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Clinical Assessment of Dermatological Manifestations of Dengue Fever in a Tertiary Level Hospital in Bangladesh

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Abstract

Objective

To see the various dermatological manifestations in case of dengue fever.

Methods

This cross-sectional study was conducted in a hospital setting over a span of 12 months, specifically from June 2022 to June 2023. The study focused on 150 cases of dengue fever between the age range of 16 months to 65 years, who exhibited symptoms and signs indicative of dengue fever. The febrile illness was accompanied by laboratory findings of progressive thrombocytopenia, elevated hepatic transaminase levels, and the presence of detectable dengue IgM and virus-expressed soluble main-structural protein (NSI). These findings were determined using the Enzyme Linked Immune Sorbent Assay (ELISA) method, specifically the Panbio Dengue Duo-Cassette. Other serologic tests yielded negative results, and blood cultures were found to be sterile. The diagnosis of dengue fever (DF) was confirmed through seroconversion of convalescent sera. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) Results: Among the sample of 150 patients, it was observed

that 97 individuals (64.67%) were identified as males, while the remaining 53 individuals (35.33%) were identified as girls. The average age of the patients was 35.20 years. Out of the total sample size of 150 patients, 45 individuals (30%) exhibited no observable skin findings, while 105 patients (70%) presented with skin abnormalities. The most often observed skin manifestation was pruritus, which was present in 35 patients (44.47%). This was followed by facial flushing, which was reported in 19 patients (24.37%). petechial rash and burning sensation were observed in 7 (8.97%) and 10 (12.82%) of the patients). Of the observed mucosal abnormalities, ocular involvement was the most prevalent, observed in six patients, accounting for 22.22% of the total sample.

Conclusion

The presence of cutaneous and mucosal symptoms constitutes a significant aspect of dengue fever. These findings additionally contribute to the evaluation of illness progression. The subject matter under consideration pertains to the medical condition known as dengue fever, with a specific focus on its cutaneous manifestations.

Keywords: Dermatological Manifestations, Clinical Assessment, DF

Introduction

The incidence of dengue virus infection, a prevalent viral infection transmitted by vectors, has experienced a significant increase during the past five decades on a global scale^[1]. Based on statistical data provided by the World Health Organization (WHO), approximately 50% of the global population is susceptible to the threat of dengue. The prevalence of this condition is

observed in over 100 nations [2]. The evolving epidemiology of dengue fever, encompassing variations in strains, severity, and geographic distribution, is generating apprehension within the context of India. The occurrence of recurring outbreaks of dengue fever has been observed in various regions of the country throughout the past decade to decade and a half. The etiology of this condition can be attributed to a human viral infection, classified within the genus *Flavivirus* of the family *Flaviviridae*. This pathogen is mostly transmitted by the bite of the mosquito species *Aedes aegypti*, which serves as the primary vector and reservoir for the virus [3]. The prevalence of dengue is higher among adults, whereas the pediatric group exhibits greater susceptibility to the disease. The infection caused by the dengue virus has been widely categorized into three distinct clinical syndromes. Additionally, there are four serotypes of the dengue virus, namely DEN-1, DEN-2, DEN-3, and DEN-4. Infection with any of the four serotypes can result in a diverse array of clinical presentations, encompassing asymptomatic infection, mild influenza-like symptoms, as well as the more severe manifestations of hemorrhagic fever and dengue shock syndrome. These severe manifestations are commonly accompanied by thrombocytopenia, a condition characterized by low platelet count, and can lead to fatal outcomes [4]. The typical manifestation of a moderate type of dengue fever encompasses symptoms such as elevated body temperature, muscle pain, joint pain, headache, pain behind the eyes, and a rash on the skin [5]. Multiple studies have documented diverse cutaneous manifestations in cases of dengue viral infection. These manifestations include transient erythema accompanied by facial flushing within the initial 24-48 hours, maculopapular rash or morbilliform rash, ecchymotic and petechial lesions, generalized rash, and mucosal lesions such as conjunctival congestion, lips crusting, and soft palate vesicles. The occurrence of these manifestations has been reported in approximately 50 to 82% of dengue viral infection cases [6]. Skin lesions can serve as the initial manifestation of dengue fever, and the identification of the characteristic rash associated with dengue fever can facilitate prompt diagnosis, thereby mitigating the risk of dengue hemorrhagic fever or dengue shock syndrome, both of which pose significant threats to life. There was a limited body of research on the clinical spectrum of dermatological signs associated with dengue fever infection. Therefore, the current study was conducted to examine different dermatological manifestations observed in patients with dengue fever who were admitted to the study location.

Materials and Methods

A study was conducted in a hospital setting over a span of 12 months, specifically from June 2022 to June 2023. The study focused on 150 cases of dengue fever between the age range of 16 months to 65 years, who exhibited symptoms and signs indicative of dengue fever. The febrile illness was accompanied by laboratory findings of progressive thrombocytopenia, elevated hepatic transaminase levels, and the presence of detectable dengue IgM and virus-expressed soluble main-structural protein (NSI). These findings were determined using the Enzyme Linked Immune Sorbent Assay (ELISA) method, specifically the Panbio Dengue Duo-Cassette. Other serologic tests yielded negative results, and blood cultures were found to be sterile. The diagnosis of dengue fever (DF) was confirmed through seroconversion of

convalescent sera.

Inclusion Criteria:

- Patients aged between 16 to 65 years.
- Both male and female
- Having positive dengue fever test and having skin rash.

Exclusion Criteria:

- Patients with negative dengue fever test
- Presented with additional viral or bacterial infections after a routine laboratory examination.
- Urticaria
- Allergy.

Data Collection and Analysis

A comprehensive historical account is provided, focusing on the presence of fever, the development of skin lesions, and a thorough documentation of drug usage prior to the appearance of these lesions, facilitated by the utilization of a standardized form. A comprehensive clinical assessment was conducted to thoroughly examine skin lesions, including their morphology, distribution, and affected areas, along with a relevant systemic examination. Additionally, necessary investigations such as hematocrit, platelet count, and serology were performed if deemed necessary. The data were inputted into a Microsoft Excel spreadsheet, and the frequencies of different cutaneous results were recorded. The classification of dermatological involvement, including the distribution of rash with or without pruritus, was based on percentages. The statistical analysis was conducted using the SPSS program.

Results

Table 1 presents the socio-demographic characteristics of the participants. A cumulative count of 134 instances of dengue fever characterized by the manifestation of symptoms and signs. The World Health Organization (WHO) has identified certain clinical indicators that are indicative of dengue fever. The present study enrolled individuals who had contracted dengue virus infection. Out of the total of 150 confirmed cases of DF, 97 individuals (64.67%) were identified as male, while the remaining 53 cases (35.33%) were identified as female. The majority of patients fell within the age range of 62 (41.33%), with the next highest proportion being 38 (22.33%) in the 16-25 year age group.

Table 1: Socio demographic profile of the Study Patients (n=150)

	Variables	Frequency (n)	Percentage (%)
Age	16-25 years	38	25.33%
	26-35 years	62	41.33%
	36-45 years	19	12.68%
	46-55 years	23	15.33%
	56-65 years	8	5.33%
	Total	150	100%
Sex	Male	97	64.67%
	Female	53	35.33%
	Total	150	100%

Table 2 displays the diverse symptoms and indicators exhibited by individuals suffering from dengue fever. The cardinal symptom most frequently observed among patients was fever, which was present in nearly all cases. Vomiting was seen in 78 patients, accounting for 52% of the total cases. Subsequently, a pain abdomen was reported in 45

patients, accounting for 30% of the total, while headache was experienced by 37 cases, representing 24.67% of the total. The occurrence of convulsion and abdominal distension was observed in only two cases, representing a prevalence rate of 1.33%. The occurrence of necrotizing fasciitis was observed in a singular instance within the research region. Hepatomegaly was observed in 22 cases, accounting for 14.67% of the total cases. Among these cases, hepatomegaly was found to be linked with splenomegaly in 8 cases (5.33%). Additionally, lymphadenopathy was present in 7 cases (4.67%).

Table 2: Distribution of symptoms and signs of Dengue fever among respondents

Variables	Frequency (n)	Percentage (%)
Fever	150	100%
Vomiting	78	52%
Pain abdomen	45	30%
Headache	37	24.67%
Arthralgia	12	8.00%
Convulsion	2	1.33%
Abdominal distention	2	1.33%
Cough	23	15.33%
Loose stools	10	6.67%
Lower limb edema	4	2.67%
Purpura fulmaninas	10	6.67%
Necrotizing Fasciitis	1	0.67%
Itching	6	4.00%
Hepatomegaly	22	14.67%
Splenomegaly	8	5.33%
Lymphadenopathy	7	4.67%

Out of the total sample size of 150 instances, cutaneous manifestations were observed in 78 individuals, accounting for 52% of the patients. Additionally, mucosal manifestations were observed in 27 patients, representing 18% of the whole sample.

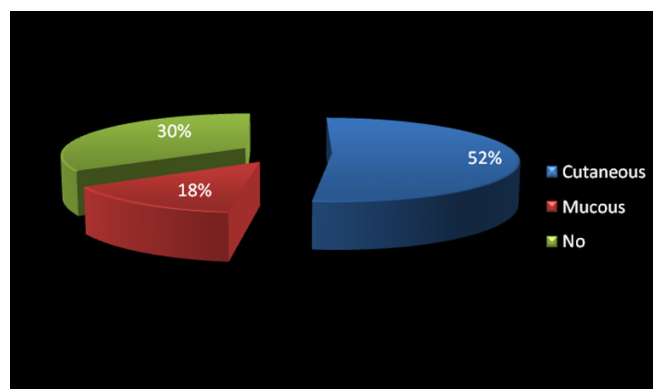


Fig 1: Skin Lesions cases with skin lesions

The predominant cutaneous manifestation observed in dengue patients was generalized pruritus, which was reported in 35 individuals (44.87%). This was followed by face flushing, which was evident in 19 patients (24.37%). A petechial rash and burning sensation were observed in 7 (8.97%) and 10 (12.82%) of the patients, respectively. The sensation of burning was predominantly experienced in the hands and feet. A total of 3 patients, accounting for 3.85% of the sample, exhibited a macular rash on their trunk. Additionally, 4 patients, representing 5.12% of the sample,

experienced ecchymosis on their limbs. (Table 3)

Table 3: Cutaneous manifestations seen in dengue fever (n=78)

Cutaneous Features	Frequency	Percentage(%)
Pruritis	35	44.87%
Facial flushing	19	24.37%
Burning sensation	10	12.82%
Petechial rash	7	8.97%
Macular rash	4	5.12%
Ecchymosis	3	3.85%
Total	78	100%

Mucosal signs were observed in 27 patients, accounting for 18% of the total sample. The mucosa most frequently affected was the ocular mucosa, observed in 13 (48.14%) patients, with the oral and nasal mucosae being involved in 6 (22.22%) patients each. (Table 4)

Table 4: Mucosal involvement in patients of dengue fever(N=27)

Mucosal involvement	Frequency (n)	Percentage(%)
Oral	6	22.22%
Nasal	6	22.22%
Eye	13	48.14%
Genitals	2	7.42%
Total	27	100%

In Fig 2, it was observed that bleeding occurred in 42 cases, accounting for 28% of the total cases. The skin exhibited the highest frequency of bleeding manifestations, specifically in the form of Petechiae (10 instances, accounting for 6.67% of the total), Purpura (8 cases, accounting for 5.33% of the total), and ecchymosis (5 cases, accounting for 3.33% of the total). Hematemesis was observed in 7 cases (4.67% of the total). Bleeding gums were observed in 5 individuals, accounting for 3.33% of the total sample, whereas epistaxis was reported in 2 individuals, representing 1.33% of the sample. A single case (0.67%) exhibited the presence of conjunctival bleeding.

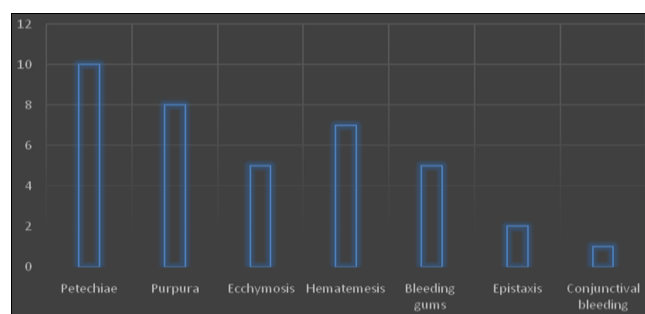


Fig 2: Distribution of bleeding manifestations among respondents (n=42)

Table 5 illustrates the occurrence of bleeding skin manifestations accompanied by a rash. The data shown in the table indicates that the majority of bleeding skin symptoms, including Purpura, Petechiae, ecchymosis, and epistaxis, were observed when the platelet count was below 50,000 cells / cumm. Epistaxis, gum bleeding, and hematemesis were identified as manifestations of mucosal bleeding when the platelet count fell below 30000 cells/cumm. In the current investigation, none of the patients exhibited symptoms of melena and hematuria.

Table 5: Bleeding skin manifestations with rash depending on platelet count

Platelet count	Rash	Petechiae	Purpura	Ecchymosis	Bleeding gums	Epistaxis	Hematemesis
< 50,000	0	2	2	1	2	1	3
50,000- 1,00,000	38	5	4	2	3	1	5
> 1,00,000	42	2	1	0	0	0	0

Discussion

Dengue fever has emerged as an endemic disease, posing a significant public health challenge for nations with little economic development. The spike in question may be attributed to global warming, substandard living conditions, urbanization, and insufficient waste management. Our study included a cohort of 150 patients. In our analysis, there was a higher proportion of male patients in comparison to females. The prevalence of males is shown in various research conducted in Asia [7, 8, 9].

In the present investigation, the average age of the patients was recorded as 35.20. In a separate study, the mean age was reported as 31.5 and 35 years [10, 11]. The majority of the patients fell within the age range of 26-35 years, with the subsequent highest representation observed in the 16-25 years age group. This distribution is similar to another study, which reported a higher prevalence of patients in the age range of 31-40 years, followed by 21-30 years [12]. In relation to the pattern of cutaneous manifestation, it has been observed that patients with dengue fever have notable cutaneous features, which have been documented to appear in 52% of cases. In a separate study conducted by Kakarla SR and Rachakonda R, it was shown that cutaneous manifestations were present in 50.7% of the patients [13]. Among the cutaneous alterations examined, pruritus was identified as the most prevalent, being present in 35 patients (44.87%) according to the findings of our study. The prevalence rates reported in many additional research vary between 16% and 27.6%. The etiology of pruritus in dengue is likely attributed to the release of cytokines. During the initial three days of fever, Th1 cytokines are released, but during the subsequent stage, Th2 cytokines are released (Reference 14). The occurrence of facial flushing was seen in 19 patients, representing 24.37% of the total sample. The predictor of dengue infection is both sensitive and specific. The leading etiologies associated with elevated body temperature accompanied by face erythema include dengue infection, influenza, and scarlet fever. A burning feeling and petechial rash were observed in 10 out of 78 patients, accounting for 12.82% of the sample. Additionally, a total of 7 patients, representing 8.97% of the sample, exhibited these symptoms. The frequency of petechial rash in this study is nearly same to that observed in a previous study [15]. In the majority of instances, the cause can be attributed to a reduction in platelet count and impaired platelet function. However, in instances where the platelet count remains within the normal range, there is evidence of abnormal liver function, as indicated by elevated levels of alanine transferase. In our analysis, 27 patients (18%) exhibited mucosal involvement, a proportion that is nearly equivalent to the findings of two earlier studies, where mucosal involvement was reported as 46.15% and 46.6% respectively [16, 17]. Among the individuals examined, the eye mucosa was found to be the most frequently affected mucosa, with a prevalence of 22.22%. This finding is consistent with previous studies conducted in North India, which reported prevalence rates of 20.9% and 36.7% [18, 19]. The most often observed signs in the ocular mucosa were

congestion and bleeding. Bleeding symptoms were observed in 28% of individuals, which exhibited a reduced prevalence when compared to earlier research. The predominant hemorrhagic symptoms observed in the present study were Petechiae, accounting for 6.67% of cases, followed by gastrointestinal bleeding, which accounted for 3.33% of cases. The study conducted by [20] indicated that hematemesis was identified as the most prevalent manifestation. Epistaxis was found to be the most prevalent condition in the study conducted [21]. The prevalence of melena in earlier investigations varied between 46% and 66.0%. In previous research, it was found that hematemesis accounted for 31.20% and epistaxis accounted for 52.60% of the recorded cases of bleeding manifestation [22].

Conclusion

The study revealed that patients with dengue fever exhibited a range of cutaneous manifestations. These tools facilitate the timely identification and management of dengue illness. These findings also provide insight into the course of the disease.

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