



HISTOPATHOLOGICAL SPECTRUM OF NONNEOPLASTIC DERMATOLOGICAL LESIONS IN A TERTIARY CARE CENTER, IN MULUGU, SIDDIPET - A RETROSPECTIVE STUDY

Histopathology

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ABSTRACT

The skin is the largest organ in the human body and acts as a protective barrier against external components. Various factors stimulate a variety of skin diseases. Biopsy is the most common tool employed to diagnose these conditions. While most of these diseases can be diagnosed clinically, histopathological examination is pivotal for accurate diagnosis. The present study was performed to analyze the occurrence of nonneoplastic skin lesions, highlighting the age, sex and site distribution of various lesions as well as their morphological patterns. This was a noninterventional, cross-sectional, retrospective study of all skin biopsy specimens collected at our tertiary care hospital in Mulugu, Siddipet district, Telangana over a period of 1 year from September 2022 to September 2023. In our study, there were 89 patients, for a female to male ratio of 1.17:1 (53.9% and 46.1% respectively). The most common age group was 21-30 years. Twenty-one (23.59%) conditions were indeterminate. The most common category of lesions was papulosquamous disorders, of which lichen planus was the most common lesion. Among infectious diseases, leprosy was the most common.

KEYWORDS

Nonneoplastic skin lesions, histopathology, lichen planus, leprosy.

BACKGROUND:

The skin is the largest organ in the human body and comprises the epidermis, dermis and subcutis. It is a major sensory organ that acts as a protective barrier against external agents^[1,2] and has a role in homeostasis.

The skin is exposed to a variety of agents including ultraviolet (UV) radiation, and hence is susceptible to a broad spectrum of lesions ranging from inflammatory to neoplastic conditions.^[3] Currently, approximately 2000 skin diseases have been identified, occurring in developing countries and involving almost all age groups.^[4] Diseases vary widely based on the region and are especially influenced by age, sex, environment, ethnicities and customs.^[5]

The majority of skin lesions are a matter of cosmetic concern, and some might even result in morbidity if left untreated. Recent years, have seen an increasing awareness of the impact of skin diseases on social, work and interpersonal relationships and questionnaires such as Dermatology Life Quality Index (DLQI) have been employed to assess such impact.^[6]

Dermatology employs very few diagnostic tests, of which, skin biopsy plays a significant role.^[7] Skin biopsies play a pivotal role in diagnosis and prognosis.^[8] There are various biopsy techniques, including punch biopsy, shave biopsy, incisional biopsy, excisional biopsy, scalpel biopsy, and curettage biopsy.^[9] Histopathological examination of the specimens obtained by any of the above procedures, offers an accurate diagnosis and helps the dermatologists in planning the treatment that is best for the patients.

Various studies have shown the correlation between clinical and pathological diagnosis ranging from 67 to 87%, suggesting influence of various factors, including the definition of concordance and availability of clinical data to the pathologist.^[10]

AIMS AND OBJECTIVES:

- To analyse the spectrum of nonneoplastic skin lesions diagnosed at our tertiary care center.
- To study the frequency, age, sex and site distribution of the nonneoplastic skin lesions.

MATERIALS AND METHODS:

Study Design: Noninterventional, cross-sectional, retrospective study.

Study Duration: 1 year from January 2023 to January 2024.

Study Site: RVM Institute of Medical Sciences and Research Center, Mulugu (M), Siddipet (D), Telangana (S).

The punch biopsy specimens sent to the Department of Pathology were fixed in 10% neutral buffered formalin with adequate labelling and clinical data on the requisition form. The specimens were subjected to standard processing in the processor, followed by paraffin embedding, and adequate sections were taken for hematoxylin & eosin (H&E) staining. The stained slides were mounted using dibutylphthalate polystyrene xylene (DPX) and studied under the microscope. Special staining was performed wherever necessary. Of the total skin biopsy specimens collected, 89 cases were nonneoplastic.

Inclusion Criteria: All the nonneoplastic skin lesions subjected to histopathological examination were included in the study.

Exclusion Criteria:

- Patients who underwent chemotherapy/ radiotherapy
- Specimens that were poorly fixed or autolyzed or inadequate samples were not included in the study.
- Patients who were diagnosed with neoplasms were excluded from the study.

Entire data was tabulated, and results were calculated and recorded. The lesions were classified based on 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).^[11]

Table 1 Shows ICD Code Groups Of Nonneoplastic Skin Lesions In The Present Study.

ICD Codes	Official name of the ICD group
L00-L08	Infections of skin and subcutaneous tissue
L10-L14	Bullous disorders
L20-L30	Dermatitis and eczema
L40-L45	Papulosquamous disorders
L50-L54	Urticaria and erythema
L60-L75	Disorders of skin appendages
L80-L99	Other disorders of skin and subcutaneous tissue
M35.1, M35.9	Connective tissue diseases
L81.1, D22	Disorders of pigmentation
Q82.0-Q82.9	Other congenital malformations of skin

RESULTS:

A total of 89 nonneoplastic cases were noted within the span of 1 year from January 2023 to January 2024; of which 41 (46.1%) patients were male and 48 (53.9%) were female; hence female to male ratio was 1.17:1.

The maximum age of the patients was 75 years, and the minimum age was 7 years. The average age at diagnosis was 37.9 years. The most common age group of patients was 3rd decade, with 23 patients and a greater number of males.

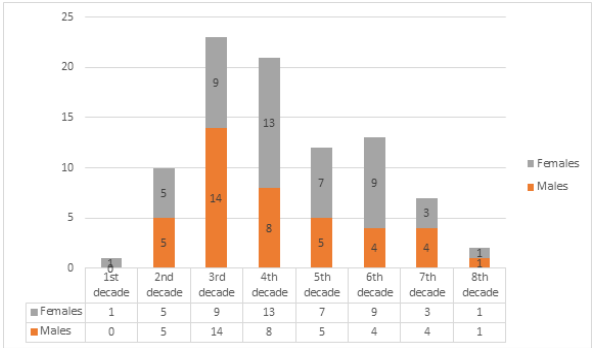


Figure 1: Age and sex distributions of the patients with lesions.

The younger age group <10years (1st decade) accounted for 1.12%, and the elderly age group >70years (8th decade) accounted for 2.24%.

Of the 89 cases, 21 (23.59%) were descriptive and indeterminate.

Table 2: Distribution Of Major Lesions In Different Categories Along With Sex Distribution.

Disease	No. of cases	Percentage	Males	Females
Infectious diseases	14	15.7	11	3
Leprosy	13	92.86	11	2
Tuberculoid	3	23.10	1	2
Borderline tuberculoid	3	23.10	3	0
Mid-borderline	-	-	-	-
Borderline lepromatous	1	7.69	1	0
Lepromatous	5	38.42	5	0
Indeterminate	1	7.69	1	0
Papulonecrotic tuberculids	1	7.14	0	1
Bullous disorders	7	7.87	3	4
Bullous pemphigoid	4	57.14	2	2
Dermatitis herpetiformis	3	42.86	1	2
Dermatitis & eczema	1	1.12	1	0
Prurigo nodularis	1	1.12	1	0
Papulosquamous disorders	24	26.96	8	16
Lichen planus	18	75	5	13
Psoriasis	3	12.5	2	1
Pityriasis lichenoides chronica	2	8.33	1	1
Pityriasis rubra pilaris	1	4.17	0	1
Urticaria & erythema	2	2.25	0	2
Other disorders of skin and subcutaneous tissue	12	13.5	5	7
Connective tissue disorders	4	4.5	1	3
Morphea	1	25	1	0
Discoid lupus erythematosus	2	50	0	2
Systemic sclerosis	1	25	0	1
Other congenital malformations of skin	4	4.5	2	2
Verrucous epidermal nevus	2	50	1	1
Hailey- Hailey	2	50	1	1
Undetermined	21	23.60	10	11

The most common category of lesion was the papulosquamous type, accounting for 26.96% of all cases, with a greater percentage of female patients, followed by infections (15.7%), with a notable male predominance. The least common category was dermatitis and eczema (1.12%), which was a case of prurigo nodularis.

Bullous disorders showed a relatively balanced gender distribution.

Among bullous disorders, bullous pemphigoid and dermatitis herpetiformis were noted. Bullous pemphigoid was slightly more common and affected both genders equally. Dermatitis herpetiformis was less common and also impacting both males and females with a relative female predominance.

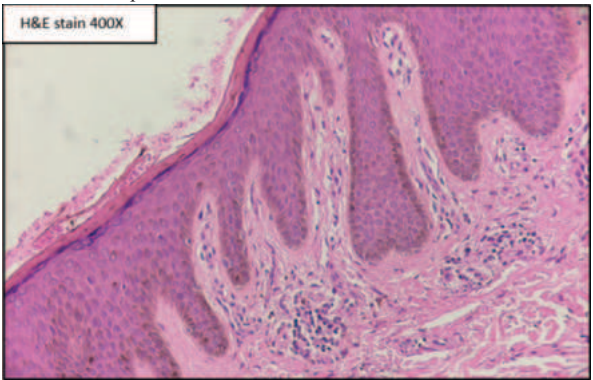


Figure 2: H&E section of Prurigo nodularis showing vertically oriented collagen bundles in papillary dermis and superficial perivascular inflammatory infiltrate.

Urticaria and erythema were uncommon, affecting only female population in the sample. Connective tissue disorders were infrequent, more common in females. Miscellaneous disorders exhibited a slightly higher occurrence in females. Congenital malformations of the skin were distributed among both genders equally. A significant portion of cases remained undetermined (23.6%), with an almost equal distribution between males and females.

Infectious diseases were predominantly represented by leprosy, affecting significantly more males than females. Within leprosy, lepromatous leprosy was the most common, with only male patients. Tuberculoid and borderline tuberculoid forms have equal representation among males and females. Mid-borderline leprosy had no reported cases within the current study. Borderline lepromatous and indeterminate leprosy were rare and noted exclusively in males. Papulonecrotic tuberculids was very rare, with a single case noted in a female.

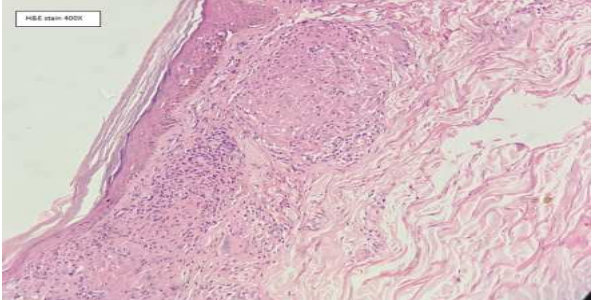


Figure 3: H&E section of Tuberculoid leprosy with epitheloid granulomas and giant cells

Papulosquamous disorders were predominantly represented by lichen planus accounting for 75% of cases, affecting more females than males. Psoriasis was less common and slightly more prevalent in males. Pityriasis lichenoides chronica was rare and equally noted in both genders. Pityriasis rubra pilaris was the least common, with a single case presenting in a female.

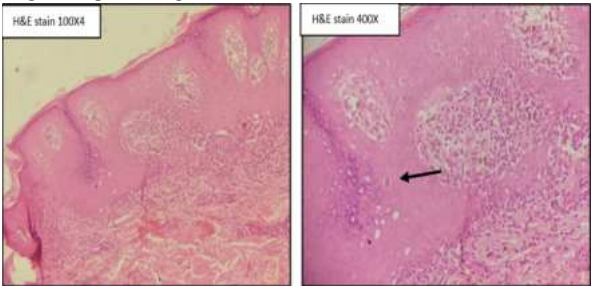


Figure 4: H&E section of Lichen planus a) Band like infiltration of inflammatory cells, b) Civatte bodies (black arrow)

Erythema nodosum was the predominant lesion under the category of urticaria and erythema.

Connective tissue disorders include morphea, discoid lupus erythematosus and systemic sclerosis. Morphea was rare and noted only in males. Discoid lupus erythematosus was more common, affecting exclusively females within the sample studied. Systemic sclerosis was also a rare occurrence, with a single case presented in a female.

Table 3: Distribution Of Other Disorders Of Skin And Subcutaneous Tissue.

Other diseases	No. of cases	Percentage	Males	Females
Post inflammatory pigmentation	2	16.68	0	2
Chronic inflammation	1	8.33	0	1
Sweet syndrome	1	8.33	0	1
Leucocytoclastic vasculitis	2	16.68	2	0
Keratosis pilaris	1	8.33	1	0
Calcinosis cutis	1	8.33	1	0
Cutaneous vasculitis	1	8.33	0	1
Nodular vasculitis	1	8.33	0	1
Pyogenic granuloma	1	8.33	0	1
Pellagra	1	8.33	1	0

The category of Other disorders of skin and subcutaneous tissue include a variety of conditions with diverse gender distributions. Post inflammatory pigmentation and leucocytoclastic vasculitis were most commonly seen and predominantly affected females, whereas chronic inflammation, keratosis pilaris, calcinosis cutis, and pellagra were more commonly observed in males. Sweet syndrome, cutaneous vasculitis, nodular vasculitis, and pyogenic granuloma each have a single reported case, with Sweet syndrome presenting in a female and the rest impacting males.

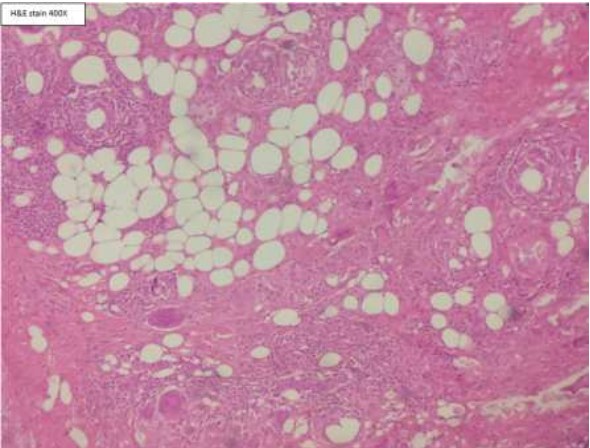


Figure 5: H&E section of Nodular vasculitis showing noncaseating granulomas with multinucleate giant cells in subcutaneous fat.

Congenital skin disorders in this study include verrucous epidermal nevus and Hailey-Hailey disease. Verrucous epidermal nevus and Hailey-Hailey disease both exhibit a 50% occurrence rate in males and females, highlighting an even gender distribution within these congenital conditions.

Clinicopathological Correlation:

Of the total of 89 cases, 66 (74.16%) demonstrated a positive clinicopathological correlation, indicating that their clinical findings were consistent with the pathological results. Conversely, 23 cases (25.84%) were inconsistent and a majority of them were descriptive and undetermined. Only 2 of the 23 cases had a definitive diagnosis which was not consistent with the clinical diagnosis. This significant proportion of positive correlations suggests a strong alignment between clinical observations and pathological diagnoses in the study population.

DISCUSSION:

In our study, the majority of the patients were female, similar to the findings of studies by Bezbaruah R et al.^[12], Adhikari et al.^[4] and Svensson A et al.^[13] where as in studies by Dayal et al.^[14], Goswami P et

al.^[15], Kumar V et al.^[16] and Albasri AM et al.^[17] there was male predominance.

The highest number of cases were noted in 3rd decade (21-30 years old) in our study, which is in accordance with Bezbaruah R et al.^[12] and Abubakar SD et al.^[18] and similar to the findings of studies by Symvoulakis et al.^[19] from a Mediterranean island, Hofny et al.^[20] from Egypt, Narang et al.^[21] from India, Al shobaili et al.^[22] from Saudi Arabia, and Bilgili et al.^[23] from Turkey with age ranges of 21-40 years, 18-39 years, 21-30 years, 15-34 years, and 20-29 years, respectively. In contrast Adhikari et al.^[4] reported that the majority of patients were 31-40 years old, and Goswami P et al.^[15] reported that the oldest patients were >60 years old. Celine et al.^[24] from India and Memon et al.^[25] from Pakistan each had the most patients aged <15years.

In our study, the most common type of lesions were papulosquamous lesions, of which the most common lesion was lichen planus, similar to the findings of a study by Gulia et al.^[26] from India, and was the second most common category in a study by Ogun et al.^[27] from Nigeria. Although lichen planus was the most commonly observed noninfectious erythematous papular and squamous disease according to studies by Goswami P et al.^[15], Agrawal S et al.^[28] and Reddy et al.^[29] it was not the most common lesion. Spongiotic dermatitis was the most commonly observed lesion in the study by Adhikari et al.^[4]

Leprosy was the most common type of infectious disease, similar to studies by Goswami P. et al.^[15] and Agrawal et al.^[28] suggesting the frequent occurrence of airborne infectious disease in the area. In contrast, dermatophytosis was the most common type of infective skin lesion in studies performed by Karn et al.^[30] and Walker et al.^[31]

Table 4: Summary Of Comparisons Of The Present Study With Other Studies.

Study	Region	Male	Female	Most common age group	Most common benign lesions
Gulia et al. ^[26]	India	8.75	91.25	<50	Non-infectious erythematous papulosquamous diseases (Psoriasis vulgaris)
Al Shobaili ^[22]	Qassim, Saudi Arabia	58.5	41.5	5-34	Eczema and dermatitis (Atopic dermatitis)
Furue et al. ^[32]	Japan	46.1	53.9	16-60	Eczema and dermatitis (Miscellaneous eczema)
Bilgili et al. ^[23]	Eskiseher, Turkey	44.3	55.7	20-29	Eczema and dermatitis (Contact dermatitis)
Celine et al. ^[24]	Kerala, India	58.9	41.1	0-15	Infection of skin and subcutaneous tissue (Bacterial infections)
Hofny et al. ^[20]	Assiut, Egypt	54.0	46.0	18-39	Infection of skin and subcutaneous tissue (Viral diseases- warts)
Svensson et al. ^[13]	Europe	53.9	46.1	18-50	Viral warts
Albasri AM et al. ^[17]	Madina, Saudi Arabia	51.5	48.5	20-49	Disorders of skin appendages (Epidermal inclusion cyst)
Goswami P. et al. ^[15]	India	M>F	M>F	>60	Non-infectious vesiculobullous and vesiculopustular disease (Seborrheic keratitis)
Present study	Telangana, India	46.1	53.9	21-30	Papulosquamous lesions (Lichen planus)

The studies across various regions provide a comprehensive view of dermatological conditions and their demographic profiles. In India, Gulia et al.^[26] and Celine et al.^[24] highlighted a higher prevalence of non-infectious erythematous papulosquamous diseases and infectious lesions, respectively, predominantly among females and younger age groups. Conversely, studies from Saudi Arabia by Al Shobaili et al.^[22] and Albasri AM et al.^[17] demonstrated a higher incidence of eczema and disorders of skin appendages among males, particularly in younger adults. Research by Furue et al.^[32] in Japan showed a balanced distribution of eczema and dermatitis between genders across a broader age range. In Turkey, Bilgili et al.^[23] reported a slight female predominance in similar dermatitis cases among young adults. These findings underscore regional variations in dermatological conditions influenced by cultural, environmental, and genetic factors, highlighting the importance of tailored healthcare approaches based on local epidemiological insights.

The cause of 25.84% cases not correlating with their clinical diagnoses could be attributed to multiple factors, such as overlapping clinical features of the diseases, inconsistent histories given by the patients etc. The significant percentage of undetermined or descriptive diagnosis reflects the gap between clinical and pathological coordination such as the quality of clinical information provided by the dermatologists in the histopathology requisition forms, the representative lesion chosen for biopsy and the choice of biopsy technique to name a few.

CONCLUSION:

The wide spectrum of skin lesions observed among the patients suggests the need to confirm the diagnosis by biopsy to ensure proper management. Higher number of leprosy cases indicate the need for extensive community education to prevent these airborne diseases. Regular audits of clinico-pathological consistencies and organizing clinico-pathological meetings in the departments can help in identifying the inadequacies and eliminating them, which in turn would help in achieving better definitive diagnostic rates. Histopathological examination is the gold standard for definitive diagnosis when supported by interdepartmental coordination.

Competing Interests:

The authors declare that they have no competing interests.

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