

The Spectrum of Dermatological Lesions on Histopathological examination

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Abstract

Background: Dermatological lesions display a wide spectrum of diseases. Although common in the developing countries, they are not considered significant on assumptions of being always non-lethal and insignificant but are sometimes indicators to underlying systemic diseases. **Aims and objectives:** To observe and analyse the spectrum of dermatological disorders through histopathological examination. **Material and Methods:** This was a prospective study, carried out at tertiary care centre of Ahmedabad, Gujarat, India. A total of 127 cases including punch and excision biopsies of skin were studied over a period of 1 year and 6 months. **Results:** Out of the total 127 cases, 56 were males and 71 were females showing a slight female predilection. Skin lesions were divided into six groups of which inflammatory, malignant & benign neoplastic; & infectious skin lesions showed female predilection while spongiotic, psoriasiform and lichenoid skin lesions as well as leprosy and tuberculous skin lesions showed male predilection. Vesicobullous lesions were found to be gender neutral. The overall male to female ratio was found to be 0.8:1. Inflammatory lesions (33%) of skin formed the most common group of skin lesions in this study followed by benign tumours/cysts (27.5%) of skin. **Conclusion:** Skin lesions show a wide variety of histomorphology and they are sometimes an important manifestation of systemic diseases. Hence, a proper histopathological examination remains the gold standard in diagnosing skin diseases.

Keywords: Hematoxylin and Eosin, Histological study, Neoplastic, Non-neoplastic, Skin lesions.

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INTRODUCTION

About a century ago, the noted pathologist Rudolph Virchow understood the skin as a protective cover [1]. Being the largest organ of the body, it accounts for 15% of the total body weight in adult humans [2]. The skin or integument is a complex organ with many functions and with three main anatomic components: epidermis and skin adnexa, melanocytic system, and dermis and subcutis [3-6]. Non-neoplastic or inflammatory skin diseases encompass a wide array of pathologic processes ranging from autoimmune to infectious to diseases of unknown aetiology [7]. Dermatologic disorders are common in all countries but the spectrum varies greatly [8]. Although skin disorders are very common in the developing countries, they are not regarded significant as they are usually assumed to be non-life-threatening minor nuisance that could not benefit from public health measures. This attitude leads to the lower priority given to these disorders [8]. There have been many studies to understand the global burden of skin diseases and an increasing trend has been found

in all these studies. The Global Burden of Disease (GBD) project (2017) is based at the Institute of Health Metrics, University of Washington and supported by the Bill and Melinda Gates Foundation located at Seattle, Washington. It provides disability and mortality estimates for a broad range of diseases, injuries, and risk factors. Various skin disease categories were assessed by the group and found the skin disorders as 4th leading cause of non-fatal disease burden. Histopathologic study is considered gold-standard for diagnosis of skin lesions, either neoplastic or inflammatory, most of the times [9]. The aim of this study is to understand the varied spectrum of skin diseases that patients present with and understand the age and gender related differences.

MATERIALS AND METHODS

This was a prospective study, carried out at tertiary care teaching institute of Ahmedabad, Gujarat, India. A total of 127 cases including punch and excision biopsies of skin were studied over a period of 1 year

and 6 months, from July 2017 to December 2018. All the biopsies were fixed using 10% Neutral buffered formalin. All tissues were grossly examined, and sampling was done keeping in mind the size of the specimen received. Specimens of size less than 1cm were bisected & processed entirely while specimens of size 1cm or more were cut, examined and representative sections were submitted for processing. All tissues were then processed in Automatic Tissue Processor Electra by Yorco™, embedded in paraffin wax, sectioned 3-4µm thick sections with Leica RM 2125 RT microtome and were stained with Hematoxylin &Eosin. Special stains were used when required to aid in further diagnosis. Relative frequency of various lesions, distribution of age and sex were analysed. Patient's history and clinical details like age, sex, site of lesion and character were noted. Indoor as well as outdoor patients of all age-groups who presented with a skin lesion and underwent biopsy for the same were included in this study. Those cases in which biopsy was inconclusive either due to inadequate sampling or absence of any microscopic abnormality were excluded from the present study.

Six groups were created based on the aetiology, pattern of lesion, component of skin involved

and whether neoplastic or not. These groups were labelled as follows-

- I. Inflammatory lesions
- II. Infectious lesions
- III. Vesicobullous lesions
- IV. Spongiotic, psoriasiform and lichenoid lesions
- V. Leprosy and Tuberculosis
- VI. Tumours and cysts (Benign and Malignant)

The final diagnosis was given after correlating clinical findings and histopathological features. All the data was collected in Microsoft excel sheet and then analysed.

RESULTS

Total 127 cases were studied out of which 56 (44%) were males and 71 (56%) were females forming a male to female ratio of 0.8:1 (Figure-1). As shown in Table-1, Groups I, II and VI showed female predilection with male to female ratios of 0.5:1, 0.3:1 and 0.6:1 respectively while groups IV and V showed male predilection with male to female ratios of 10:1 and 1.7:1 respectively. Group III showed no gender predilection

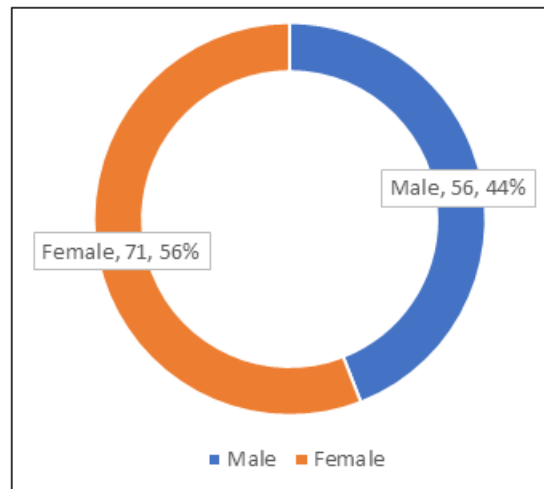


Fig-1: Gender distribution in skin lesions

Table-1: Gender distribution overall and among various groups

Groups	Type of lesion	Male		Female		Total
		Cases	%	Cases	%	
Group I	Inflammatory	15	26.8	27	38.0	42
Group II	Infectious	1	1.8	3	4.2	4
Group III	Vesicobullous	7	12.5	7	9.8	14
Group IV	Spongiotic, psoriasiform and lichenoid lesions	10	17.8	1	1.4	11
Group V	Leprosy and Tuberculosis	5	9.0	3	4.2	8
Group VI	Tumours and cysts	18	32.1	30	42.3	48
	Benign	16	28.6	19	26.8	35
	Malignant	2	3.6	11	15.4	13
Total		56	100	71	100	127

Table-2: Age wise distribution of cases with skin lesions

Group s	Type of lesion	Age range (years)								Most common age group
		0 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	
Group I	Inflammatory	0	5	10	7	6	8	4	2	21 to 30
Group II	Infectious	0	0	1	0	1	0	0	2	71 to 80
Group III	Vesicobullous	0	0	2	1	3	4	2	2	51 to 60
Group IV	Spongiotic, psoriasiform and lichenoid lesions	0	2	1	4	0	2	2	0	31 to 40
Group V	Leprosy and Tuberculosis	0	2	1	1	0	3	1	0	51 to 60
Group VI	Tumours and cysts	1	7	9	12	7	2	6	4	31 to 40
	Benign	1	6	8	11	6	1	2	0	31 to 40
	Malignant	0	1	1	1	1	1	4	4	61 to 80
Total		1	16	24	25	17	19	15	10	21 to 40

Skin lesions were found to be widely distributed covering all age-groups (Table-2). There was a slightly higher incidence of occurrence of skin diseases in the age group of 21-40 years which constituted 38.6% (49/127) of all cases. The lowest number of patients were seen in the age-group of 1-10 years constituting only 0.8% (1/127) of all cases. Inflammatory lesions (Group I) showed majority of cases i.e. 23.8% (10/42) in the age-group of 21-30 years. Infectious lesions (Group II) showed majority of cases i.e. 50% (2/4) in the 71-80 years age-group. Vesicobullous lesions (Group III) were found more in age group of 51-60 years constituting 28.6% (4/14) of all cases in that group. Spongiotic, psoriasiform and Lichenoid lesions (Group IV) had majority in the age-group of 31-40 years i.e. 36.3% (4/11). Leprosy and Tuberculous lesions (Group V) showed majority of cases i.e. 37.5% (3/8) in age-group of 51-60 years. Tumours and cysts (Group VI)- Benign lesions showed 31-40 years age-group as the most common group with 31.4% (11/35) cases while malignant lesions showed the most common age-group to be 61-80 years with 61.5% of cases (8/13).

In the present study, most common were the Inflammatory skin lesions (Group I) consisting of 33.0% (i.e. 42/127) followed by Benign part of Tumours and cysts (Group VI) consisting of 27.6% (i.e. 35/127) (Table-3).

Group I consisted of the inflammatory lesions of skin in which a wide variety of disorders showing at least some amount of inflammation in epidermis, dermis or subcutis excluding inflammation caused by infectious diseases and lichenoid lesions were included.

Group I comprised of 42 cases out of total 127 cases i.e. 33.0%.

In Group II, skin lesions caused by any infection other than leprosy and tuberculosis were included. There were 4 cases in this group out of total 127 cases i.e. 3.2% of the total skin lesions.

Group III was formed by Vesicobullous lesions of skin with a total of 14 cases out of 127 cases forming 11.0% of total skin lesions studied.

Group IV consisted of Spongiotic, psoriasiform and lichenoid lesions of skin with a total of 11 cases out of 127 forming 8.7% of the total skin lesions.

In Group V, lesions caused by Lepra bacilli and Mycobacterium tuberculosis were included. This group displayed a total of 8 cases with 6 cases of Leprosy and 2 cases of tuberculous inflammation. This group formed 6.3% of all skin lesions. Leprosy formed 4.7% whereas tuberculous inflammation formed 1.6% of the total skin lesions.

Last group i.e. Group VI consisted of the benign and malignant tumours and cysts of skin and adnexa. There were total 48 cases out of which 35 cases (73%) were of benign skin lesions and 13 cases (27%) were of malignant skin lesions. This group formed the maximum number of cases with 37.8% of all skin lesions. Epidermal and sebaceous cysts (23/35) were the most common benign lesions & Basal cell carcinoma (6/13) was the most common malignant skin lesion. Out of all malignant skin lesions, there was one case of metastatic breast carcinoma.

Table-3: Group-wise distribution of skin lesions with list of individual lesions

Disease Group	Details	Total lesions (N)	Different lesions found in the group	No. of cases (n)
I	Inflammatory lesions	42	Elastosis perforans serpiginosa	1
			Non-specific Dermatitis	12
			Leukocytoclastic vasculitis	5
			Erythema annulare centrifugum	2
			Idiopathic calcinosis cutis	1
			Urticaria	3
			Perforating collagenosis	3
			Macular amyloidosis	1
			Systemic lupus erythematosus	2
			Panniculitis	1
			Morphea	2
			Granulomatous annulare	4
			Drug-induced erythema multiforme	1
			Baboon syndrome (Contact dermatitis)	1
			Terlipressin induced skin necrosis	1
II	Infectious	4	Keratosis pilaris	1
			Exogenous ochronosis	1
			Verruca plantaris	3
III	Vesicobullous	14	Carbuncle	1
			Bullous pemphigoid	5
IV	Spongiotic, psoriasiform and Lichenoid lesions	11	Darier's disease	2
			Pemphigus vulgaris	7
			Psoriasis	3
			Lichen planus pigmentosa	3
V	Leprosy and Tuberculous inflammation	8	Lichen striatus	1
			Lichen simplex atrophicus	1
			Prurigo	2
			Pityriasis rosea	1
			Lepromatous leprosy	2
VI	Tumours and Cysts	47	Borderline lepromatous leprosy	1
			Borderline Tuberculoid leprosy	2
			Indeterminate leprosy	1
			Benign	35
			Epidermal cyst	15
			Dermoid cyst	1
			Sebaceous cyst	8
Trichilemmal cyst	2			
Hydrocystoma	1			
Pilomatrixoma	1			
Seborrheic keratosis	3			
Melasma	1			
Mixed nevus	1			
Junctional nevus	1			

		Malignant	Basal cell carcinoma	6
		13	Malignant melanoma	2
			Malignant Trichilemmal tumour	1
			Squamous cell carcinoma	1
			T-cell lymphoma	1
			Large cell anaplastic lymphoma	1
			Metastasis from Breast Carcinoma	1

DISCUSSION

The Institute of Health Matrix, University of Washington had undertaken the Global Burden of Disease (GBD) project (2017) by support of the Bill and Melinda Gates foundation, Seattle, Washington. This project had found that skin conditions contributed 1.79% of the total global burden of disease which was measured by DALY (Disability Adjusted Life Years) and YLD (Years Lived with Disability) across 306 diseases and injuries. This made skin and subcutaneous disorders 4th leading cause of non-fatal disease burden following iron-deficiency anemia, tuberculosis and sense organ diseases. Out of all skin conditions, dermatitis (encompassing atopic, seborrheic and contact types) resulted in greatest burden of skin conditions costing 9.3 million DALYs. Thus, skin disorders are a very significant component of disease burden and hence it requires an utmost attention [9].

A total of 127 cases were studied out of which 56 were males and 71 were female. Male to female ratio was found to be 0.8:1 showing a slight female predominance. This finding was comparable to the study done by Dr. Rukmin *et al.*, which also showed a female predominance with 58 females out of total 113 cases with a ratio of 0.9:1 [12]. This was in contrast to the study done by Rakesh Mehar *et al.*, and Grover *et al.* who found skin lesions to be more common in male population. Rakesh Mehar *et al.* found 63 males out of total 112 patients i.e. 1.3:1 and Grover *et al.* found 325 males out of total 522 cases i.e. 1.6:1 in their studies [8, 13].

The most common age-group found to be affected in the present study was the age-group of 21-30 years consisting of 24 cases (18.9%) and next to it was 31-40 years with 25 cases (19.7%). These two age-groups together comprised of total 49 cases i.e. 38.6% of all cases found in this study. This was found to be similar to other studies done by D' Costa *et al.* and Rajput *et al.*, who found the maximum number of cases in the age-group of 31-40 with 28.6% cases and 30-39 years with 26.67% cases respectively [2, 14]. Grover *et al.* found in their study that the majority of the population was in the age group of 11-20 years with 164 cases (31.4%), followed by 21-30 year group with 101 cases (19.3%) & 31-40 year group with 76 cases

(14.6%) which was slightly different than the current study [13].

Group I lesions- Inflammatory (Figure-2)

This group consisted of total 42 cases (33% of total) out of which males were 15 and females were 27 forming a ratio of 0.6:1. The most common age group was 21-30 years with 10 cases forming 24% of total cases in this group.

Non-specific dermatitis was the most common diagnosis amongst all in this group with a total of 12 cases forming 28.6% of skin lesions in this group.

One such study done by Piyush Vaghela *et al.*, also found inflammatory lesions to be most common i.e. 51% of all non-neoplastic skin lesions studied by them [15]. Another study done by D' Costa *et al.*, found infectious lesions to be the most common i.e. 25% of all cases [2].

Group II & V lesions- Infectious (Figure-3)

Infectious lesions of skin consist of Groups II and V. Group II consisted of 4 cases (3% of total) out of which 1 was male and 3 were females forming a ratio of 0.3:1. The most common age group was 71-80 years with 2 cases forming 50% of total cases in this group.

Group V consisted of total 8 cases (6.3% of total) out of which males were 5 and females were 3 forming a ratio of 0.17:1. The most common age group was 51-60 years with 3 cases forming 37.5% of total cases in this group.

Most common infectious skin lesion was leprosy consisting of total 6 cases and forming 4.7% of all skin lesions. 5 out of 6 cases were male patients showing a male predilection. Cases with leprosy showed a wide age at presentation starting from 10 years to 70 years. This finding was similar to a study by Rakesh Mehar who also found cases with leprosy in the age range of 10-70 years. Study by Rakesh Mehar *et al.* also found that leprosy showed a male predilection with 30 males and 17 females out of the total 47 cases which was similar to the present study [8].

Group III lesions- Vesicobullous lesions [Figure-4]

This group consisted of total 14 cases (11% of total) out of which males were 7 and females were 7 forming a ratio of 1:1. The most common age group was 51-60 years with 4 cases forming 28% of total cases in this group.

Pemphigus was the most common entity found in this group with total of 7 cases forming 50% of all vesicobullous lesions. Similarly, Piyush Vaghela *et al.*, found 12 cases of Pemphigus out of 22 cases of vesicobullous skin lesions and Patel *et al.*, also observed maximum cases of Pemphigus i.e. 22 of 33 cases of vesicobullous skin lesions [15, 16]. Vesicobullous lesions showed no sex predilection. This was comparable to other study done by Piyush Vaghela *et al.*, who also found no sex predilection in vesicobullous lesions [15].

Group IV- Spongiotic, psoriasiform and lichenoid lesions [Figure-5]

This group consisted of total 11 cases (8.7% of total) out of which 10 were males and 1 was female forming a ratio of 10:1. The most common age group was 31-40 years with 4 cases forming 36% of total cases in this group.

Lichenoid lesions were found to be 5 in number being the most common type of lesion in this group. Similarly, in the study done by Piyush Vaghela *et al.*, they found lichen planus to be most common i.e. 12 cases out of total 25 cases of interface dermatitis. [15] Lichenoid lesions in the present study showed male preponderance in contrast to the study done by D' Costa *et al.*, who found female preponderance [2]. Psoriasis consisted of 2.36% of all skin lesions. A study by Nailesh G. Patel *et al.*, found 4.5% cases of psoriasis [17]. All the 3 confirmed cases of psoriasis were male patients which was comparable to study done by Bell *et al.*, who also found male preponderance [18].

Group VI- Tumours and cysts- Benign and Malignant (Figure 6 &7)

This group consisted of total 48 cases (38% of total) out of which males were 18 and females were 30 forming a ratio of 0.6:1. The most common age group was 31-40 years with 12 cases forming 25% of total cases in this group.

Benign lesions in this group consisted of total 35 cases (27.5% of total) out of which males were 16 and females were 19 forming a ratio of 0.8:1. The most common age group was 31-40 years with 11 cases forming 31.4% of total cases in this group.

Out of 35 cases of benign neoplastic skin lesions, 15 cases were of Epidermal cysts forming 11.8% of all skin lesions and 42.9% of all benign neoplastic skin lesions. This was followed by sebaceous cysts forming 6.3% of all skin lesions with 8 cases in total. This was comparable to the study done by Dr. Rukmini *et al.*, who found 30 cases of epidermal cyst making it the most common benign neoplastic lesion and 8 cases of sebaceous cyst which was the second most common benign neoplastic skin lesion [12].

Malignant lesions in this group consisted of total 13 cases (10.2% of total) out of which males were 2 and females were 11 forming a ratio of 0.2:1. The most common age group was 61-80 years with 8 cases forming 62% of total cases in this group.

Most common lesion in the malignant neoplastic group was found to be Basal cell carcinoma followed by malignant melanoma with a total of 6 cases and 2 cases respectively. Out of the 6 cases of basal cell carcinoma, 5 were female and only one was male showing a female gender predilection. The most common site of basal carcinoma was face. Dr. Rukmini *et al.*, & Abubakar *et al.*, found 13 cases (out of 23 cases) & 46 cases (out of 88 cases) of squamous cell carcinoma which was not similar to the present study [12, 19].

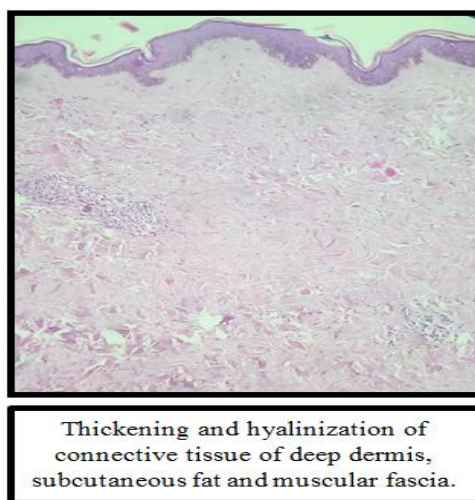
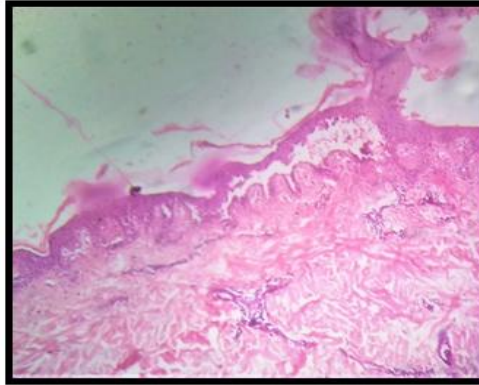
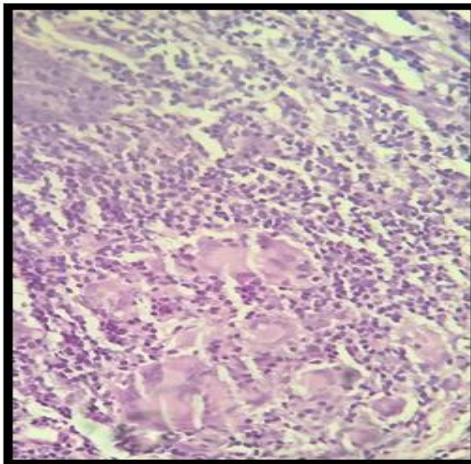


Fig-2: Morphea, 10x, H&E



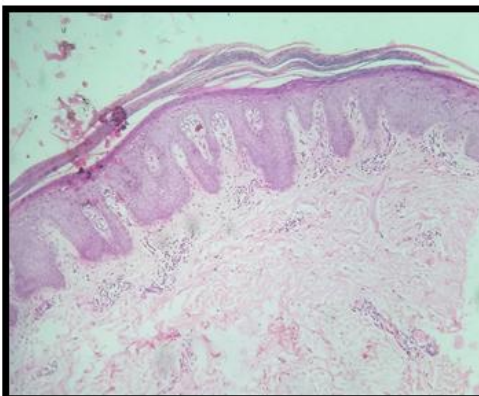
Intraepithelial blister with acantholysis and chronic inflammation

Fig-3: Skin tuberculosis, 10x, H&E



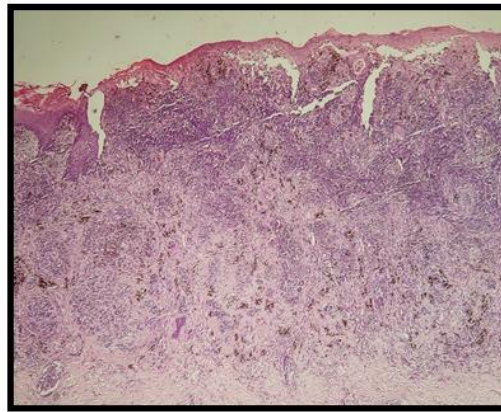
Tuberculoid granulomas with surrounding lymphocytic infiltration

Fig-4: Pemphigus Vulgaris, 10x, H&E



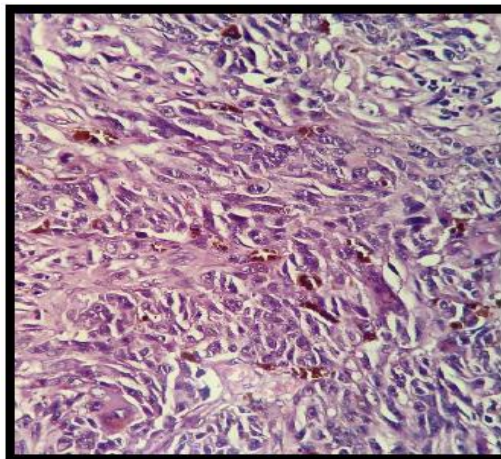
Parakeratosis without hyperkeratosis, acanthosis with downward elongation of rete ridges resembling a comb.

Fig-5: Psoriasis, 10x, H&E



Junctional activity with obscured dermoepidermal junction. Pagetoid spread individually and in clusters throughout epidermis. Prominent melanin pigmentation, invasion of surrounding tissue

Fig-6: Malignant Melanoma, 4x



Prominent melanin pigmentation, invasion of surrounding tissue. Large cells with abundant eosinophilic and finely granular cytoplasm. Marked atypia with pleomorphic nuclei

Fig-7: Malignant Melanoma, 40x

CONCLUSION

The present study showed a huge spectrum of skin diseases ranging from non-specific dermatitis to malignant skin lesions like malignant melanoma and basal cell carcinoma. Tumours and cysts as a whole formed the largest group in this study with epidermal cysts being the predominant ones. All skin biopsies received in the histopathology department were to rule in or rule out the various differentials arrived at during the clinical diagnosis. Thus, histopathological evaluation forms a very important link in the appropriate diagnosis of skin lesions.

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