# Clinicopathological Correlation of Non-Neoplastic Dermatoses: A Prospective Tertiary Care Study

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**ABSTRACT**

**Background**: Non-neoplastic skin lesions represent a major proportion of dermatological disorders encountered in routine clinical practice. Due to overlapping clinical presentations, accurate diagnosis based solely on clinical examination is often challenging. Histopathological examination remains the gold standard for definitive diagnosis and plays a pivotal role in guiding appropriate clinical management.

Objectives: To study the histomorphological spectrum of non-neoplastic skin lesions and to evaluate the clinicopathological correlation in patients attending a tertiary care hospital.

**Materials and Methods**: This prospective observational study included 56 skin biopsy specimens from clinically suspected non-neoplastic skin lesions received in the Department of Pathology, Hind Institute of Medical Sciences, Sitapur. Biopsy specimens were fixed in 10% buffered formalin, routinely processed, and stained with hematoxylin and eosin. Special stains such as Ziehl–Neelsen, Fite–Faraco, Periodic Acid–Schiff, and Masson's Trichrome were used where indicated. Clinical findings were correlated with histopathological diagnoses. Data were analysed using descriptive statistics.

**Results**: Of the 56 cases studied, 34 (60%) were males, and 22 (40%) were females, showing a male predominance. The majority of patients belonged to the 21–40-year age group. Hansen's disease was the most common histopathological diagnosis (34.3%), followed by bullous disorders (17.1%). Histopathological examination confirmed the clinical diagnosis in most cases and identified additional unsuspected lesions in a few cases.

**Conclusion**: Non-neoplastic skin lesions predominantly affect young and middle-aged adults, with a male preponderance. Histopathological evaluation remains indispensable for accurate diagnosis, classification, and effective management of these lesions. Early biopsy and strong clinicopathological correlation significantly enhance diagnostic accuracy and patient care.

**Keywords**: Non-neoplastic skin lesions; Histopathology; Dermatopathology; Hansen's disease; Clinicopathological correlation; Skin biopsy

## 1. Introduction

Dermatological disorders are among the most commonly encountered conditions in clinical practice and account for approximately 6–11% of all outpatient consultations worldwide [1]. The skin, being the largest organ of the body, is susceptible to a wide range of pathological processes, and skin diseases

affect individuals across all age groups, contributing significantly to morbidity and reduced quality of life.

Clinically, dermatological lesions present with diverse morphological patterns, including macules, papules, nodules, vesicles, bullae, pustules, and pigmentary alterations [2]. Many inflammatory and infectious skin disorders exhibit overlapping clinical features, which often makes accurate diagnosis based solely on clinical examination difficult. Such overlap may lead to diagnostic ambiguity and inappropriate management if not further evaluated.

Histopathological examination serves as a crucial diagnostic tool in dermatology by providing a detailed assessment of epidermal, dermal, and adnexal changes at the microscopic level [3]. It enables differentiation between clinically similar conditions, confirms provisional diagnoses, and may reveal unsuspected pathological entities. Therefore, histopathology remains the diagnostic gold standard for the evaluation of skin lesions, particularly non-neoplastic disorders [4].

Clinicopathological correlation plays an essential role in enhancing diagnostic accuracy and guiding appropriate treatment strategies. Understanding the histopathological spectrum of non-neoplastic skin lesions is especially important in developing countries like India, where infectious and inflammatory dermatoses continue to be prevalent [5]. The present study aims to evaluate the clinicopathological correlation and to identify the spectrum of non-neoplastic skin disorders in an Indian outpatient setting.

## 2. Materials and Methods

### Study Design and Setting

This was a prospective observational study conducted in the Department of Pathology at Hind Institute of Medical Sciences (HIMS), Sitapur, over a defined study period. The study included patients attending the outpatient and inpatient dermatology services who were clinically suspected to have non-neoplastic skin disorders and were referred for skin biopsy evaluation [1].

Sample Size

A total of 56 skin biopsy specimens from clinically suspected cases of non-neoplastic skin disorders were included in the study.

### Inclusion Criteria

- Patients of all age groups and both sexes
- Clinically suspected non-neoplastic skin lesions
- Adequate skin biopsy specimen
- Written informed consent obtained

### Exclusion Criteria

- Inadequate or poorly preserved biopsy specimens
- Patients who did not provide informed consent

Specimen Processing and Histopathological Examination

Skin biopsy specimens were fixed in 10% buffered formalin, routinely processed, and embedded in paraffin wax. Sections of 3–5 µm thickness were cut and stained with hematoxylin and eosin (H&E) for routine histopathological evaluation. Special stains such as Ziehl–Neelsen, Fite–Faraco, Periodic Acid–Schiff (PAS), and Masson's Trichrome were applied where indicated to aid in definitive diagnosis [2,3]. Histopathological findings were correlated with clinical data to establish clinicopathological concordance.

### Statistical Analysis

Data were entered into Microsoft Excel and analysed using descriptive statistical methods. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation (SD). Associations between clinical and histopathological findings were assessed using the Chi-square test, with a p-value of $<0.05$ considered statistically significant [4].

**Ethical Considerations**

The study was approved by the Institutional Ethics Committee of HIMS, Sitapur. All procedures were conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants before inclusion in the study.

**Results**

Demographic Characteristics of the Study Population

A total of 56 skin biopsy specimens obtained from patients with clinically suspected non-neoplastic skin disorders were analysed in the present study. The demographic characteristics of the study population are summarised in **Table 1**. Out of the total cases, 34 patients (60%) were males and 22 patients (40%) were females, indicating a clear male predominance with a male-to-female ratio of 1.5:1. This male preponderance suggests a possible influence of occupational exposure, outdoor activity, and healthcare-seeking behaviour, which have been commonly reported in studies on non-neoplastic dermatoses.

Age-wise analysis revealed that non-neoplastic skin lesions were predominantly observed in young and middle-aged adults. The highest number of cases was recorded in the 31–40-year age group, followed closely by the 21–30-year age group. Together, patients aged 21–40 years constituted the majority of the study population, highlighting this age bracket as the most affected. Fewer cases were observed in the pediatric and elderly age groups, suggesting a comparatively lower biopsy rate or disease prevalence in these populations.

On the other hand, the mean age was 34.5 ± 12.8 years. Non-neoplastic skin lesions were more prevalent in males, with 34 cases (60%) compared to 22 cases (40%) in females, yielding a male-to-female ratio of 1.5:1. The higher prevalence among males may reflect occupational exposure, outdoor activities, and differential healthcare-seeking behaviour in the study population.

Although the demographic distribution indicates that non-neoplastic skin disorders are most commonly encountered during the economically productive years of life, they potentially contribute to morbidity and reduced quality of life. These findings emphasise the importance of early diagnosis and histopathological evaluation in young and middle-aged adults presenting with chronic or atypical skin lesions.

**Table 1. Demographic Distribution of Study Population (N = 56)**

| Variable | Category | Number of Cases (n) | Percentage (%) |
|---|---|---|---|
| **Sex** | Male | 34 | 60.0 |
| | Female | 22 | 40.0 |
| **Age Group (years)** | ≤20 | 6 | 10.7 |
| | 21–30 | 16 | 28.6 |
| | 31–40 | 18 | 32.1 |
| | 41–50 | 9 | 16.1 |
| | >50 | 7 | 12.5 |
| **Total** | | **56** | **100** |

**Histopathological Spectrum**

Histopathological evaluation revealed a broad spectrum of non-neoplastic skin lesions, as detailed in **Table 2**. Hansen's disease was the most common diagnosis, accounting for 34.3% of cases, followed by bullous disorders, which constituted 17.1% of cases. The remaining cases comprised various other inflammatory dermatoses. However, Chi-square analysis showed a **significant association** between clinical diagnosis and histopathological confirmation for **Hansen's disease** ($p < 0.05$), demonstrating the reliability of histopathology in confirming clinically suspected cases.

**Table 2. Distribution of Histopathological Diagnoses (N = 56)**

| Histopathological Diagnosis | Number of Cases (n) | Percentage (%) |
|---|---|---|
| Hansen's disease | 19 | 34.3 |

| | | |
|---|---|---|
| Bullous disorders | 10 | 17.1 |
| Other inflammatory dermatoses | 27 | 48.6 |
| **Total** | **56** | **100** |

The proportional distribution of histopathological diagnoses is depicted in **Figure 1**, which demonstrates the predominance of Hansen's disease among non-neoplastic skin lesions in the present study.

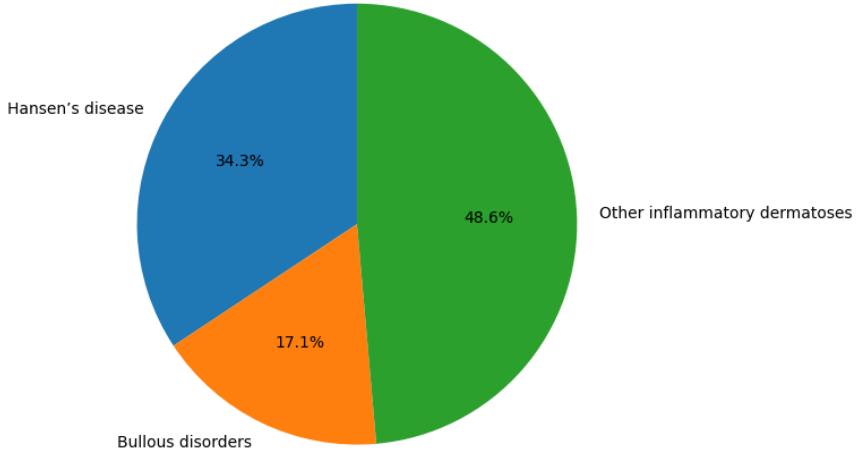


**Figure 1. Pie chart depicting the histopathological spectrum of non-neoplastic skin lesions, with Hansen's disease as the most common diagnosis, followed by bullous disorders.**

## 3. Discussion

Non-neoplastic skin lesions constitute a significant proportion of dermatological morbidity and pose diagnostic challenges due to their overlapping clinical presentations. As highlighted in the Introduction, the skin exhibits diverse reaction patterns to inflammatory, infectious, and immune-mediated insults, often making clinical diagnosis alone insufficient [1,2]. The present study was undertaken to evaluate the demographic profile and histomorphological spectrum of non-neoplastic skin lesions and to emphasize the role of histopathology in achieving accurate diagnosis.

In the present study, a male predominance was observed, with males accounting for 60% of cases and a male-to-female ratio of 1.5:1. Similar male predominance has been reported in several Indian studies on non-neoplastic skin lesions [3–5]. This gender difference may be attributed to increased outdoor activity, occupational exposure, and greater healthcare-seeking behavior among males, particularly in rural and semi-urban populations. Additionally, certain infectious dermatoses, including Hansen's disease, are known to be more frequently reported in males, further contributing to this pattern [6].

Age-wise distribution revealed that the majority of cases occurred in the 21–40-year age group, corresponding to young and middle-aged adults. This finding aligns with previous studies that have documented a higher prevalence of non-neoplastic dermatoses in this economically productive age group [4,7]. Increased exposure to environmental factors, physical stress, and immune-mediated mechanisms during this period of life may explain the higher incidence. The relatively lower number of cases in pediatric and elderly populations could be due to fewer biopsies being performed in these age groups or differences in disease presentation.

Histopathological analysis in the present study demonstrated that Hansen's disease was the most common diagnosis, accounting for 34.3% of cases, followed by bullous disorders. This observation is consistent with reports from several Indian studies that continue to show Hansen's disease as a major contributor to non-neoplastic skin biopsies, despite national elimination programs [6,8,12-14]. The persistence of leprosy reflects ongoing transmission, delayed diagnosis, and the need for continued surveillance. Histopathology plays a crucial role in confirming the diagnosis, classifying disease spectrum, and guiding treatment, particularly in cases with atypical or early clinical presentation [9,13].

Bullous disorders constituted the second most common category in this study. These conditions often present with overlapping clinical features such as vesicles, bullae, and erosions, making histopathological examination indispensable for differentiation between various autoimmune and non-autoimmune blistering diseases [10-15]. Routine H&E examination, supplemented by special stains when required, allows identification of the level of blister formation and associated inflammatory patterns, thereby narrowing the differential diagnosis.

The findings of the present study strongly reinforce the concepts discussed in the Introduction regarding the indispensability of dermatopathology in clinical practice. Histopathological examination not only confirms clinical diagnoses but also identifies unsuspected lesions and refines disease classification based on reaction patterns such as granulomatous, vesiculobullous, and inflammatory changes [1,2,11,16]. This clinicopathological correlation is essential for accurate diagnosis, appropriate therapy, and improved patient outcomes.

Overall, the present study contributes valuable regional data on the demographic and histopathological spectrum of non-neoplastic skin lesions and highlights the continued relevance of biopsy-based diagnosis in dermatology. Strengthening collaboration between dermatologists and pathologists, as emphasized in earlier literature, remains crucial for improving diagnostic accuracy and patient care [12-17].

## 4. Conclusion

Non-neoplastic skin lesions constitute a significant proportion of dermatological conditions encountered in routine clinical practice, with a higher prevalence observed among young and middle-aged adults. The present study highlights the wide histomorphological spectrum of these lesions and underscores the limitations of clinical diagnosis alone due to overlapping presentations. Histopathological examination remains an indispensable and definitive diagnostic modality, enabling accurate disease classification, confirmation of clinical suspicion, and identification of unsuspected conditions. Effective clinicopathological correlation is essential for appropriate therapeutic decision-making and improved patient outcomes.

**Recommendations**

- Strengthening collaboration between dermatologists and pathologists to enhance clinicopathological correlation.
- Encouraging early skin biopsy in clinically ambiguous or non-responsive lesions to facilitate timely and accurate diagnosis.
- Promoting awareness among clinicians regarding the diagnostic value of histopathological evaluation in non-neoplastic skin disorders.

**Future Scope**

Future studies with larger sample sizes and multicentric involvement are warranted to better define the epidemiological patterns of non-neoplastic skin lesions. Integration of advanced diagnostic modalities such as immunohistochemistry, molecular techniques, and artificial intelligence–based digital pathology platforms may further enhance diagnostic accuracy, enable pattern recognition, and support personalized management strategies in dermatopathology.

**Limitations**

The present study has certain limitations that should be acknowledged. The sample size was relatively small and drawn from a single tertiary care center, which may limit the generalizability of the findings to the broader population. The study focused primarily on routine histopathological evaluation using hematoxylin and eosin staining; advanced diagnostic modalities such as immunohistochemistry, molecular testing, and direct immunofluorescence were not routinely employed due to resource constraints. Additionally, clinical follow-up data were limited, restricting assessment of long-term outcomes and treatment response. Despite these limitations, the study provides valuable insight into the histomorphological spectrum of non-neoplastic skin lesions and reinforces the diagnostic importance of histopathology.

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