

Skin Manifestations in Dengue Patients of a Tertiary Hospital during Dengue Epidemic in Kathmandu: A Retrospective Study

Seema Sitaula¹, Suraj Shrestha², Punam Mishra¹, Mamata Subba¹, Elisha Poddar³

1. Department of Dermatology, Tribhuvan University Teaching Hospital, Kathmandu, Nepal

2. Suryabinayak Municipal Hospital, Bhaktapur, Nepal

3. Maharajgunj Medical Campus, Institute of Medicine, Kathmandu, Nepal

Abstract

Introduction: With a wide range of clinical manifestations and a drastic shift in epidemiology, dengue infection is a life-threatening condition. Studies of skin manifestations in dengue fever are scarce, and hence, it is prudent to explore the skin manifestations of dengue in Nepal for prompt diagnosis and to reduce associated complications.

Methods: We conducted a single-center retrospective cross-sectional study from August 1, 2022, to December 1, 2022. Information on demographics, clinical characteristics of rash, and laboratory investigations were gathered in a pre-formed proforma from patients' charts, which were organized and analyzed using the statistical software SPSS 21. Continuous data were presented as mean, and standard deviation and categorical data were presented as frequency and percentage.

Results: There were 98 dengue cases with a mean age of 39.47 years. Among 43 patients, maculopapular (72.1%), erythematous macules (23.3%), purpuric (20.9%), both macules and maculopapular (11.6%) and ecchymotic (4.6%) rashes with no mucosal involvement were found. There was no statistically significant association between platelet count and rashes.

Conclusion: Patients with dengue had varied cutaneous features. Maculopapular and erythematous rashes were the most commonly observed dermatological manifestations.

Keywords: Dengue; Nepal; Skin

Introduction

Dengue virus, a single-stranded, encapsulated RNA virus, has four antigenically different serotypes (DENV1, DENV2, DENV3, and DENV4). This arboviral illness has a significant morbidity and mortality with wide geographic distribution. *Aedes aegypti* mosquitoes carry the dengue virus, which can cause a mild, self-limiting fever to a severe hemorrhagic condition. The symptoms of the illness start 5-8 days after the mosquito bite and include fever, an intense headache, retroorbital pain with or without photophobia, backache, myalgia, and arthralgia. However, this condition can worsen and can cause multiorgan dysfunction, myocarditis, encephalitis, renal failure, and, most significantly, hepatitis, which are all possible side effects of dengue.¹⁻³

About 390 million dengue infections occur yearly, of which 96 million develop clinical symptoms. Dengue hemorrhagic fever affects more than 500,000 people annually, resulting in at least 12,000 fatalities. Mortality rates typically range from 10% to 20% but can be as high as 40% in dengue shock syndrome.¹

Oral mucosal congestion, generalized morbilliform rash, and purpuric spots are common in dengue

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Corresponding Author:

Dr. Seema Sitaula

Assistant Professor

Department of Dermatology, Tribhuvan University Teaching Hospital, Kathmandu, Nepal.

Email: seema.sitaula@gmail.com

ORCID: 0000-0001-7878-224X

fever. These dermatological features are significantly noticeable in dengue fever patients, which can help promptly diagnose and manage this condition.⁴

However, studies on dermatological manifestations in dengue patients in Nepal are scarce. Given the frequent outbreaks and changes in epidemiology in recent years, it is crucial to explore skin manifestations of dengue in Nepal for timely diagnosis and reduction of associated complications.

Methods

This was a retrospective study of patients with dengue infections who presented in the Skin out-patient department (OPD) or ward patients' consultations for skin conditions from August 2022 to December 2022 under the Department of dermatology and venerology of Tribhuvan University Teaching Hospital. All patients of all age groups who were serology positive for dengue were included in the study. The institutional review committee of the Institute of Medicine approved the study. A non-probability convenience sampling was done.

The details of the patient's demographic features (age, gender), clinical features (myalgia, pruritis, and rash), duration of fever, and laboratory investigations (counts, platelets, and hemoglobin), and tourniquet test were recorded. The clinical characteristics of rashes: ecchymosis, erythema, maculopapular, erythema, and maculopapular, purpura, and mucosal involvement were also recorded from the patient's chart.

The data was compiled and entered for data analysis in SPSS. Statistical analysis was performed using SPSS 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Continuous data was presented as mean and standard deviation. Categorical data was presented as frequency and percentage. For the test, a p-value of 0.05 or less is considered statistically significant.

Results

There were 98 cases of dengue fever. The mean age of the patients was 39.47 ± 18.09 , ranging from 7 to 89. Dengue fever was most common among patients aged 20-30. Other demographic information is tabulated in Table 1.

Variables	Total patients, N (%)
Sex	
Male	48 (54.6%)
Female	40 (45.5%)
Age group (in years)	
0-10	1 (1.1%)
10-20	9 (10.2%)
20-30	25 (28.4%)
30-40	18 (20.5%)

40-50	14 (15.9%)
50-60	6 (6.8%)
60-70	9 (10.2%)
70-80	4 (4.6%)
80-90	2 (2.3%)

Table 1: Demographic details of the patients

The mean duration of fever was 5.03 ± 2.71 days, ranging from 1 to 15 days. Pruritis 52.3%, rash 51.1% and myalgia 39.8% were the typical clinical features. Tourniquet test was positive in only 3 (3.4%) patients. The mean total platelet count was 126618.6 ± 2.79 . Only 22 (25%) of the patients had platelet count less than 50,000 (Table 2). Similarly, the mean hemoglobin count is 13.03 ± 2.43 gm/dl.

Platelet count (per microliter of blood) x10 ³	N (%)
0-50	22 (25%)
50-100	26 (29.5%)
100-150	17 (19.3%)
150-200	14 (15.9%)
200-250	6 (6.8%)
250-300	0
300-350	1 (1.1%)
350-400	2 (2.3%)

Table 2: Various laboratory findings in dengue patients

The most common skin manifestation was maculopapular rash (72.1%) followed by erythematous macules (23.3%), purpura (20.9%), both macules and maculopapular rash (11.6%) and ecchymosis (4.7%). None of the patients had mucosal involvement (Table 3).

Type of Rash	Total Number (N=43) (%)
Maculopapular	31 (72.1%)
Erythematous macules	10 (23.3%)
Purpura	9 (20.9%)
Erythematous macules + maculopapular	5 (11.6%)
Ecchymosis	2 (4.6%)
Tourniquet test	2 (4.6%)
Mucosal Involvement	0

Table 3: Clinical Characteristics of Rash

There was no significant association between platelet counts and the appearance of rashes ($p > 0.05$).

Discussion

The southern plains of Nepal had the first reports of dengue fever in 2004. Since then, outbreaks in this region have been frequent. The monsoon season in July 2019 brought the first outbreak to Kathmandu, the capital of Nepal, which lies higher north of the plains. Factors like climate change, unrelenting and unplanned urbanization, brisk trade and transportation

from dengue-infested areas, and inadequate health infrastructure as favored the city as a perfect breeding site for the *Aedes vector mosquito*.⁵

In a study by Thomas et al., conducted in North India among 124 dengue patients, the most common age group presenting with dengue infection was 31-40 years without sex predilection. The most common age group affected in our study was 20-30 years.⁶ Similarly, Azfar et al., reported that most dengue patients belonged to the age group of 31-40 years. This is because the classic dengue is more common among adolescents and adults.⁷ A study in Nepal showed the mean duration of fever and onset of rash in dengue fever were 3.02 ± 2.960 days and 2.56 ± 2.032 days, respectively.⁸ While in our study, the duration of dengue fever was 5.03 days which could be due to the fact that the study center is a tertiary center hospital, and patients often are symptomatic for a while before they reach the center.

Dermatological features are significantly noticeable in dengue fever patients. The skin rash is a response of the vessels to cytokines, which are produced by an active immune system. It manifests as dermal edema following increased permeability of the vessels and inflammatory cell infiltration.^{6,9}

In a study by Ali Azfar et al., sixty-five per cent of patients had cutaneous symptoms. Among them, 31.7% had a macular rash, and 11.2% had a papular rash. Thirteen per cent of individuals had ecchymosis, and twenty per cent had a petechial eruption.⁷ In addition, in a study by Thomas et al., among 124 patients, cutaneous manifestations were present in 46.8% of patients, the most common being a maculopapular or morbilliform eruption among 48.3% of the cases.⁶ Similar findings were seen in Aryal et al.'s study as 34.65%.⁸ However, in our study, we found maculopapular rash to be the most common presentation, with 72.1%. A study by Ullah et al., including 228 dengue patients, showed pruritis in 32.9% patients, macular rash present in 20.6%

patients, purpura in 7.5% patients, burning sensation in 8.8% patients and other skin rashes were present in 6.1% patients.¹⁰ A study by Huang et al., showed that dengue fever patients who developed skin rash were younger, had more pruritus and had swollen palms and soles.¹¹

Azfar et al., reported mucosal involvement in dengue among 40.66% of patients.⁷ Similarly, in a study done by Mahboob et al., the most common dermatological presentation was oral mucous membrane congestion 66.67%, followed by generalized morbilliform rash 64.58%, and eye congestion (64.58%.⁴ Similarly, in the study by Thomas et al., mucosal involvement was present among 29.8% of the patients.⁶ The study by Huang et al., showed that those patients with no skin rash with dengue fever had significantly higher rates of genital mucosa involvement.¹¹ However, contrary to these studies, pruritus was not a complaint in the majority of the patients in this study, and no mucosal involvement was seen in our study, most likely due to the small sample size, absence of mucosal involvement at the time of examination or delayed presentation to the hospital during which the mucosal manifestations may have already subsided.

This study has certain drawbacks. Because of the limited sample size in our study, the results may not be representative. Likewise, the study location is limited to a single hospital, precluding generalizability for all patients.

Conclusion

Patients with dengue were observed to have a range of cutaneous features. Dermatologists and other medical professionals should know these dermatological manifestations for early recognition and proper management, as dengue fever can progress to life-threatening hemorrhagic fever or dengue shock syndrome.

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