

Original Article

Demographic Trends and Analysis of Dermatological Presentations of Dengue Fever: A Study in Dengue Field Hospital, Lahore During Dengue Epidemic 2021 Amidst COVID 19 Pandemic

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Abstract

Objective: To study the demographic trends of dengue fever outbreak and spectrum of skin lesions in dengue fever patients, describe their relationship with type of dengue fever and other coinfection like COVID -19.

Methods: This descriptive study was undertaken at Dengue Field Hospital, Expo Centre, Lahore from August 2021 to November 2021. Patient demographics, clinical profile and mucocutaneous lesions were noted in those patients fulfilling criteria for clinical diagnosis of dengue fever. Those with a strong clinical suspicion of dengue fever or with positive serology were enrolled. Diagnosis of COVID-19 was also confirmed by lab test in suspected coinfection cases. SPSS 18 was used for statistical analysis of clinical data.

Results: 551 cases of confirmed dengue fever were evaluated. Mean age of patients was 27 years. Male were 72% and female 28 %. Mean duration of fever was 5 days. Skin rash was seen in 21% cases. 75% had oral cavity involvement. The main site of oral lesions was buccal mucosa (45%) then soft palate (39%). The most common oral symptom was bitterness of mouth (93%) and then gum bleeding 34%. Lesions in oral cavity included mucosal erythema (89%), lip crusting (57%), candidiasis (45%), palatal vesicles (45%) and herpes simplex (32%). Less common manifestations were angioedema, tongue petechiae and inflamed tonsils.

Conclusion: Most of mucocutaneous manifestations were secondary disorders mostly seen in earlier phase of illness facilitated by dengue fever related systemic damage, immune suppression or adverse effects of treatment. Health professional should completely examine for ensuring full patients support and treatment.

Keywords: Demographics, Dengue, Skin lesions, COVID -19

How to cite this:

Batool S, Raffad, Malik KU, Amin U, Ahmad A. Demographic trends and analysis of dermatological presentations of dengue fever: A study in dengue field Hospital, Lahore during dengue epidemic 2021 amidst COVID 19 pandemic. J Pak Soc Intern Med. 2025;6(4): 327-330

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Received: 28-05-2025 **Revised:** 24-08-2025 **Accepted:** 10-11-2025 **DOI:** <https://doi.org/10.70302/jpsim.v6i4.2560>

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Introduction

Dengue viral infection is a significant tropical disease and has become a major global public health concern.¹ Dengue outbreak in Lahore, Pakistan during 2021 was one of the most significant public health challenges in recent years in which 24446 cases of dengue fever were reported with 126 deaths as compared to previous outbreak in 2011 when 15000 cases were reported. Lahore city was one of the hardest-hit areas in Punjab province and the overlapping COVID-19 pandemic further stretched the healthcare system.^{2,3} The outbreak emphasized the need for better understanding of demographic susceptibilities and clinical presentations, particularly

dermatological symptoms, which play a critical role in diagnosis and management.

Dengue fever is characterized by high fever of abrupt onset, severe headache, pain in muscles and joints, nausea, vomiting and skin rash. Hemoconcentration and signs of plasma leakage may progress to dengue hemorrhagic shock (DHS) or dengue shock syndrome (DSS) due to circulatory failure⁴. Various cutaneous manifestations have also been reported and may vary according to type and severity of dengue fever.⁵

Therefore, this study was done to explore the demographic patterns of the affected population and highlight the mucocutaneous (dermatological) manifestations

of this syndemic.

Methods

Study design: A descriptive cross sectional study

Place and duration of study: Dengue Field Hospital, Expo Centre, Lahore from August 2021 to December 2021.

Inclusion criteria: Patients presenting to dengue field hospital with high grade fever of more than 2 days and confirmed on dengue blood testing or those with a strong clinical suspicion of dengue fever were enrolled. Patients of fever more than 5 days with other clinical criteria of dengue like thrombocytopenia, / bleeding tendency / plasma leakage shown by pleural effusion, ascites or hemoconcentration were also be included.

Exclusion criteria: Patient developing fever after having sore throat. Patients having low grade fever for more than 2 days and those having Dengue shock syndrome were also excluded.

Data collection procedure: Patient demographics, clinical profile and cutaneous lesions were noted in those patients fulfilling criteria for clinical diagnosis for dengue fever. Diagnosis of COVID-19 was also confirmed by lab test in suspected coinfection cases. Those patients fulfilling the inclusion criteria were taken informed consent and their demographic data was recorded. Various parameters like duration of fever, presence or absence of skin rash, thrombocytopenia, etc. were noted on predesigned proforma. Skin of each patient was also examined in detail to note various cutaneous signs, also recorded by photographs after taking informed consent of patient.

SPSS 21 was used for statistical analysis of clinical data. Frequency and percentages were calculated for quantitative variables. Charts and graphs were made for qualitative variables

Results

551 cases of confirmed dengue fever were evaluated. A significant proportion of cases were reported in the young active population (26-50 years) age group, highlighting the vulnerability of the working-age population.

Table 1: Age groups in studied population

Age group (Years)	Frequency	%
<26	206	37.4
26-50	253	45.9
>50	92	16.7
Total	551	100.0

Males constituted about 72% (n = 396) and female were 28% (n = 155) of the total cases.

GENDER DISTRIBUTION

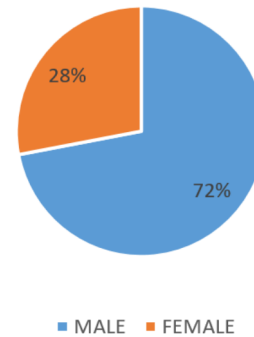


Figure I: Gender distribution of cases

Patients were studied in three age groups i.e less than 26 years, 26-50 years and more than 50 years. Mean age of patients was 27 years. Mean duration of fever was 5 ± 3 days.

Cases of dengue fever (DF) were 422 (77%) and those of dengue hemorrhagic fever (DHF) were 155 (23 %). Thrombocytopenia was seen in half of the cases (n= 276).

A higher incidence of cases was observed in low-income neighborhoods due to inadequate sanitation and stagnant water, which serve as breeding grounds for *Aedes aegypti*, the primary vector of dengue. Urban areas of Lahore reported a higher burden of cases, likely due to population density and lack of vector control measures.

Skin rash was seen in 21% (n=118) cases. Maculopapular rash was the most common dermatological symptom, observed in approximately 43% of patients, often appearing 3–5 days after the onset of fever. Skin rash was less frequently seen in patients of age more than 50 years than other age groups.

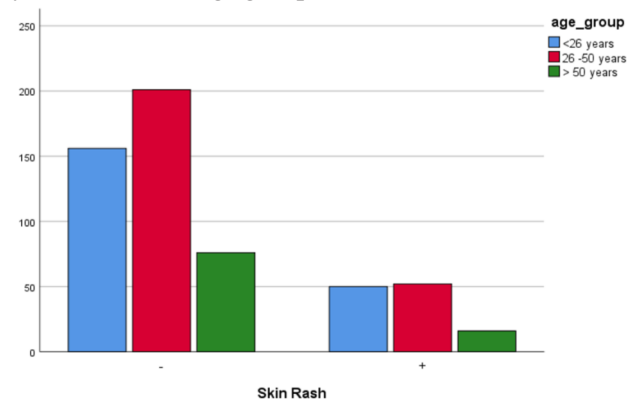


Figure II: Skin rash In various age groups

The rash was transient, blanchable, and predominantly affected the trunk and limbs. Post-fever pruritus, particularly on the palms and soles was reported in about 32% of patients having skin rash and was considered as a sign of recovery.

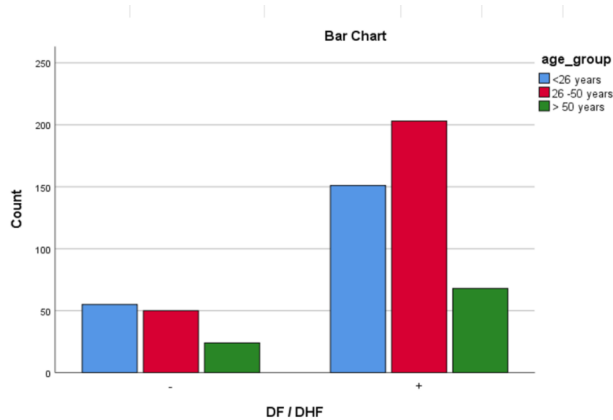


Figure III: Distribution of two clinical types of dengue fever in various age groups

Oral involvement was present in 75% cases. The most common oral symptom was bitterness of mouth (93%) and then gum bleeding 34%. The main site of oral lesions was buccal mucosa (45%) then soft palate (39%). Lesions in oral cavity were mucosal erythema (89%), lip crusting (57%), candidiasis (45%), palatal vesicles (45%) and herpes simplex (32%). Less common manifestations were angioedema, tongue petechiae and inflamed tonsils.

Discussion

Dengue is potentially fatal illness caused by four mosquito-transmitted dengue viruses (DENV 1-4) which belong to Flavi virus family and *Aedes aegypti* is major vector.⁶ Pakistan is in danger of worsening epidemiological profile of dengue due to co-existing viral infections like COVID-19 (syndemic). The 2021 dengue outbreak in Lahore, Pakistan, highlighted critical challenges in the city's public health infrastructure while providing valuable insights into the demographic trends and dermatological manifestations of the disease.⁷ Underdiagnosis of dengue is also common due to somewhat similar clinical picture to COVID-19 and lack of available tests in strangled health care system amidst COVID-19. Both diseases of this syndemic exhibit nonspecific symptoms like fever, headache, malaise hence making a confirm diagnosis very arduous task due to similar biochemical and hematological profile like thrombocytopenia and leukopenia.⁸

Understanding the demographic distribution and dermatological presentations help in early identification and stratification of cases during the outbreak. Patients presenting with fever, mucocutaneous symptoms, and low platelet counts can be promptly diagnosed and managed. The demographic analysis of the outbreak revealed that young adults aged 20–40 years were most

affected, likely due to increased exposure to outdoor environments and occupational activities. Males were disproportionately impacted, which can be attributed to greater outdoor activity compared to females, these results are comparable with global trends in dengue epidemiology.⁹ The significant burden in low-income neighborhoods further emphasize the role of socioeconomic factors in dengue transmission. Poor sanitation, limited access to clean water, and inadequate vector control in these areas created ideal conditions for *Aedes aegypti* breeding. Urban areas of Lahore reported higher case counts than rural areas, primarily due to population density and environmental factors.

Skin manifestations played a critical role in the clinical identification of dengue cases during the outbreak. The high prevalence of maculopapular rash (observed in 50% of patients) provided a valuable diagnostic marker, particularly in febrile patients with thrombocytopenia. Petechiae and ecchymosis were also common and correlated strongly with severe forms of the disease, such as dengue hemorrhagic fever.¹⁰ Oral lesions in dengue fever comprise a variety of signs and symptoms which may be due to virus itself or complications of immunosuppression. These lesions may be a clue to early diagnosis especially if exist with skin rash. Most of the oral lesions overlap with clinical picture of COVID 19 and other viral infections which might be due to synergy or crosstalk phenomenon in various coexisting viral enanthems.¹¹

Many dengue cases, particularly mild or asymptomatic ones, might not have been reported, resulting in underestimation of demographic trends. Population mainly comprised urban thus study could not cover rural areas. Detailed exploration of the environmental factors (e.g. Climate, water stagnation etc.) influencing the outbreak was not done.

Conclusion

Dengue infection has posed a huge burden to the health-care system. Its spectrum ranges from mild self-limiting disease to severe fatal disease. Infected patients were males, adults, within the age range of 16 - 30 years, the epidemic peaked in the month of October and November.

Recommendations; Strengthening measures are needed to eliminate mosquito breeding sites and regular fumigation should be done in high-risk areas. Launch campaigns to educate the population about dengue prevention and recognize warning signs. Establish robust surveillance systems to track demographic trends and clinical presentations.

Equip healthcare facilities with resources to manage outbreaks, including rapid diagnostic kits and trained personnel.

Ethical Approval: The IRB/EC approved this study via letter no. null dated September 10, 2021.

Conflict of Interest: None

Funding Source: None

Authors' Contribution

SB: Conceptualization of the project

Raf, AA: Design of the work.

KUM, UA: acquisition, analysis, or interpretation.

KUM, UA, AA: Draft the work.

SB, Raf: Critical review of important intellectual content.

All authors approve the version to be published.

All authors agree to be accountable for all aspects of the work.

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