 2009 and national guidelines for clinical management of dengue fever of Bangladesh.[2,7,13,14] Non severe dengue were 38% and Severe Dengue was 62%, among them, 12(12%) were Dengue Haemorrhagic Fever (DHF) and 22(22%) were Dengue Shock Syndrome (DSS) and the rest 28 (28%) were Dengue Expanded Syndrome (DES). In another study, 35% patients have DF, 54% DHF and 11% DSS.[11] In a study by Mazumder et al, they found 57% classical DF, 26% DHF and 17% DSS.[12] In this study severe dengue cases were found more which may be due to the DNCC centre, as because this centre was dedicated as dengue hospital and critical cases were referred here.

The gold standard investigation for the diagnosis of dengue is the detection, isolation and identification of virus by the RT- PCR method.[15] But due to economical constraints, low cost and easy serological test is an alternative way to diagnosis dengue for developing countries. For this perspective, ELISA test for NS1 antigen or specific IgM and IgG detection is an important diagnostic tool compared to RT-PCR.[16] In the present study, most of the patients were NS1 (86%) positive, followed by anti-dengue IgM antibody (20%) positive. 10% patients had both IgM and IgG positive. R. Mahmood et al. conducted a study where they found NS1 Positive in 93%. So, the observations are in line with the study conducted by R. Mahmood et al.[17]

Dengue has wide spread presentation. In this current study predominantly, gastrointestinal features had been studied. Most common gastrointestinal presentation was anorexia (92%), nausea (90%). Vomiting and abdominal pain were 84%, followed by diarrhoea 56%. Ascites, jaundice, hepatomegaly and acalculus cholecystitis were noted in 52%, 10%, 263% and 42% respectively. Acute pancreatitis was found in 02 cases. A current study *found that gastrointestinal* manifestations in 96% cases. They observed nausea 71%, vomiting 59%, pain abdomen 33 %, diarrhoea 13%. Ascites was present in 24%, acalculous cholecystitis in 13%, hepatomegaly 14%, splenomegaly 16%. Acute pancreatitis was found in 4% of patients.[8] Another study by Tanveer Hussain et al., found nausea 89%, vomiting 55%, abdominal pain 59%, diarrhoea 18%, ascites 44%, hepatomegaly 14%, acalculous cholecystitis 22%, acute severe liver injury in 5% and acute pancreatitis in 2%.[11] So, the clinical findings of our study are consistent with the other various study.

GI bleeding was found in 38% cases. Among bleeding manifesting, hematemesis, melena, gum bleeding and per rectal bleeding were found in 14%, 20%, 16% and 12% patients respectively. Most of the bleeding manifestations were overlapped with each other. Recent studies found GI bleeding in 9% and 6% respectively.[8,11]

Bleeding manifestation is a common presentation in Dengue. Petechiae, purpura, ecchymosis, and GI bleeding may occur in critical cases. Among gastrointestinal bleeding manifesting, hematemesis, melena, gum bleeding and per rectal bleeding were found.[18,19] Bleeding manifestation in Dengue has multifactorial causes, it may be due to decreased platelet function. The other causes are fibrinogen consumption, prolongation of PT/aPTT, and vasculopathy.[20]

In this present study, there are many gastrointestinal presentations, among them, only diarrhoea is statistically significant ($p < 0.05$) in severe dengue patients. Prashanth VN observed that nausea, vomiting, abdominal pain, jaundice, GI bleeding, ascites, elevation of transaminases, acute fulminant hepatitis and acute pancreatitis correlated with severity of Dengue fever. Other studies found that GI bleedings (hematemesis & melena), ascites, hepatomegaly were significant with dengue severity.[8,12]

Conclusion:

Dengue fever is very common infection in our country with vast of presentation and complications. Preventive measures, prompt diagnosis and proper management can bring down its mortality. Patients present with atypical GI manifestations should be handle very cautiously.

Ethical Approval:

The study was conducted in accordance with the Declaration of Helsinki. This study was approved by the Institutional Review Board of Shaheed Suhrawardy Medical College (Memo no/ShSMC/Ethical/2023/02). Written informed consent was taken from all the patients before taking part of the study.

Funding:

No funding sources

Conflict of interest:

No author has any conflict of interest to disclose for this manuscript.

Author Contributions:

Conception and design of the study: PU. Acquisition, analysis and interpretation of data: PU, FRC, Manuscript drafting and revising it critically: PU, SAK, FRC, FS, Approval of the final version of the manuscript: PU, SAK, FRC and Guarantor accuracy and integrity of the work: PU

Acknowledgements:

Authors would like to grateful to all patients who participated in our study and the Authority of DNCC hospital.

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