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Identification of Clinical Characteristics of Dengue Fever at Tertiary Care Hospital in Bangladesh

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Abstract **Original Research Article**

Background: Dengue fever (DF) is a viral illness transmitted by Aedesaegypti and Aedesalbopictus mosquitoes, which are found globally. The etiological agent responsible for Dengue Fever (DF) is the dengue virus, which belongs to the Flaviviridae family. The disease exhibits clinical manifestations including pyrexia, intense cephalalgia, arthralgia, myalgia, and cutaneous eruptions. ***Objective*****:** The objective of the current study was to examine the diverse clinical manifestations of dengue fever and conduct an investigation of the platelet profile in individuals diagnosed with DF. ***Methods:*** The present observational study was conducted on of100 individuals who were diagnosed with dengue fever between July 2022 and July 2024. The participants were selected from a tertiary care hospital located in Bangladesh, and all of them were over the age of 14 years. The data-collecting process encompassed the gathering of several patient attributes, such as age and gender, as well as clinical symptoms, hematocrit levels, platelet counts, and indications of plasma leakage. ***Results:*** The majority of the patients fall within the age range of 15 to 24 years, exhibiting a higher proportion of males in comparison to girls. The prevailing manifestation of dengue fever was characterized by the presence of fever and myalgia, which were reported in 100% and 94% of the patients, respectively. In 63% of patients, a platelet counts below 1,00,000 was seen; while a reduced total leukocyte count (TLC) and hematocrit were observed in 52% and 54% of patients, respectively. Approximately 48% of the individuals exhibited bradycardia during the assessment. Pleural effusion and ascites were observed in 25% and 22% of the patient population, respectively. ***Conclusion:*** Dengue fever is a widespread, endemic illness in developing nations, with fever, myalgia, headaches, dermatological symptoms, and arthralgia being the most common symptoms. Severe complications include hemorrhagic fever and organ damage.

Keywords: Dengue fever (DF), Aedesalbopictus mosquitoes, Flaviviridae family, hematocrit levels.

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INTRODUCTION

Dengue fever (DF) is a transient, self-restricting systemic viral disease that is attributed to the dengue virus (Flaviviridae), which is disseminated worldwide by the Aedesaegypti and Aedesalbopictus mosquito species [1]. DF has been identified by the World Health Organization (WHO) as one of the foremost global health hazards, ranking among the top ten. The estimated annual global incidence of dengue virus infection is approximately 390 million individuals, of which approximately 96 million individuals exhibit clinical symptoms. Over the course of the preceding decade, there has been a notable increase in the incidence of cases in Southeast Asia [2]. Dengue fever (DF) poses a significant public health concern in countries located in tropical and subtropical regions. The frequency of epidemics in India is on the rise, placing a significant strain on the limited resources of the public health system. The prevalence of dengue cases in India has exhibited a notable escalation in recent times. Dengue epidemics in India exhibit cyclical patterns, with geographical expansion into rural areas, and the circulation of various serotypes within the population [3]. Dengue cases can be identified through specific clinical criteria, although they may manifest with a range of symptoms. DF is a disease characterized by its enigmatic nature, encompassing the intricate interplay between the virus-vector and host-virus relationships, as well as a diverse array of clinical manifestations [4]. The manifestation of dengue infection encompasses a range of clinical presentations, spanning from a mild febrile illness known as dengue fever (DF) to more severe forms such as dengue

hemorrhagic fever (DHF) and dengue shock syndrome (DSS) [5]. The most lethal forms of this disease, namely DHF and DSS, have been recorded in India, specifically in the cities of Delhi, Calcutta, and Chennai [6]. In the decade subsequent to the initial epidemic, there has been an observed temporal shift in the frequency of different clinical symptoms. The alteration in the clinical manifestation was hypothesized to be attributed to the fluctuation of serotypes (DEN-1, 2, 3, and 4) during outbreaks and subsequent reinfections. Furthermore, comprehensive serotype information for each instance is currently not accessible [7]. Antipyretics and analgesics are utilized in the symptomatic treatment of DF to alleviate musculoskeletal discomfort. In more severe cases, hospitalization may be required in addition to ensuring proper hydration. The febrile phase of dengue fever (DF) is characterized by elevated body temperature, headache, muscle pain, general body discomfort, vomiting, joint pain, a transient rash, and mild bleeding manifestations including petechiae, ecchymosis at sites of pressure, and bleeding from venipuncture sites [8]. The likelihood of the patient developing severe dengue (SD) is heightened during the critical phase, characterized by plasma leakage that may result in shock, fluid accumulation (ascites or pleural effusion), severe bleeding without respiratory distress, and significant organ impairment [9]. Uncommon clinical manifestations include acute liver failure, encephalopathy accompanied by convulsions, renal dysfunction, and lower gastrointestinal hemorrhage. The 2linic-epidemiologic characteristics of dengue infection have been extensively examined in numerous published studies [10].

The study focused on evaluating the clinical and hematological profiles of patients diagnosed with dengue fever who sought medical attention at the outpatient or emergency departments of a tertiary care hospital. The objective of the current study was to examine the various clinical manifestations of dengue fever and analyze the platelet profile in patients with this condition.

OBJECTIVE

To examine the diverse clinical manifestations of dengue fever and conduct an investigation of the platelet profile in individuals diagnosed with DF.

MATERIALS AND METHOD

The current observational study was carried out at a tertiary care hospital over a period of 24 months, specifically during the dengue fever season spanning from 2022 to 2024. This study included 100 individuals who sought medical attention at the outpatient department and exhibited symptoms of fever and clinical manifestations consistent with dengue, as well as a positive result on the dengue NS1 test. Prior to participating in the clinical trial, all volunteers provided written informed consent.

Inclusion Criteria:

- Both male and female
- Age over 14 years
- Positive dengue PCR
- Positive anti-dengue IgM or anti-dengue IgG in a patient who has fever <7 days
- Platelet count equal to or below 100,000/µL

Exclusion Criteria:

- Presented with additional viral or bacterial infections subsequent to a routine laboratory examination.
- Those who declined to partake in the survey.

Data Collection and Analysis:

During the time of the presentation, data was gathered pertaining to various factors including age, gender, clinical presentation, duration of fever, myalgia, joint pain, vomiting, rash, bleeding, hepatomegaly, headache, and shock. Additionally, evidence of plasma leakage such as ascites, pleural effusion, presence of petechiae, positive tourniquet test, other bleeding manifestations, hematocrit, and platelet count were also recorded. Patients were categorized into three groups, namely dengue fever without warning signals (DF), dengue fever with warning signs (DFWS), or severe dengue (SD), based on the manifestation of clinical symptoms. The data were systematically organized and subsequently represented as numerical values expressed in percentages.

RESULTS

All participants were effectively registered in the research study. The majority of the patients fell within the age range of 15-24 years, constituting 40% of the total. This was followed by the age group of 25-34 years, which accounted for 20% of the patients. The age groups of 35-44 years, 45-54 years, and >54 years represented 12%, 18%, and 10% of the patients, respectively.

Table 1: Age Distribution of the Study Patients

Age	Frequency	Frequency
15-24 Years	40	40%
25-34 Years	20	20%
35-44 Years	12	12%
45-54 Years	18	18%
>54 Years	10	10%
Total	**100**	**100%**

Sixty-eight percent of the 100 patients were men, compared to 32 percent of the female patients. This suggests that there is a higher proportion of male patients in the sample population. It would be interesting to further investigate the reasons behind this

gender disparity and its potential implications on healthcare outcomes.

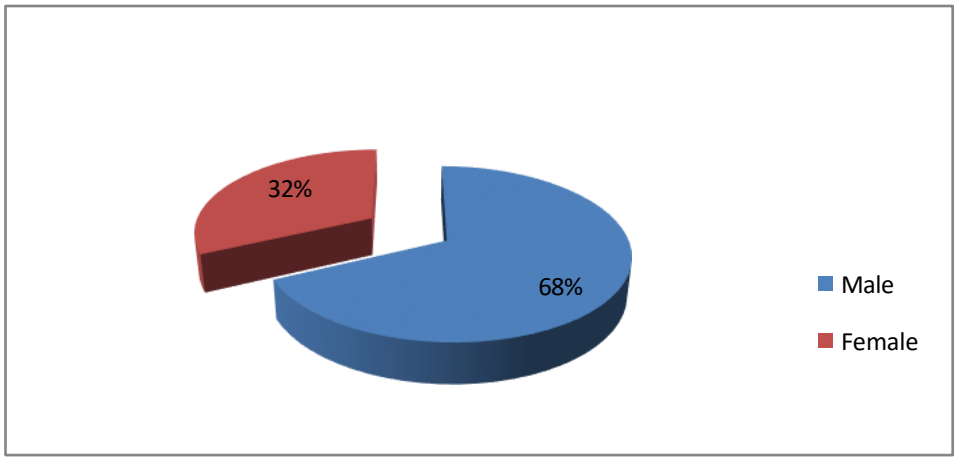

Figure 1: Gender Distribution of the Patients

The incidence of dengue severity was observed to have escalated in 11% of patients diagnosed with dengue hemorrhagic fever (DHF), while a 5% increase was noted in patients with dengue shock syndrome (DSS). The DHF and DSS categories were primarily composed of male patients, accounting for 8% and 3% of the cases, respectively. A lower proportion of female patients were observed in the DHF group (3%) and the DSS group (2%).

The results of this study indicate that there is a higher incidence of severe dengue cases among male patients in comparison to female patients. Additional investigation is required in order to comprehensively comprehend the potential variables that may be contributing to the observed gender disparity in the severity of dengue.

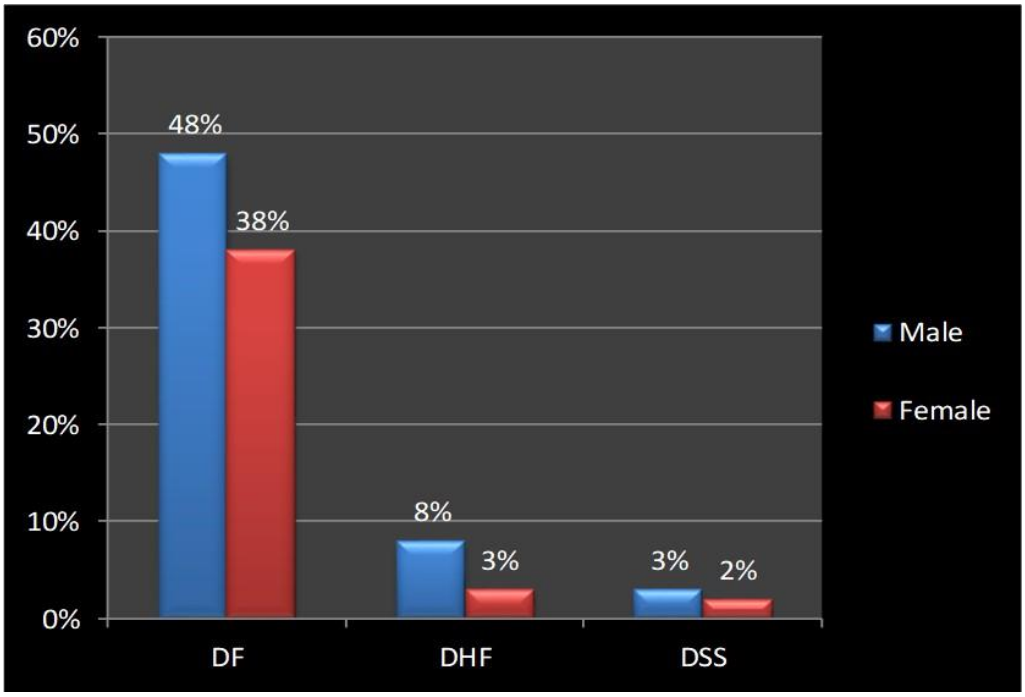

Figure 2: Gender-specific clinical syndrome of dengue patients

In the patient cohort, it was observed that all individuals presented with fever (100%), while myalgia (6), headache (92%), and joint pain (90%) were also prevalent symptoms, occurring at higher frequencies of Vomiting and rashes were observed in 54% and 29% of the patients, respectively. The majority of patients did not exhibit bleeding (98%) or hepatomegaly (97%).

Table 2: Clinical features of patients with dengue fever

Variables	Frequency	Percentage
Fever	100	100%
Myalgia	94	94%
Joint pain	90	90%
Vomiting	54	54%
Pain ABD	49	49%
Rash	29	29%
Bleeding	2	2%
Headache	78	78%
Hepatomegaly	2	2%

Upon examination of the hematological parameters, it was observed that 63% of the patients exhibited a platelet count lower than 1,00,000/µL. The leukocyte count, also known as the total leukocyte count (TLC), was found to be below 4000 in 52% of cases and above 11,000 in 3% of cases. Nevertheless, it is worth noting that a significant proportion of patients, specifically 45%, exhibited normal total leukocyte count (TLC). Among the patients, 68 individuals (54%) exhibited a hematocrit level below 40, while 37 patients (13%) had a hematocrit level ranging from 40 to 45. Additionally, 25 patients (33%) displayed a hematocrit level exceeding 45. Bradycardia was observed in 48% of the individuals (Table 3).

Table 3: Laboratory hematological parameters

Parameters		Normal reference value	Number (%)
Platelet count	<100,000	1,00,000-2,50,000 per microliter	63(63)
	>100,000		37(37)
	Total		100 (100)
Total leukocyte count	<4000 cu.mm	4000-11,000 cu.mm	52 (52)
	>11000 cu.mm		3 (3)
	4000-11000 cu.mm		45 (45)
	Total		100 (100)
Hematocrit	Below 40	35.5% to 44.9%	54 (54)
	40-45		13 (13)
	Above 45		33 (33)
	Total		100 (100)
Bradycardia	Present	60-90 beats per minute	48(48)
	Absent		52(52)

The available data indicates that pleural effusion was observed in 25% of cases as a manifestation of plasma leakage, followed by ascites in 22% of cases and pedal edema in 8% of cases.

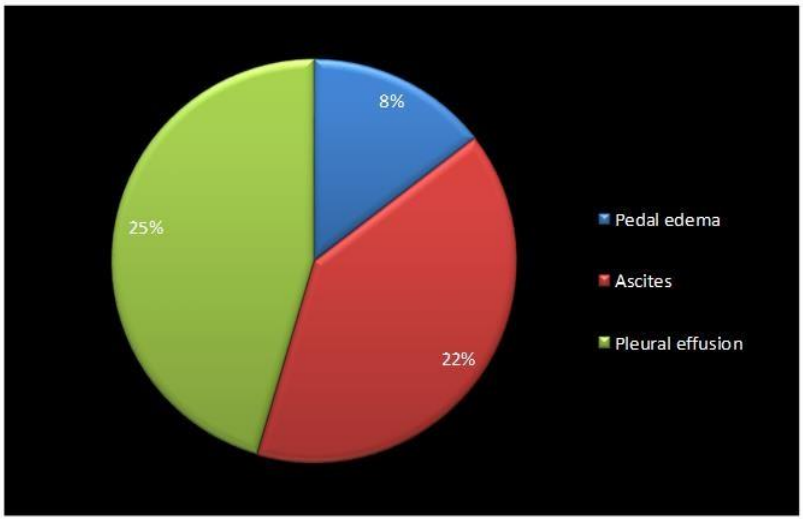

Figure 3: Bleeding manifestation in dengue patients

DISCUSSION

The objective of this study was to investigate the clinical and laboratory parameters of patients with dengue fever who sought medical care at our hospital. The objective of this study is to establish a comprehensive clinical-hematologic profile of dengue disease in order to facilitate the timely and appropriate management of patients requiring immediate attention. The research was carried out on a sample of 100 individuals who tested positive for dengue fever and exhibited seropositivity. Predominantly, the affliction was noted within the demographic of young adult males ranging from 15 to 24 years old. The syndrome that was most frequently observed in the study was DF, in comparison to DHF and DSS. Nevertheless, the most prevalent symptoms detected in the patients were fever and myalgia, with a 100% and 94% occurrence rate, respectively. Furthermore, it was revealed that 52% of the patients had a hematocrit level below 40. A prevalence rate of 48% was observed for bradycardia among the patient population. The most often observed signs of plasma leakage were pleural effusion and ascites.

The current investigation revealed a higher prevalence of the DF strain of dengue virus among males. Multiple studies have revealed similar prevalence of infections among male patients. The results establish a correlation between the prevalence of the virus and the comparatively greater rates of exposure in males. Dengue fever is classified into three categories, namely DF, DHF, or DSS, based on the level of severity exhibited by the clinical signs [11, 12]. The findings of this study were consistent with previous publications that reported a greater prevalence of dengue fever (DF) at 94%, compared to dengue hemorrhagic fever (DHF) at 28% and dengue shock syndrome (DSS) at 8%, among the 130 individuals with dengue who were included in the analysis [13].

Patients presenting with classic dengue fever often exhibit a triad of symptoms, which includes arthralgia, myalgia, retro-orbital pain, rash, and hemorrhagic indications, with or without shock. In recent times, there has been a growing body of evidence documenting respiratory symptoms, gastrointestinal disturbances, a decreased platelet count, and anomalous liver function tests as clinical manifestations of dengue fever. In the decade subsequent to the initial outbreak, there has been an observed temporal shift in the occurrence rates of several clinical signs.The presence of fever was documented as a notable indicator during the outbreaks that occurred in the years 2010 and 2018 [14]. Our investigation identified a probable combination of symptoms, wherein fever and myalgia were the most prevalent, accompanied by less frequent indicators such as headache, joint pain, vomiting, abdominal discomfort, rash, hepatomegaly, and bleeding.

Hemorrhagic manifestation is a consequence of DF due to a decrease in platelet count and an increase in capillary permeability [15]. This phenomenon was observed in the majority of our patients, as indicated by a decrease in platelet count in 63% of cases. Currently, we have not seen any patients exhibiting bleeding signs and a positive tourniquet test throughout our ongoing duty. The majority of patients included in our study exhibited neutropenia, and our results align with the research conducted by Singh *et al*., which also reported comparable low total leukocyte counts [16]. A discrepancy in the total leukocyte count (TLC) of individuals diagnosed with dengue was also observed, mirroring the findings of our own investigation [17]. This study also suggests that the destruction or inhibition of myeloid progenitor cells generated by the virus may be responsible for the occurrence of leukopenia in individuals with dengue fever. Bradycardia, a prominent sign of dengue, was observed in 46.15% of the patient population. A comparable incidence of bradycardia was documented in a previous study [18]. The occurrence of transitions leading to plasma leakage, which subsequently caused respiratory distress syndrome and organ failure, was observed with greater frequency. These transitions were believed to be indicative of a higher likelihood of mortality among those diagnosed with dengue [19]. According to our investigation, pleural effusion and ascites were identified as the prevailing signs of bleeding. The incidence of ascites and pleural effusion in dengue patients was recognized as a probable event [20].

CONCLUSION

Dengue fever is a significant endemic illness, particularly prevalent in developing nations. The current study investigates the prevalent clinical and hematological manifestations of dengue fever, along with other associated syndromes. The most prevalent symptoms observed in individuals affected by dengue were fever and myalgia. Additional frequently observed symptoms encompass headaches, dermatological manifestations, and arthralgia. Furthermore, dengue fever has the potential to result in severe complications, including but not limited to hemorrhagic fever and organ damage.

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