Section: Pathology

Original Research Article

HISTOPATHOLOGICAL STUDY OF NON-NEOPLASTIC SKIN DISEASES: A STUDY FROM TERTIARY CARE CENTRE

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ABSTRACT

Background: Non-neoplastic skin diseases constitute a diverse group of dermatological disorders with overlapping clinical features, making definitive diagnosis challenging in many cases. Histopathological examination of skin biopsy specimens plays a crucial role in establishing accurate diagnosis, classifying lesions, and guiding appropriate management. The spectrum of these disorders varies according to geographic, environmental, and demographic factors. The objective is to study the histopathological spectrum of non-neoplastic skin diseases, to analyse their age and sex distribution, and to assess clinicopathological concordance in patients presenting to a tertiary care centre.

Materials and Methods: This hospital-based descriptive observational study was conducted in the Department of Pathology in collaboration with the Department of Dermatology at a tertiary care centre over a period of two years. A total of 300 skin biopsy specimens diagnosed as non-neoplastic skin diseases were included in the study. Detailed clinical information was collected from requisition forms and medical records. Biopsy specimens were processed using routine paraffin embedding, and sections were stained with hematoxylin and eosin. Special stains were used whenever indicated. Histopathological findings were correlated with the provisional clinical diagnosis to determine clinicopathological concordance.

Results: The most commonly affected age group was 41–50 years (19.67%), and the majority of cases occurred between 21 and 60 years of age. Inflammatory dermatoses were the predominant category, accounting for 127 cases (42.33%), followed by granulomatous dermatoses in 96 cases (32.00%), vesiculobullous disorders in 48 cases (16.00%), collagen disorders in 26 cases (8.67%), and miscellaneous lesions in 3 cases (1.00%). Psoriasis was the most common inflammatory lesion, while Hansen's Disease was the predominant granulomatous disorder, with Borderline Tuberculoid Leprosy as the most frequent subtype. Pemphigus Vulgaris was the most common vesiculobullous lesion, and Morphea was the predominant collagen disorder. Overall clinicopathological concordance was 86.33%, with the highest concordance observed in inflammatory dermatoses (90.55%).

Conclusion: Non-neoplastic skin diseases exhibit a broad histopathological spectrum, with inflammatory and granulomatous dermatoses being the most common categories. Histopathological examination of skin biopsies is an indispensable and highly reliable diagnostic tool that significantly enhances clinicopathological correlation and facilitates accurate diagnosis and appropriate management of dermatological disorders.

Keywords: Non-neoplastic skin diseases; Histopathology; Skin biopsy; Clinicopathological correlation; Psoriasis; Hansen's disease.

INTRODUCTION

The skin is the largest organ of the human body and serves as a dynamic interface between the internal milieu and the external environment. It performs multiple essential functions, including protection against mechanical injury and microbial invasion, regulation of body temperature, prevention of excessive water loss, sensory perception, immune surveillance, and synthesis of vitamin D. Owing to its complex structure and constant exposure to environmental and endogenous influences, the skin is affected by a wide variety of disorders ranging from inflammatory and infectious conditions to autoimmune, metabolic, and neoplastic diseases.[1]

Non-neoplastic skin diseases constitute a broad and heterogeneous group of dermatological disorders that do not involve uncontrolled neoplastic proliferation. These lesions include infectious dermatoses, papulosquamous disorders, vesiculobullous diseases, connective tissue disorders, pigmentary abnormalities, granulomatous conditions, and various reactive inflammatory processes.[2] Such disorders are encountered frequently in routine clinical practice and account for a significant proportion of outpatient visits to dermatology departments worldwide. Skin diseases are associated with considerable morbidity, cosmetic disfigurement, psychological stress, and reduction in quality of life.[3]

The clinical diagnosis of cutaneous lesions is often challenging because many disorders share overlapping morphological features such as macules, papules, plaques, nodules, vesicles, pustules, and ulcers. Similar clinical appearances may represent entirely different pathological processes, while a single disease may show variable manifestations depending on its stage and duration.[4] Therefore, histopathological examination of skin biopsies remains one of the most important diagnostic tools in dermatology and is widely regarded as the gold standard for establishing a definitive diagnosis in many non-neoplastic skin disorders.[5]

Histopathology enables detailed evaluation of the epidermis, dermo-epidermal junction, dermis, adnexal structures, and subcutaneous tissue. Characteristic microscopic patterns such as spongiosis, acanthosis, hyperkeratosis, interface dermatitis, lichenoid infiltrate, vasculitis, granulomatous inflammation, and subepidermal blister formation assist in categorizing lesions and narrowing the differential diagnosis.[6] When interpreted in conjunction with clinical findings and ancillary techniques such as special stains and immunofluorescence, histopathology significantly improves diagnostic accuracy and guides appropriate treatment.[7]

Clinicopathological correlation is especially important in dermatopathology because a skin biopsy captures the lesion at only one point in its evolution. Early or late biopsies may reveal nonspecific changes, and inadequate clinical information may hinder accurate interpretation. Hence, communication between the dermatologist and pathologist is essential to achieve meaningful and clinically relevant diagnoses.[8]

The spectrum of non-neoplastic skin diseases varies with age, sex, geographic location, socioeconomic conditions, occupational exposures, hygiene practices, climate, and prevalence of infectious diseases.[9] In tropical countries such as India, infectious and granulomatous diseases, particularly leprosy and fungal infections, remain common, whereas inflammatory disorders such as psoriasis, lichen planus, eczema, and autoimmune bullous diseases are increasingly recognized.[10] Several studies from tertiary care centers have documented considerable variation in the prevalence and histomorphological patterns of non-neoplastic skin lesions across different regions.[11-14]

Understanding the histopathological spectrum of non-neoplastic skin diseases in a particular institution is valuable for identifying common diagnostic categories, assessing demographic trends, and improving clinicopathological correlation. Such studies also contribute to local epidemiological data and may help clinicians develop more focused diagnostic and therapeutic strategies.[15]

The present study, titled “Histopathological Study of Non-Neoplastic Skin Diseases: A Study from a Tertiary Care Centre,” was undertaken to analyse the histomorphological spectrum of non-neoplastic skin lesions received in the Department of Pathology, to evaluate their age and sex distribution, and to emphasize the role of histopathological examination in the accurate diagnosis and classification of dermatological disorders.

MATERIALS AND METHODS

Study Design: This study was a hospital-based observational descriptive study conducted in the Department of Pathology at in collaboration with the Department of Dermatology at a tertiary care centre Dr Panjabrao Alias Bhausaheb Deshmukh Memorial medical college, Amravati, Maharashtra, India.

Study Setting: The study was carried out in a tertiary care teaching hospital at Dr Panjabrao Alias Bhausaheb Deshmukh Memorial medical college, Amravati, Maharashtra, India where skin biopsy specimens from patients attending the dermatology outpatient department and inpatient wards were routinely received for histopathological examination.

Study Duration: The study was conducted over a period of 24 months from January 2025 to March 2026

Study Population: All patients presenting with clinically diagnosed non-neoplastic skin diseases and undergoing skin biopsy during the study period were included in the study.

Sample Size: A total of 300 skin biopsy specimens diagnosed as non-neoplastic skin diseases were included in the study.

Sampling Technique: Consecutive sampling was used, and all eligible skin biopsy specimens received during the study period were included.

Inclusion Criteria

1. Skin biopsy specimens from patients of all age groups and both sexes.
2. Clinically suspected non-neoplastic skin lesions.
3. Adequate biopsy specimens with sufficient tissue for histopathological evaluation.
4. Patients who provided informed written consent for skin biopsy and participation in the study.

Exclusion Criteria

1. Biopsy specimens diagnosed as benign or malignant neoplastic skin lesions.
2. Inadequate, autolyzed, or poorly preserved tissue samples.
3. Repeat biopsies from previously diagnosed lesions.
4. Specimens with inconclusive histopathological findings due to insufficient tissue.

Data Collection: Detailed clinical and demographic information of all patients included in the study was obtained from the histopathology requisition forms, dermatology case records, and hospital medical records. The collected data included age, sex, duration of the lesion, anatomical site involved, presenting clinical features, and provisional clinical diagnosis. Relevant history regarding associated symptoms, treatment received, and any pertinent laboratory findings was also noted whenever available. All information was systematically entered into a predesigned and pretested data collection proforma. Each case was assigned a unique study identification number to maintain confidentiality and facilitate clinicopathological correlation.

Specimen Collection and Processing: Skin biopsy specimens were obtained by punch biopsy, incisional biopsy, or excisional biopsy depending upon the size, location, and clinical nature of the lesion. Immediately after collection, the biopsy specimens were fixed in 10% neutral buffered formalin for 12 to 24 hours to ensure optimal preservation of tissue architecture. Gross examination of each specimen was performed, and relevant details such as size, shape, color, and consistency were recorded. The tissues were then processed by routine paraffin embedding techniques. Sections of 3–5 µm thickness were cut using a rotary microtome and mounted on glass slides. All sections were stained with haematoxylin and eosin (H&E) for routine microscopic examination. Special stains such as Periodic Acid–Schiff (PAS), Ziehl–Neelsen (ZN), Fite-Faraco, Congo red, Alcian blue, and Masson-Fontana were used whenever indicated to confirm specific pathological diagnoses. The stained sections were examined microscopically by experienced pathologists, and the histopathological findings were correlated with the clinical diagnosis to establish the final diagnosis.

RESULTS

Age and Sex Distribution: The study included 300 cases. Males (174) predominated over females (126), giving an M:F ratio of approximately 1.4:1. The 21–40-year age group was most commonly affected, followed by the 41–60-year group.

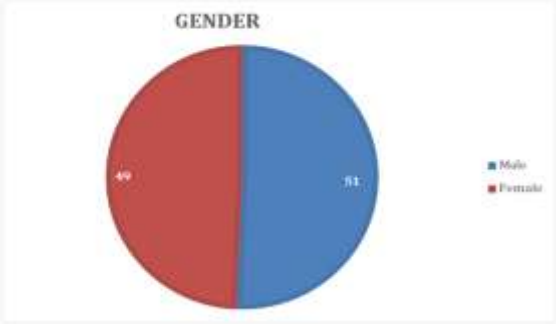

Figure 1: Gender-wise Distribution.

Table 1: Age-wise Distribution of Patients

Age	Frequency	Percentage
≤ 10 years	9	3.00%
11-20 years	46	15.33%
21-30 years	47	15.67%
31-40 years	49	16.33%
41-50 years	59	19.67%
51-60 years	44	14.67%
61-70 years	29	9.67%
71-80 years	9	3.00%
81-90 years	8	2.66%
Total	300	100.00%

Histopathological Diagnosis: Among all non-neoplastic lesions, inflammatory dermatoses were the most frequent. The common histopathological diagnoses included psoriasis, lichen planus, leprosy, discoid lupus erythematosus, and pemphigus vulgaris.

Table 2: Histopathological Diagnosis of Non-neoplastic skin lesions

Category	Diagnosis	Frequency	Percentage
Inflammatory	Psoriasis	41	13.67%
	Psoriasis Vulgaris	27	9.00%
	Lichen Planus	23	7.66%
	Prurigo nodularis	12	4.00%
	Ashy dermatosis	9	3.00%
	Pityriasis rosea	4	1.33%
	Licheniform dermatitis	3	1.00%
	Pityriasis lichenoides chronica	3	1.00%
	Pustular Psoriasis	3	1.00%
	PLEVA	2	0.67%
	Subtotal	127	42.33%
Granulomatous	Borderline tuberculoid Hansen's disease	42	14.00%
	Lepromatous Hansen's disease	28	9.33%
	Tuberculoid Hansen's disease	10	3.33%
	Erythema nodosum leprosum	8	2.67%
	Borderline lepromatous Hansen's disease	3	1.00%
	Lupus vulgaris	3	1.00%
	Histoid Hansen's disease	2	0.67%
	Subtotal	96	32.00%
Vesiculobullous	Pemphigus vulgaris	35	11.67%
	Bullous pemphigoid	6	2.00%
	Pemphigus foliaceous	4	1.33%
	Dermatitis herpetiformis	3	1.00%
	Subtotal	48	16.00%
Collagen Disorders	Morphea	20	6.67%
	Discoid lupus erythematosus	3	1.00%
	Basal vacuolar degeneration with panniculitis	3	1.00%
	Subtotal	26	8.67%
Miscellaneous	Hair follicle nevus	3	1.00%
Total		300	100.00%

Site of Lesion: The majority of non-neoplastic skin lesions in the present study were located on the extremities, accounting for 55% of all cases, making this the most commonly involved anatomical site. The trunk was the second most frequently affected site, contributing 46% of cases. Lesions involving the face constituted 8% of cases, while generalized lesions distributed all over the body were observed in 7% of patients. The scalp and neck were less commonly involved, each accounting for approximately 3% of cases. Genital involvement was the least common site, representing only 1% of the total cases.

The predominance of lesions over the extremities and trunk may be attributed to increased exposure to environmental factors, trauma, infections, and inflammatory dermatoses that commonly affect these regions. The relatively lower frequency of lesions over the scalp, neck, and genitalia reflects the lesser occurrence of disorders requiring biopsy at these sites in routine clinical practice.

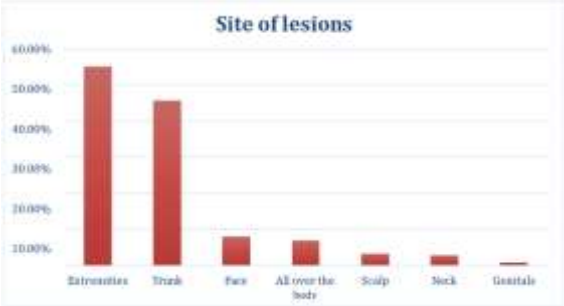

Figure 2: Site of lesions.

Table 3: Distribution of Hansens disease

Distribution of Hansens disease	Frequency	Percentage
Borderline tuberculoid Hansen's disease	42	45.16%
Lepromatous Hansen's disease	28	30.11%
Tuberculoid Hansen's disease	10	10.75%
Erythema nodosum leprosum	8	8.60%
Borderline lepromatous Hansen's disease	3	3.23%
Histoid Hansen's disease	2	2.15%
Total	93	100%

Among the 93 cases of Hansen's disease diagnosed in the present study, Borderline Tuberculoid Leprosy was the most common subtype, accounting for 42 cases (45.16%). This was followed by Lepromatous Leprosy, which constituted 28 cases (30.11%). Tuberculoid Leprosy was observed in 10 cases

(10.75%), while Erythema Nodosum Leprosum was seen in 8 cases (8.60%). Less common variants included Borderline Lepromatous Leprosy in 3 cases (3.23%) and Histoid Leprosy in 2 cases (2.15%).

The predominance of borderline tuberculoid Hansen's disease reflects the common occurrence of immunologically unstable forms of leprosy in the study population. The substantial proportion of lepromatous leprosy indicates the continued presence of multibacillary disease, which has important implications for transmission and public health. Histopathological examination remains essential for accurate classification of Hansen's disease and for guiding appropriate multidrug therapy.

Table 4: Clinicopathological Concordance of Skin Lesions

Category	Histopathologically Diagnosed Cases (n)	Clinically Concordant Cases (n)	Discordant Cases (n)	Concordance (%)
Inflammatory	127	115	12	90.55%
Granulomatous	96	80	16	83.30%
Vesiculobullous	48	41	7	85.40%
Collagen Disorders	26	21	5	80.80%
Miscellaneous	3	2	1	66.70%
Total	300	259	41	86.33%

Clinicopathological correlation showed an overall concordance of 86.33%. Concordance was highest in inflammatory dermatoses (90.55%), followed by vesiculobullous disorders (85.4%) and granulomatous disorders (83.3%). Collagen disorders (80.8%) and the miscellaneous group (66.7%) showed comparatively lower concordance.

Out of 300 histopathologically diagnosed non-neoplastic skin lesions, overall clinicopathological concordance was observed in 259 cases, yielding a concordance rate of 86.33%, while 41 cases (13.67%) showed discordance between the clinical and histopathological diagnoses.

Among the various categories, inflammatory dermatoses demonstrated the highest concordance, with 115 of 127 cases showing agreement between clinical and histopathological diagnoses, resulting in a concordance rate of 90.55%. Granulomatous dermatoses accounted for 96 cases, of which 80 were clinically concordant and 16 were discordant, giving a concordance rate of 83.30%. Vesiculobullous disorders showed concordance in 41 of 48 cases, corresponding to a concordance rate of 85.40%. Collagen disorders exhibited concordance in 21 of 26 cases, with a concordance rate of 80.80%. The miscellaneous category showed the lowest concordance, with only 2 of 3 cases being clinically concordant, resulting in a concordance rate of 66.70%.

These findings indicate that clinical diagnosis was highly reliable for inflammatory and vesiculobullous dermatoses, whereas granulomatous and collagen disorders demonstrated comparatively lower concordance due to overlapping clinical features. The results emphasize the critical role of histopathological examination in confirming the diagnosis of non-neoplastic skin diseases and improving diagnostic accuracy, particularly in clinically ambiguous cases.

DISCUSSION

In the present study, the highest number of cases of non-neoplastic skin diseases was observed in the 41–50 years age group (19.67%), followed by the 31–40 years (16.33%), 21–30 years (15.67%), and 11–20 years (15.33%) age groups. Overall, the majority of cases were concentrated in the economically productive age group of 21–60 years, accounting for 66.34% of all cases. This finding suggests that non-neoplastic skin diseases are more commonly encountered among adults who are more frequently exposed to occupational, environmental, and infectious risk factors.

A similar predominance of cases in middle-aged adults was reported by Nishal A et al[11], who observed that the majority of patients belonged to the third to fifth decades of life. Omenai SA et al[12] also documented that non-neoplastic skin lesions were most frequently encountered in the fourth and fifth decades. Likewise, Goyal N et al,[13]reported that the bulk of cases occurred in young and middle-aged adults, particularly between 21 and 50 years of age. Kumar V et al,[14] similarly found that the highest incidence of non-neoplastic skin diseases was seen in patients in the third to fifth decades of life.

The predominance of cases in the 41–50 years age group in the present study is thus consistent with the observations of Nishal A et al,[11] Omenai SA et al,[12] Goyal N et al,[13] and Kumar V et al.[14] The increased frequency of skin disorders in this age group may be attributed to cumulative exposure to infectious agents, allergens, occupational irritants, ultraviolet radiation, and age-related immunological changes.

Therefore, the age distribution observed in the present study is in close agreement with previous studies, confirming that non-neoplastic skin diseases are most commonly encountered in young and middle-aged adults, particularly during the third to fifth decades of life.

Comparison of Histopathological Spectrum with Other Studies: In the present study, inflammatory dermatoses constituted the largest category of non-neoplastic skin diseases, accounting for 127 cases (42.33%), followed by granulomatous dermatoses in 96 cases (32.00%), vesiculobullous disorders in 48 cases (16.00%), collagen disorders in 26 cases (8.67%), and miscellaneous lesions in 3 cases (1.00%). Among the inflammatory lesions, Psoriasis

was the most common diagnosis, observed in 41 cases (13.67%), followed by Psoriasis Vulgaris in 27 cases (9.00%) and Lichen Planus in 23 cases (7.66%). Among granulomatous lesions, Hansen's Disease predominated, particularly Borderline Tuberculoid Leprosy (14.00%) and Lepromatous Leprosy (9.33%). In the vesiculobullous category, Pemphigus Vulgaris was the most frequent lesion (11.67%), while Morphea was the predominant collagen disorder (6.67%).

These findings are comparable to those reported by Nishal A et al[11], who found inflammatory dermatoses to be the most common histopathological category, with psoriasis and lichen planus among the leading diagnoses. Omenai SA et al,[12] similarly documented inflammatory lesions as the predominant group, followed by infectious and granulomatous dermatoses. Goyal N et al,[13] also reported that papulosquamous and granulomatous disorders constituted the majority of non-neoplastic skin lesions, with psoriasis and Hansen's disease being commonly encountered diagnoses. Kumar V et al,[14] observed a similar predominance of inflammatory dermatoses, with psoriasis, lichen planus, and autoimmune vesiculobullous disorders forming major components of the histopathological spectrum. The relatively high proportion of granulomatous lesions in the present study, particularly Hansen's disease, reflects the continued burden of leprosy in the region and the importance of skin biopsy in accurate classification and management. The substantial number of vesiculobullous disorders and collagen diseases further underscores the utility of histopathological examination in diagnosing clinically overlapping dermatoses.

Overall, the histopathological spectrum observed in the present study is in close agreement with the findings of Nishal A et al,[11] Omenai SA et al,[12] Goyal N et al,[13] and Kumar V et al,[14] all of whom emphasized that inflammatory dermatoses constitute the largest group of non-neoplastic skin diseases and that histopathology plays a pivotal role in establishing a definitive diagnosis and guiding appropriate treatment.

CONCLUSION

The present study, "Histopathological Study of Non-Neoplastic Skin Diseases: A Study from a Tertiary Care Centre," demonstrated that non-neoplastic skin diseases encompass a wide and diverse spectrum of dermatological disorders, with inflammatory and granulomatous dermatoses constituting the predominant categories. The extremities and trunk were the most commonly affected anatomical sites, and Hansen's Disease emerged as the most frequent granulomatous lesion, with Borderline Tuberculoid Leprosy being the most common subtype.

Histopathological examination proved to be a highly reliable diagnostic tool, providing definitive diagnosis and classification of skin lesions and showing an overall clinicopathological concordance of 86.33%. The highest concordance was observed in inflammatory dermatoses, underscoring the accuracy of clinical diagnosis in this group, while histopathology was particularly valuable in resolving diagnostically challenging granulomatous, vesiculobullous, and collagen disorders.

This study highlights the indispensable role of skin biopsy and histopathological evaluation in the diagnosis of non-neoplastic skin diseases. Close clinicopathological correlation significantly enhances diagnostic precision, facilitates appropriate treatment, and contributes to a better understanding of the local epidemiological pattern of dermatological disorders encountered at tertiary care centers.

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