

Evaluation of Histomorphological Spectrum of Skin Lesions at a Teaching Institute in Agra: A Cross-sectional Study

CHANDRAKANTA¹, POOJA NAGAYACH², LALIT KUMAR³, DEEPAK RAWAL⁴,
PRASHANT SINGH⁵, HARENDRA KUMAR⁶, YATENDRA CHAHAR⁷



ABSTRACT

Introduction: The skin is the largest organ system in humans. Different skin diseases consist of non specific, non infectious and infectious diseases to various neoplastic lesions. Dermatological lesions are commonly encountered in all countries and it encompasses a wide spectrum, varies from country to country and various regions within a country and influenced by sex, age and associated systemic disorders, economy, literacy, racial and social customs. The clinical presentation is restricted to only a few changes such as hyperpigmentation, hypopigmentation, macules, papules, nodules and few others. However, the spectrum of histopathology of skin disorders is varied. Accurate diagnosis of skin disorders is of utmost importance as treatment is varied for different skin disorders presenting with the similar clinical lesions.

Aim: To study histomorphological spectrum and distribution of skin lesions.

Materials and Methods: This hospital-based cross-sectional study was conducted in Department of Pathology in collaboration with Department of Skin and Venereal Diseases, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India, over a period of two years from September 2019 to August 2021. The biopsy sample taken from clinically diagnosed skin lesions sent to histology laboratory in 10% formalin. Sample was fixed in 10% neutral buffered formalin over a period of 12 to 24 hours. Paraffin wax

blocks were made and 3-4 micrometer sections were taken and stained with Haematoxylin and Eosin (H&E) stain and histology was studied under microscope. Special stains such as Ziehl-Neelsen (Z-N) stain and Fite stain was done, whenever required. Data was entered in Microsoft Excel excel and descriptive data was obtained.

Results: Out of total 105 cases, the maximum patients were of 21-30 years of age group 30 (28.57%) cases followed by 11-20 years of age group 25 (23.81%) cases with male and female ratio M:F=1.5:1. Out of total 105 cases, the most common site involved was trunk in 42 (40%) cases followed by upper limb in 25 (23.81%) cases. The most common skin lesions were non infectious 70 (66.67%) cases, followed by infectious disease 22 (20.95) cases. In non infectious papulosquamous diseases group found 25 (23.81%) cases followed by vesiculobullous and vesiculopustular diseases group 24 (22.86%) cases. Infectious diseases were seen in 22 (20.95%) cases, out of which bacterial diseases being most common in 19 (18.10%) cases followed by parasitic infection 2 (1.90%) cases.

Conclusion: According to the findings of the present study the majority of skin lesions cases requiring biopsy in developing countries is still psoriasis in non infectious papulosquamous diseases group. Tuberculosis and leprosy in infectious diseases category were being the leading cause of morbidity.

Keywords: Genodermatoses, Non infectious, Papulosquamous, Pemphigus vulgaris, Tuberculosis

INTRODUCTION

The skin is the largest organ of the integumentary system in human [1]. Different skin diseases comprise of non specific, non infectious and infectious diseases to various types of benign and malignant tumorous (neoplastic) lesions. Dermatological lesions are commonly encountered in all countries and it encompasses a wide spectrum, varies from country to country and various regions within a country. This variation is also influenced by sex, age and associated systemic disorders, economy, literacy, racial and social customs. Its prevalence ranges from 6.3%-11.16% [2]. Many of the skin lesions are diagnosed clinically based on the history and examination of the lesions. However, some of them require additional simple diagnostic procedures to make final diagnosis such as potassium hydroxide preparation, Tzanck smear, examination under wood's lamp and skin biopsy in around 1.3% of patients [2].

The histomorphology of skin disorders shows wide spectrum, however the clinical presentations are very few like hypopigmentation, hyperpigmentation, macules, papules, nodules and few others [3]. Accurate diagnosis of skin disorders is of utmost importance as treatment is varied for different skin disorders presenting with the similar clinical lesions [4]. Histopathological study required for definitive diagnosis and

identifying causative agent with special stains wherever feasible, help clinicians to decide the appropriate management and clinical intervention [2]. The present study was conducted to study histomorphological spectrum of skin lesions and to evaluate histopathological diagnosis of skin lesions in different age groups, sex and site wise distributions and to find out frequency of various dermatological disorders in the tertiary care teaching hospital in Agra.

MATERIALS AND METHODS

This hospital-based cross-sectional study was conducted in Department of Pathology in collaboration with Department of Skin and Venereal diseases, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India over a period of two years from September 2019 to August 2021. Ethical clearance was obtained from Institutional Ethical Committee. (Letter No. IEC/2022/117). The study was carried out on skin biopsies of patient's of all age group, coming to the histopathology laboratory and all cases coming during the study period. A total of 105 cases were selected as sample size on the basis of inclusion and exclusion criteria.

Inclusion and Exclusion criteria: All skin biopsies that showed definite signs of any specific pathology received in histopathology laboratory of the Department of Pathology during the study period

were included. Inadequate, inconclusive and autolysed skin biopsies that did not show definite signs of any specific pathology were excluded from this study.

Study Procedure

The biopsy sample taken from clinically diagnosed skin lesions were sent immediately to histology laboratory in 10% formalin. Clinical history and relevant data were recorded. Sample was fixed in 10% neutral buffered formalin over a period of 12 to 24 hour. Paraffin wax blocks were made and 3-4 micrometer sections were taken and stained with H&E stain and histology was studied under microscope. Special stains like Z-N stain, modified Z-N Stain (Fite stain) etc., were done, whenever required. Relevant demographic data was obtained from requisition form provided with the specimens.

STATISTICAL ANALYSIS

Data was entered in Microsoft word and descriptive data was obtained.

RESULTS

In this study youngest patient encountered was eight years of age and oldest patient encountered was 70 years of age. The maximum patients were of 21-30 years of age group i.e., 30 (28.57%) cases followed by 11-20 years of age group, 25 (23.81%) cases with male and female ratio M:F=1.5:1 [Table/Fig-1a]. Most common age group affected by infectious diseases was 21-30 years accounting 7 (6.67%) cases followed by 11-20 years 6 (5.71%) cases with male predominance (M:F=1.4:1). Most common age group affected by non infectious diseases was 21-30 years accounting 22 (20.95%) cases followed by 11-20 years 16 (15.24%) cases with male predominance (M:F=1.26:1). Most common age group affected by neoplastic diseases was 51-60 years and 11-20 accounting for 3 (3.81%) cases each followed by 31-40 years and 41-50 years 2 (1.90%) cases with male predominance (M:F=5.5:1).

Age groups	Male	Female	Total (%)
0-10	1	1	2 (1.90%)
11-20	10	15	25 (23.81%)
21-30	17	13	30 (28.57%)
31-40	10	6	15 (14.28%)
41-50	10	5	16 (15.23%)
51-60	7	1	8 (7.62%)
Above 60	8	1	9 (8.57%)
Total	63 (60%)	42 (40%)	105 (100%)

[Table/Fig-1a]: The distribution of skin lesions according to age groups and sex.

In this study, out of total 105 cases, the most common site involved was trunk in 42 (40%) cases followed by upper limb in 25 (23.81%) cases, lower limb 23 (21.90%) cases and head and neck region in 15 (14.28%) cases. In non infectious diseases, papulosquamous diseases seen in 25 (23.81%) cases, vesiculobullous and vesiculopustular diseases 24 (22.86%) cases, pigmentary diseases 3 (2.86%) cases, benign tumour 10 (9.52%) cases, trunk being the most common site to be involved. In infectious diseases 22 (20.95%) cases, connective tissue diseases 5 (4.77%) cases, upper limb being the most common site to be involved. In non infectious Inflammatory diseases 11 (10.48%) cases, lower limb being the most common site to be involved. In malignant tumour 3 (2.86%) cases, head and neck the most common site to be involved. In genodermatoses 2 (1.90%), one case in upper limb and one case in trunk [Table/Fig-1b].

	Head and neck	Upper limb	Lower limb	Trunk	Total
1. Non infectious	7	17	16	30	70
Non infectious papulosquamous diseases	2	6	4	13	25
Vesiculobullous and vesiculopustular diseases	2	6	6	10	24
Non infectious inflammatory diseases	2	2	4	3	11
Connective tissue diseases	1	2	1	1	5
Pigmentary diseases	0	0	1	2	3
Genodermatoses	0	1	0	1	2
2. Infectious diseases	3	7	6	6	22
3. Neoplastic	5	1	1	6	13
Benign tumour	3	0	1	6	10
Malignant tumour	2	1	0	0	3
Total	15 (14.28%)	25 (23.81%)	23 (21.90%)	42 (40%)	105 (100%)

[Table/Fig-1b]: Distribution of cases according to site of lesions

In this study, out of total 105 skin lesions, most common skin lesions were non infectious 70 (66.67%) cases, followed by infectious disease 22 (20.95) cases and neoplastic lesion 13 (12.38%) cases [Table/Fig-1c].

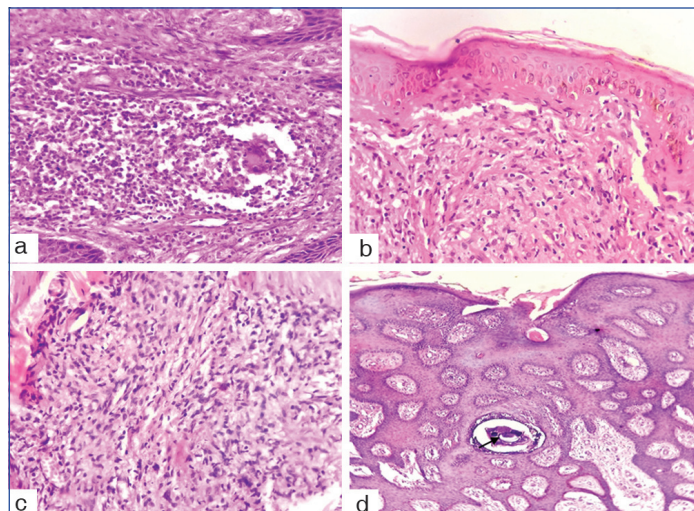
Skin lesions	Number of cases	Percentage (%)
1. Non infectious disease	70	66.67
Papulosquamous diseases	25	23.81
Vesiculobullous and vesiculopustular diseases	24	22.86
Inflammatory diseases	11	10.48
Connective tissue diseases	5	4.77
Pigmentary diseases	3	2.86
Genodermatoses	2	1.90
2. Infectious disease	22	20.95
Bacterial diseases	19	18.10
Parasitic	02	1.90
Viral	01	0.95
3. Neoplastic diseases	13	12.38
Benign tumour	10	9.52
Malignant tumour	3	2.86
Total	105	100%

[Table/Fig-1c]: Frequencies of various skin diseases based of histopathology.

In this study, out of 105 cases, the most common type of skin lesions were of non infectious papulosquamous diseases group 25 (23.81%) cases, in which psoriasis 11 (10.48%) cases being most common followed by vesiculobullous and vesiculopustular diseases group 24 (22.86%) cases, in which pemphigus vulgaris being most common in 6 (5.71%) cases, infectious diseases in 22 (20.95%) cases, non infectious inflammatory diseases in 11 (10.48%) cases, benign tumour in 10 (9.52%) cases, malignant tumour in 3 (2.86%) cases, pigmentary diseases in 3 (2.86%) cases, and connective tissue diseases in 5 (4.77%) cases [Table/Fig-1c].

In this study, out of 105 cases, infectious diseases were seen in 22 (20.95%) cases, in which bacterial diseases being most common in 19 (18.10%) cases followed by parasitic infection in 2 (1.90%) cases and viral infection in 1 (0.95%) case. In Infectious disease, most common histological diagnosis was tuberculosis and leprosy with 9 (8.57%) cases each [Table/Fig-2a-c]. There was only one (0.95%) case of verruca vulgaris in viral infection. In parasitic infection with total 2 (1.90%) cases,

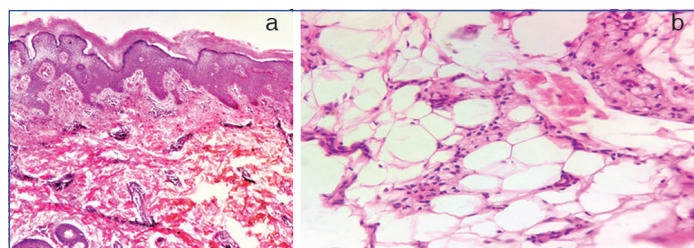
there was single case each of crusted scabies [Table/Fig-2d] and cutaneous leishmaniasis.



[Table/Fig-2]: a) Photomicrograph showing epithelioid cell granuloma with langerhans type giant cells and rim of lymphocytic infiltrate; Tuberculosis (H&E, 40X); b) Photomicrograph showing histiocytic granuloma; Lepromatous leprosy (H&E, 40X); c) Photomicrograph showing spindle shaped histiocytes; Histoid leprosy (H&E, 40X); d) Photomicrograph showing hyperplastic epidermis with organism (mite) in granular layer of epidermis. Inflammatory infiltrate in superficial dermis; Scabies (H&E, 10X) (Arrow- mite).

In this study, 1 (5.56%) case out of nine cases of tuberculosis were found AFB positive on ZN stain and five (27.78%) cases out of nine cases of leprosy were found AFB positive on Fite stain.

In this study, out of 105 cases, non infectious inflammatory diseases were seen in 11 (10.48%) cases. In which, the most common histological diagnosis was Polymorphic light eruption 5 (4.76%) cases followed by 2 (1.90%) cases each of erythema nodosum and non caseating granulomatous lesion and 1 (0.95%) case each of granulomatous lesion and granuloma annulare [Table/Fig-3a,b].

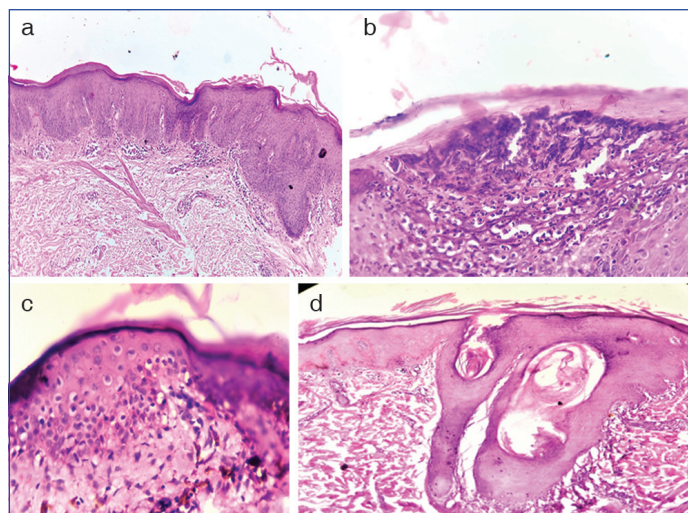


[Table/Fig-3]: a) Photomicrograph showing epidermis with hyperkeratosis with mild spongiosis. In dermis, perivascular lymphocytic infiltrate is seen; Polymorphous light eruption (H&E, 10X); b) Photomicrograph showing lymphocytic inflammation in between adipose tissue within the subcutis; Erythema nodosum (H&E, 40X).

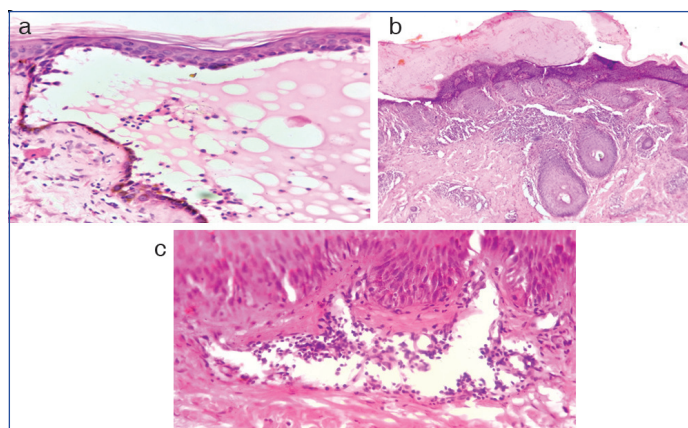
In this study, out of 105 cases, non infectious papulosquamous diseases were seen in 25 (23.81%) cases. In which, the most common histological diagnosis was psoriasis 11 (10.48%) cases followed by 5 (4.76%) cases of Lichen planus 3 (2.86%) cases each of pityriasis rubra pilaris pityriasis Lichenoides and 1 (0.95%) case each of Parapsoriasis, Pityriasis rosea, Lichenoid keratosis [Table/Fig-4a-d].

In this study, 2 (1.90%) cases of genodermatoses were seen, each one of Acrokeratosis verruciformis and Urticaria pigmentosa respectively.

In this study, out of 105 cases, vesiculobullous and vesiculopustular diseases were seen in 24 (22.86%) cases, in which Pemphigus vulgaris being the most common histological diagnosis in 6 (5.71%) cases followed by 4 (3.81%) cases of Pemphigus foliaceus, 3 (2.86%) cases of Dermatitis herpetiformis 2 (1.90%) cases each of Bullous pemphigoid, endogenous dermatitis, Lichen simplex chronicus and 1 (0.95%) case each of spongiotic dermatitis, contact dermatitis, atopic dermatitis, nummular eczema, subcorneal pustular dermatosis [Table/Fig-5a-c].

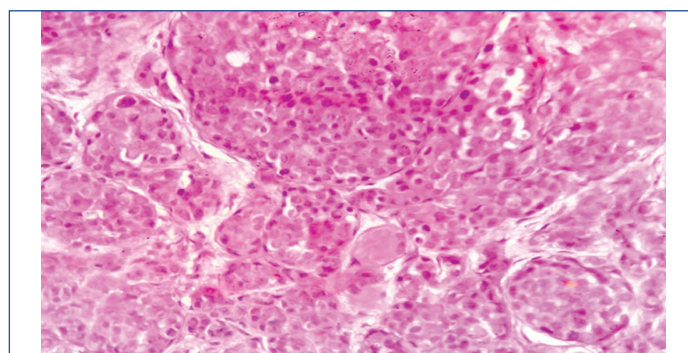


[Table/Fig-4]: a) Photomicrograph showing epidermis with hyperkeratosis and parakeratosis along with lymphocytic infiltrate in upper dermis with slight acanthosis; Guttate psoriasis (H&E, 10X); b) Photomicrograph showing closer view of spongiform pustule of Kogoj formed by collection of neutrophils in spinous and granular layer; Psoriasis vulgaris (H&E, 40X); c) Photomicrograph showing vacuolar alteration of the basal cell layer and necrotic keratinocytes (civatte bodies); Lichen planus (H&E, 40X); d) Photomicrograph showing dilated follicular infundibulum with hyperkeratotic plug; Pityriasis rubra pilaris (H&E, 10X) (Arrow- hyperkeratotic plug).



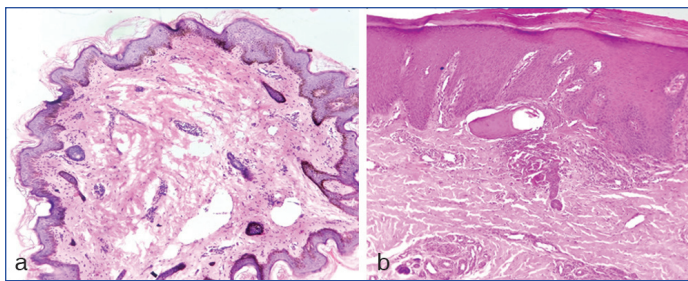
[Table/Fig-5]: a) Photomicrograph showing Suprabasal blister which contains acantholytic cells, neutrophils and few eosinophils; Pemphigus vulgaris (H&E, 40X); b) Photomicrograph showing dermal papillary microabscess with a separation is seen between the tips of dermal papillae and the overlying epidermis with dermal papillary inflammatory infiltrate; Dermatitis herpetiformis (H&E, 10X); c) Photomicrograph showing blister arising at the dermaepithelial junction with papillary dermal oedema in combination with perivascular inflammatory infiltrate; Bullous pemphigoid (H&E, 40X).

In this study, out of 105 cases, pigmentary diseases were seen in 3 (2.86%) cases, in which 2 (1.90%) cases of post inflammatory hyperpigmentation and 1 (0.95%) case of intradermal nevus [Table/Fig-6]. All three cases were seen in males.



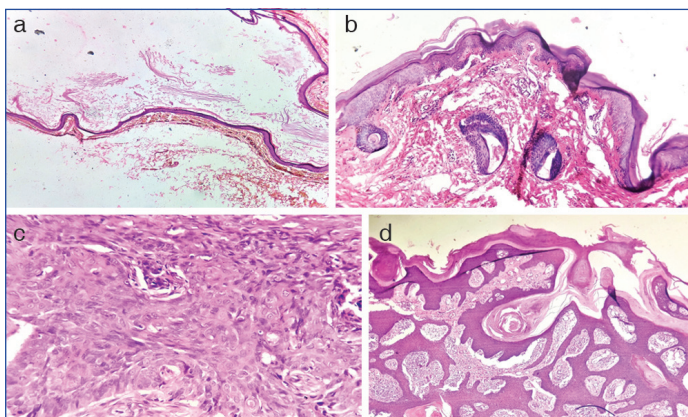
[Table/Fig-6]: Photomicrograph showing multinucleated nevus cells in upper dermis arranged in nest and cords; Intradermal nevus (H&E, 40X).

In this study, out of 105 cases, connective tissue diseases were seen in 5 (4.76%) cases, in which, 2 (1.90%) cases of morphea and 1 (0.95%) case each of Lichen sclerosis et atrophicus, dermatomyositis and Discoid Lupus Erythematosus (DLE) [Table/Fig-7a,b].



[Table/Fig-7]: a) Photomicrograph showing reticular dermis with sparse inflammation at dermal-subcutaneous interface. Appendages are absent; Morphea (H&E, 10X); b) Photomicrograph showing hyperkeratosis with epidermal hyperplasia and perivascular lymphocytic infiltrate and muscular neutrophilic infiltrate; Dermatomyositis (H&E, 10X).

In this study, out of 105 cases, neoplastic diseases were seen in 13 (12.38%) cases. Out of which, benign tumours 10 (9.52%) cases were more common than malignant lesions 3 (2.86%) cases. In benign tumour the most common histological diagnosis was epidermoid cyst 4 (3.81%) cases followed by dermoid cyst and lipoma in 2 (1.90%) cases each and 1 (0.95%) case each of seborrheic keratosis and lymphangioma circumscriptum [Table/Fig-8a,b]. In malignant tumours, there were 2 (1.90%) cases of squamous cell carcinoma and 1 (0.95%) case of keratoacanthoma [Table/Fig-8c,d].



[Table/Fig-8]: a) Photomicrograph showing epidermal lining along with anucleate squamous cells and haemorrhage; Epidermal cyst (H&E, 10X); b) Photomicrograph showing epithelial lining with anucleate squamous cells with dermal component; dermoid Cyst (H&E, 4X); c) Photomicrograph showing neoplastic cells are polygonal with moderate amount of cytoplasm and hyperchromatic nuclei arranged in sheets; Squamous cell carcinoma (H&E, 40X); d) Photomicrograph showing central, keratin filled crater. Epidermis extends like a buttress over the side of crater. Irregular epidermal proliferation extend downward from base of crater into dermis; Keratoacanthoma (H&E, 10X).

The variations in the present study as compared to studies carried out elsewhere in the past could be due to difference in the geographical distribution of the several aetiological factors responsible for causation of these conditions.

DISCUSSION

Skin lesions are due to disparity in homeostasis that results in various conditions such as wrinkles, hair loss, rashes, blisters and life-threatening cancers. All the skin lesions may not required

biopsy but for the proper diagnosis and identification of causative agents, dermatologist used to do it [5]. The pattern of skin diseases are variable depending on economy, education level, variation in climate, primary healthcare facilities, industrialisation and variation in religious and cultural factors [6]. Skin lesions are heterogeneous with a wide clinical and histopathological spectrum. Histopathological examination is the gold standard technique for diagnosing skin lesions. However, good clinical history, a close histopathological examination of the skin biopsy, clinicopathological correlation is essential for making final diagnosis so that the appropriate treatment can met [7]. Special stains in conjunction with histopathological examination may also be required to reach final aetiological diagnosis [7]. Skin biopsy is a simple outpatient procedure that helps in the confirmation of the clinical diagnosis [8].

The present study was aimed to study histomorphological spectrum of skin lesions, the aetiology of skin lesions using special stains like ZN stain, Fite stain as and when required and to study the age wise prevalence of different aetiologies of skin lesions. Biopsy specimen is expected to provide a fairly good estimate of patterns of skin disorders. In this study, youngest case was seen in eight years of age and the oldest case encountered was 70 years of age. The present study encountered patient's age between 1st to 7th decades, which is concordant with Mamatha K et al., Singh S et al., Agarwal D et al., Narang S et al., and Kafle SU et al., [2,9-12]. However, Ayesha N et al., Mehar R. et al., Yalla ASD et al., George VP et al., Deepthi KN et al., Gaikwad SL et al., Bharadwaj V et al., Sushma C, Gupta P et al., found patients from 1st to 8th decade and Gulia SP et al., Bezbaruah R and Baruah M, Adhikari RC et al., found patients in 1st to 9th decade of life [1,3,6,8,13-20].

In this study, maximum numbers of cases were found in 21-30 years age group 30 (28.57%) followed by 11-20 years age group 25 (23.81%), which is comparable with different studies and different age group being the most common age group in other studies [Table/Fig-9].

In this study, male predominance with male to female ratio of 1.5:1 was found and that was in concordance with other studies [1,3,4,9-11,13,14,16-18,20-22]. While it was not concordant with the findings in the studies by with Bezbaruah R and Baruah M [20], Mamatha K et al., Kafle SU et al., and Gulia SP et al., as they found female predominance [2,12,19].

In this study, the most common site of lesion was trunk (40%) followed by upper limb (23.81%), while Bezbaruah R and Baruah M, (57.52% cases), Bharadwaj V et al., (33% cases); Chalise S et al., (29.32% cases) and Adhikari RC et al., (30.2% cases) found head and neck region being the most common site [5,6,8,20]. This could be due to the geographical differences of the study place.

In this study, non neoplastic lesions including infectious and non infectious disease i.e. 22 (20.95%) cases and 70 (66.67%) cases respectively outnumbered neoplastic lesions 13 (12.38%) cases which was found concordant with some studies [2,3,4,6,8,9,10,12

Author's name/Year of study	Place of study	Age group (years)								
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Singh S et al (2016) [9]	Silhar, India	4.08%	4.28%	14.28%	16.32%	13.46%	18.36%	28.9%	--	--
Mamatha K et al., (2018) [2]	Karnataka, India	6.64%	10.48%	19.23%	17.48%	16.78%	25.17%	3.84%	--	--
Gupta P et al., (2018) [18]	Meerut, India	3.90%	9.57%	23.04%	25.53%	21.10%	10.28%	5.32%	--	--
Bezbaruah R Baruah M (2018) [20]	Dibrugarh, Assam, India	7.08%	12.4%	23.01%	7.96%	19.47%	13.27%	9.73%	6.19%	0.88%
Yalla ASD et al., (2019) [3]	Vijayawada, India	5.14%	17.14%	23.42%	24.0%	16.57%	7.42%	6.28%	4.57%	--
Bharadwaj V et al., (2020) [8]	Andhra Pradesh, India	1.51%	6.6%	27.92%	40.61%	16.23%	4.56%	2.02%	0.5%	--
Deepthi KN et al., (2020) [16]	Telangana, India	9.10%	11.68%	20.78%	18.19%	15.58%	11.68%	7.80%	5.19%	--
Present study (2022)	Agra, UP, India	1.90%	23.81%	28.57%	14.28%	15.24%	7.62%	8.57%	--	--

[Table/Fig-9]: Comparison of age distribution with different studies [2,3,8,9,16,18,20].

Author's name/Year of study	Place of study	Most common disease group (%)	Most common histological diagnosis (%) cases	Neoplastic diseases	
				Benign cases %	Malign. cases %
Mehar R et al., (2014) [14]	Indore, MP, India	Granulomatous lesions (42.85%)	Leprosy (41.96%)	94.65	5.35
Gulia SP et al., (2014) [19]	Puducherry, India	Non-infectious Papulosquamous disease (24.0%)	Psoriasis (9.6%)	--	--
Narang S and Jain R, (2015) [11]	Indore, MP, India	Granulomatous lesions (24.80%)	Leprosy (33.53%)	--	--
Agarwal D et al., (2015) [10]	Sonepat, Haryana, India	Non specific dermatitis (22.22%)	Leprosy (12.78%)	6.11	6.67
Gaikwad SL et al., (2016) [1]	Maharashtra, India	Neoplastic lesions (58.0%)	Epidermal cyst (13.27%)	76.92	23.08
Singh S et al (2016) [9]	Silhar, India	Granulomatous lesions (17.55%)	Lupus vulgaris (13.06%)	85.31	14.64
Gupta P et al., (2018) [18]	Meerut, India	Infectious disease (34.60%)	Leprosy (14.22%)	17.5	4.6
Yadav S et al., (2018) [21]	Gurgaon, Haryana, India	Neoplastic lesions (68.4%)	Epidermal cyst (37.5%)	89.89	10.11
Sushma C, (2018) [17]	Tirupati, AP, India	Cutaneous cyts (36.32%)	Epidermal cyst (20.08%)	17.09	24.78
Mamatha K et al., (2018) [2]	Karnataka, India	Granulomatous lesions (53.85%)	Leprosy (31.81%)	--	--
Bezbaruah R and Baruah M, (2018) [20]	Dibrugarh, Assam, India	Neoplastic lesions (81.42%)	Epidermal cyst (26.55%)	61.07	20.35
Ayesha N et al., (2019) [13]	Maharashtra, India	Tumours and cyst of dermis and subcutis (32.00%)	Squamous cell carcinoma (16.00%)	--	--
Yalla ASD et al., (2019) [3]	Vijayawada, India	Infectious disease (33.34%)	Leprosy (33.34%)	--	--
Adhikari RC et al., (2019) [6]	Kathmandu, Nepal	Vesiculobullous (VB) and Vesiculopustular (VP) disease (28.60%)	Spongiotic dermatitis (24.8%)	--	--
Kafle SU et al., (2020) [12]	Birat, Nepal	Infectious disease (24.30%)	--	9.90	4.50
Chalise S et al., (2020) [5]	Kathmandu, Nepal	V.B and V.P disease (46.6%)	Spongiotic dermatitis (28.9%)	--	--
Bhardwaj V et al., (2020) [8]	Andhra Pradesh, India	Tumours and cyst of dermis and subcutis (41.62%)	Epidermal cyst (20.8%)	--	--
George VP et al., (2020) [15]	Puducherry, India	Inflammatory lesions (59.5%)	Leprosy (9.62%)	63.54	36.46
Patel A and Raval N (2020) [4]	Gujarat, India	Infectious diseases	Leprosy (41.00%)	--	--
Deepthi KN et al., (2020) [16]	Telangana, India	Cutaneous cysts (41.6%)	Epidermal cyst (41.55%)	22.4	16.0
Present study 2022	Agra, UP, India	Non infectious papulosquamous disease (23.81%)	Psoriasis (10.48%)	76.92	23.08

[Table/Fig-10]: Comparison of most common disease group and histological diagnosis with different studies [1-6, 8-21].

,15,16,18,22]. This study was found non concordant with Gaikwad SL et al., (58.0% cases), Bezbaruah R and Baruah M, (81.42% cases), Yadav S et al., (68.4% cases) as they found overall neoplastic lesions outnumbered non neoplastic lesions with epidermal cyst being most common histological diagnosis [1,20,21].

In this study, the most common type of skin lesion group was non infectious papulosquamous diseases 25 (23.81%) cases followed by Vesiculobullous and vesiculopustular diseases 24 (22.86%) cases and Infectious diseases 22 (20.9%) cases which was concordant with some studies and however other found different type of skin lesion being most common [Table/Fig-10]. In this study, the second most common type of skin lesion group was vesiculobullous and vesiculopustular diseases (22.86%) cases, while non infectious papulosquamous diseases was second most common in study of Kafle SU et al., (18.01% cases) and neoplastic lesions were second most common in George VP et al., (22.4% cases) and vesiculobullous lesion were second most common in study of Patel A and and Raval N (15.0% cases) [4,12,15].

In this study, psoriasis 11 (10.48%) cases was most common histological diagnosis followed by tuberculosis and leprosy 9 (8.57%) cases in each and different studies found different histological type being the most common histological diagnosis [Table/Fig-10]. In this study, among neoplastic lesions, epidermal cyst was found most common histological diagnosis in 30.76% cases concordant with Bharadwaj V et al., (44.56% cases) [8]. However, Achalkar GV et al., (52.8% cases), Ayesha N et al., found squamous cell carcinoma, Agarwal D et al., (30.43% cases) found basal cell carcinoma and Gupta P et al., (20.75% cases) found lipoma as most common histological diagnosis among the neoplastic lesions [10,13,18,22]. So meticulous histopathological examination combined with awareness in mind regarding prevalence of diverse skin lesions can help in correct diagnosis.

Limitation(s)

Limitations of present study was lack of clinicohistological correlation and absence of follow-up.

CONCLUSION(S)

The present study was conducted to study histopathological spectrum of skin lesions, aetiology of skin lesions using special stain and age, sex and site wise prevalence of skin lesions. The major cases of skin lesions requiring biopsy in developing countries is still psoriasis in non infectious papulosquamous diseases group. Tuberculosis and leprosy in infectious diseases category were being the leading cause of morbidity. The age distribution pattern showed highest prevalence in 21-30 years age group i.e. 28.57%. The sex distribution pattern showed males preponderance. The non infectious papulosquamous diseases were the most common type of skin lesions.

REFERENCES

- [1] Gaikwad SL, Kumawat UD, Sakhare NA, Grace F, D'costa, et al. Histopathological spectrum of skin lesions experience at rural based hospital. *Int J Curr Res.* 2016;8(08):36223-27.
- [2] Mamatha K, Susmitha S, Vijayalaxmi SP, Sathyashree KV, Disha BS. Histopathological spectrum of dermatological lesions -An experience at tertiary care centre. *IP Archives of Cytology and Histopathology Research.* 2018;3(2):83-88.
- [3] Yalla ASD, Kambala GM, Natta BR. Histopathological study of skin lesions by punch biopsy. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS).* 2019;18(6):25-30.
- [4] Patel A and Raval N. Histopathological spectrum of skin lesion-100 cases study report. *Inter Journal of Clinical and Diagnostic Pathology.* 2020;3(4):36-38.
- [5] Chalise S, Dhakhwa R, Pradhan SB. Histopathological study of skin lesions in a tertiary care hospital: A descriptive cross-sectional study. *JNMA J Nepal Med Assoc.* 2020; 58(224):218-222.
- [6] Adhikari RC, Shah M, Jha AK. Histopathological spectrum of skin diseases in a tertiary skin health and referral centre. *J Pathol Nep.* 2019;9:1434-40.
- [7] Kumar L, Agarwal P, Mishra T, Chahar Y, Kamal R, Tyagi S. et al. Study of Histomorphological spectrum of granulomatous lesions of skin. *Journal of Clinical and Diagnostic Research.* 2021;15(7):EC01-EC06.
- [8] Bharadwaj V, Sudhakar R, Srikanth Reddy K, Naidu SR. Histopathological spectrum of dermatological lesions - A retrospective study. *J Evid Based Med Health.* 2020;7(25):1198-02.
- [9] Singh S, Debnath A, Datta D, Chakravarty S, Chaubey RN. Histopathological evaluation of skin lesions with special reference to skin adnexal tumors in a tertiary centre of North-Eastern India- A three year study. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) IOSR-JDMS.* 2016;15(2):34-39.
- [10] Agarwal D, Singh K, Saluja SK, Kundu PR, Kamra H, Agarwal R. Histopathological

- review of dermatological disorders with a keynote to granulomatous I: A retrospective study. *Int J Sci Stud*. 2015;3(9):66-69.
- [11] Narang S, Jain R. An evaluation of histopathological findings of skin biopsies in various skin disorders. *Annals of Pathology and Laboratory Medicine (APALM)*. 2015;2(1):A42-46.
- [12] Kafe SU, Chaudhary D, Yamu S, Jha K. Diagnostic significance of clinicopathological concordance in various spectrums of skin disorders. *BJHS*. 2020;5(1):955-59.
- [13] Ayesha N, Shinde B, Khaparde S, Deshmukh S. Histopathological spectrum of skin lesions: At a tertiary care center. *Pathology Indian Journal of Applied Research*. 2019;9(12):55-56.
- [14] Mehar R, Jain R, Kulkarni CV, Narang S, Mittal M, Patidar H. Histopathological study of dermatological lesions – A retrospective approach. *Int J Med Sci Public Health*. 2014;3:1082-85.
- [15] George VP, Sowmya S, Krishnan S. A histopathological study of skin biopsy specimens in a tertiary care hospital with a keynote on clinicopathological correlation. *Annals Patho Lab Medicine*. 2020;7(1):A39-45.
- [16] Deepthi KN, Karamchedu S, Saritha G. Spectrum of neoplastic and non neoplastic skin lesions: A histopathological institutional study. *IP J Diagn Pathol Oncol*. 2020;5(1):25-29.
- [17] Sushma C. Histomorphological motif of skin lesions – A model analysis in a tertiary care teaching hospital. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. 2018;17(5):70-76.
- [18] Gupta P, Karuna V, Grover K, Rath M, Verma N. The histopathological spectrum of skin diseases with emphasis on clinicopathological correlation: A prospective study. *IP Journal of Diagnostic Pathology and Oncology*. 2018; 3(2):91-95.
- [19] Gulia SP, Wadhwa SA, Lavanya M, Menon R, Chaudhary M. Histopathological pattern of skin diseases in a teaching hospital Puducherry. *Int J Recent Trend Sci Technol*. 2014;11:4550.
- [20] Bezbaruah R, Baruah M. Histopathological spectrum of skin lesions- A hospital based study. *Indian Journal of Applied Research*. 2018;8(7):51-52.
- [21] Yadav S, Sharma U, Raghava V, Bali IK. Histopathological spectrum of skin lesions among patients in a rural community, Chandu Bhudhera, FMHS, SGT Medical College, Hospital & Research Institute Gurgaon, Haryana. *International Journal of Current Advanced Research*. 2018;07(5):12427-30.
- [22] Achalkar GV. Clinicopathological evaluation of non-neoplastic and neoplastic skin lesions: A study of 100 cases. *Indian J Pathol Oncol*. 2019;6(1):118-22.

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of Pathology, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India.
2. Assistant Professor, Department of Pathology, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India.
3. Senior Resident, Department of Pathology, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India.
4. Junior Resident, Department of Pathology, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India.
5. Assistant Professor, Department of Pathology, Sarojini Naidu Medical College Agra, Agra, Uttar Pradesh, India.
6. Professor, Department of Pathology, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India.
7. Assistant Professor, Department of Skin and Venereal disease, Sarojini Naidu Medical College, Agra, Uttar Pradesh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Prashant Singh,
Department of Pathology, Sarojini Naidu Medical College, Agra,
Uttar Pradesh, India.
E-mail: drprashant4488@gmail.com

PLAGIARISM CHECKING METHODS: [Main H et al.]

- Plagiarism X-checker: Apr 11, 2022
- Manual Googling: May 23, 2022
- iThenticate Software: Jul 14, 2022 (15%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:

- Financial or Other Competing Interests: No
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Apr 04, 2022**

Date of Peer Review: **Apr 19, 2022**

Date of Acceptance: **Jul 14, 2022**

Date of Publishing: **Sep 01, 2022**