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Clinicopathological Correlate of Papulosquamous Skin Disorder in a Tertiary Health Care

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Authors' contributions

This work was carried out in collaboration among all authors. Author BAU designed the study, wrote the protocol, wrote the first draft of the manuscript, managed the analyses of the study and managed the literature searches. Authors PUI and BAA proof read the work. Author BAA interpreted the histology results while authors BAU and PUI obtained the clinical information and diagnosis. All authors read, proof read and approved the final manuscript.

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ABSTRACT

Papulosquamous skin disorder is one of the frequently seen skin dermatoses; but due to clinical and morphological overlap, it is sometimes difficult to make a straight forward clinical diagnosis without histological confirmation. This study seeks to examine the level of correlation between clinical diagnosis and histological confirmation. Medical records of subjects diagnosed at the Dermatology clinic with papulosquamous skin disorder between January 2017 and December 2019 were retrieved. Their bio data, clinical description of their lesions, clinical diagnosis and histopathological report were noted and analyzed with SPSS version 23 of the 88 patients with clinical diagnosis of a papulosquamous skin disease, 62 had record of skin biopsy result; these were included in the data analysis. The mean age was 39.1± 13.8 years (age ranged from 3-64 years). Ratio of male to female was 1.7:1 Thirty-four 34 (54.8%) were clinically diagnosed as lichen planus, 25 (40.3%) as psoriasis, 1(1.6%) each as parapsoriasis, lichen nitidus and lichen simplex

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chronicus. Histopathological diagnosis was the same in 26 cases of lichen planus, 19 of psoriasis and for the above mentioned disorders. Common histological findings for lichen planus were acanthosis 88.5%, hyperkeratosis (30.8%), parakeratosis (3.8%), papillomatosis (61.5%), hypergranulosis (3.8%) and band-like lymphocytic infiltrate (57.7%). While acanthosis (68.4%), Elongated rete ridges (84.2%); band-like lymphocytic infiltrate (78.9%) and dermal dilated blood vessels (5.3%) were seen in psoriasis. In conclusion: We observed 77.4% accuracy in diagnosis of papulosquamous skin disorder.

Keywords: Papulosquamous skin disorder; clinicopathological diagnosis; lichen planus; psoriasis.

1. INTRODUCTION

Papulosquamous skin disorders are dermatoses frequently seen in Dermatology clinics. The characteristic primary lesion of papulosquamous skin disorder usually includes papules, plaques, and erythematous changes with various amount of scaling on the surface [1]. A number of these skin diseases have similar reactionary pattern in response to a pathological stimulus, sometimes leading to an overlap in morphology and distribution which in turn makes accurate clinical diagnosis difficult. A good clinical description and histopathological examination correlate would aid in definite diagnosis and accurate patient's treatment [2].

Some examples of papulosquamous skin disorder are lichen planus, psoriasis, pityriasisrosea, pityriasis rubra pilaris, parapsoriasis, pityriasisli chenoides et variolifomisacuta, pityriasis lichenoides chronica, seborrheic dermatitis, tineacorporis, drug reaction, secondary syphilis and Reiter's disease [2,3]. This study aims to examine the extent of clinical and histopathological correlation in the diagnosis of papulosquamous skin disorder. The objectives of the study are to: assess the level of accuracy in clinical diagnosis of papulosquamous skin disorder; determine how many of such diagnosis were confirmed histopathologically and determine the level of correlation. *The Null Hypothesis:* There is no significant difference between clinical and pathological diagnosis of papulosquamous skin disorder.

2. MATERIALS AND METHODS

This is a retrospective study conducted between January 2017 and December 2019 in the Dermatology unit of the Department of medicine in collaboration with the Department of morbid pathology. Only patients who were clinically diagnosed with a papulosquamous skin disorder and had evidence of histopathological report from a skin biopsy which was either punch or excisional biopsy were included in the study. The Pathologists had a pre- knowledge of the clinical description of the rash and differential diagnosis. Patients whose clinical data was incomplete within the study period were excluded. Data obtained included biodata, clinical description of lesions including symptoms and body sites affected, clinical diagnosis made and results of a skin biopsy.

The biopsy site cleaned with hibitane solution and methylated spirit. Specimen obtained fixed in 10% neutral buttered formalin, inked and sectioned within 2 to 5 days of collection at the laboratory. Usually, a microscopic section of 2.5 – 3.5 µm thickness was cut with a microtome and stained with Hematoxylin & Eosin (H and E). The slide then viewed at different magnification ranging from x10 to x40.

Data generated were input into IBM-SPSS statistics for Windows version 23, Armonk, NY: IBM Corp. for analysis. Statistical tools such as frequency, percentages and Kruskal Wallis (H)were used to assess the degree of relationship between clinical observations and histological confirmation of the disease.

3. RESULTS

Data from 62 (70.5%) of the 88 patients who were clinically diagnosed of papulosquamous skin disorder, and who had a skin biopsy results were analysed in this study. Their mean age was 39.1 ± 13.8 years; age ranged from 3 to 64 years with 1.7: 1 male to female ratio. Thirty-four (54.8%) persons were clinically diagnosed as lichen planus; 25 (40.3%) as psoriasis; 1 (1.6%) each as parapsoriasis, lichen simplex chronicus and lichen nitidus. Median (IQR) duration at presentation was 12.0 (6.0- 16.5) months for lichen planus and 14 (7.5 – 24.0) months for psoriasis. The areas of involvement among those clinically diagnosed with lichen planus were: lower limb (33/34= 97.1%); trunk (13/34=38.2%); upper limb (9/34= 26.5%); scalp (3/34= 8.8%); gluteal region (1/34=2.9%); and nails

(1/34=2.9%) while the area of involvement for psoriasis were lower limbs (21/25=84.0%); trunk (15/25=60.0%); gluteal region (8/25=32.0%); upper limbs (7/25=28.0%); scalp (6/25=24.0%); nails (4/25=16.0%); axilla (4/25= 16.0%); genitals (1/25= 4.0%); and palms (1/25=4.0%). The clinical variants of lichen planus and psoriasis as observed in this study are shown in Figs. 1 and 2 while the correlate of the different morphological variants and their histopathological features are presented in Table 5.

Out of the 34 that were clinically diagnosed as lichen planus, only 26 (76.5%) were supported histologically as lichen planus (Those not supported by histopathology were hypertrophic lichen planus (4); Linear Lichen planus (1); Lichen planopilaris (1) and Follicular Lichen planus(2)). Meanwhile, 19/25 (76.0%) of those diagnosed from clinical perspective as psoriasis were confirmed by histological findings (Six patients clinically diagnosed as psoriasis but not supported by histology were inverse (1), Chronic plaque (3), erythrodermic (1) and guttate psoriasis (1)). The only case of parapsoriasis, lichen simplex chronicus and lichen nitidus each were confirmed both clinically and histologically [Table 1]. Although, histopathological findings did not support the clinical diagnosis of papulosquamous skin disease (Lichen Planus and Psoriasis as listed above) in 14 patients, the variations were not statistically significant (H=0.906; *P*=0.924) [Table 1, Fig. 1]. This supports the null hypothesis which stated that there is no difference between clinical and pathological diagnosis of papulosquamous skin disorder. The features from histological findings accurately confirmed 48 (77.4%) of the clinical diagnosis.

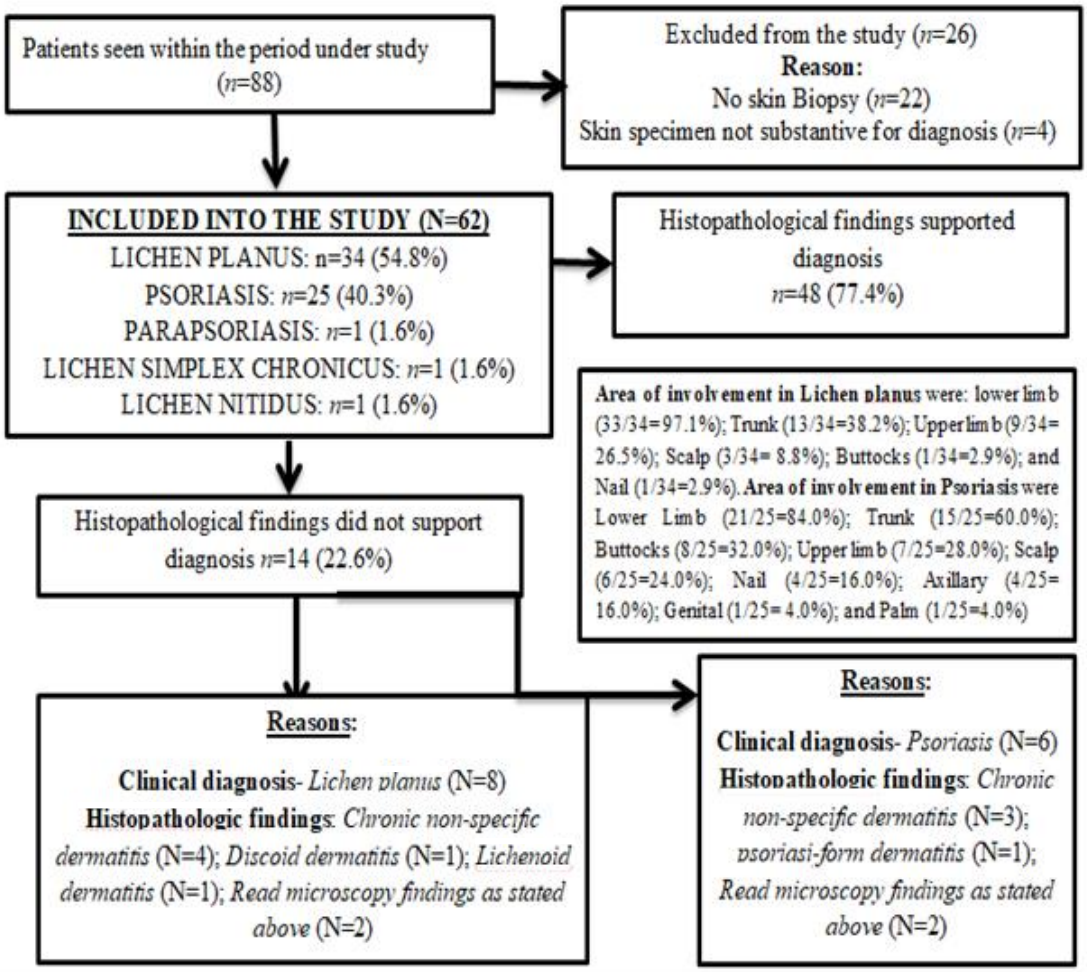

Fig. 1. Study Flow Chart

Histological features identified from those confirmed by histology as lichen planus (N=26) include Acanthosis 23 (88.5%), pigmentary incontinence 17 (65.4%), papillomatosis 16 (61.5%), band-like lymphoctic infiltrates 15 (57.7%), saw tooth appearance 8 (30.8%), band-like mononuclear cells and chronic inflammatory cells 4 (15.4%) each and parakeratosis 1 (3.8%). Among these features: pigmentary incontinence; saw tooth appearance and hypergranulosis were only seen in lichen planus lesions [Table 2]. Common features identified among 19 patients confirmed histologically as having psoriasis include: elongated rete ridges 16 (84.2%), band-like infiltrate 15 (78.9%), parakeratosis 14 (73.7%), hyperkeratosis, band-like mononuclear and polymorphs infiltrate 3 (15.8%) each. Histological features seen only in psoriasis lesions were elongated rete ridges, polymorphs infiltrates, orthokeratosis, dermal blood vessel and micro abscess of Munro [Table 2].

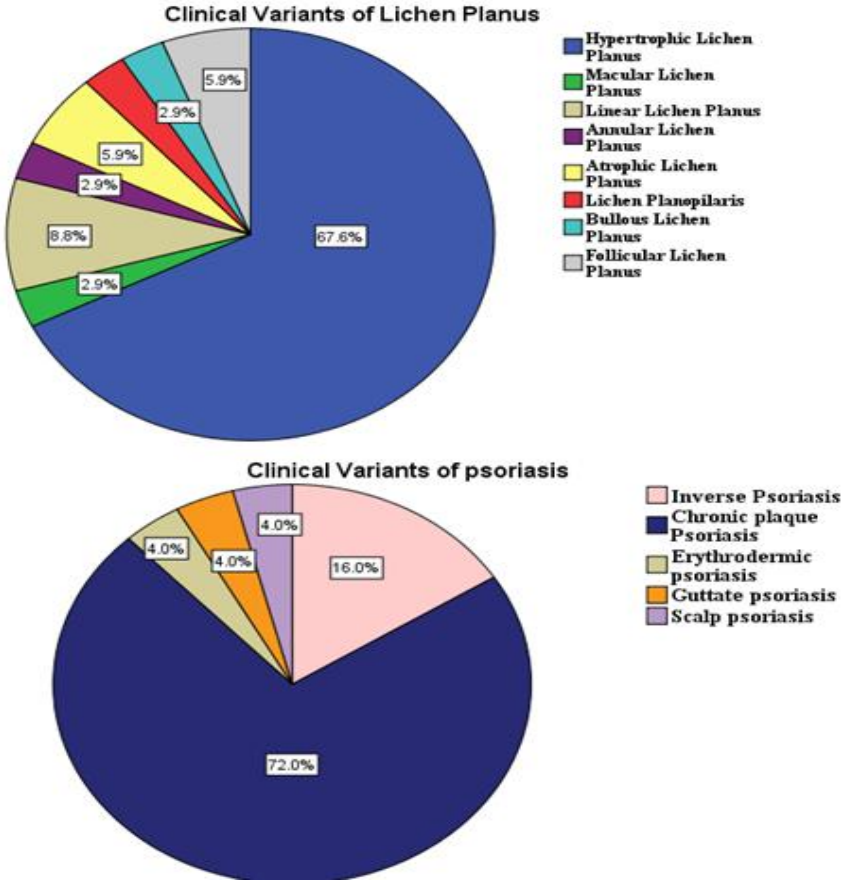

Fig. 2. Distributions of clinical variants of lichen planus and psoriasis

Table 1. Correlate of Clinical Diagnosis and Histological Findings in the study population

Diagnosis	Total	Histology did not confirm diagnosis N (%)	Histology confirmed N (%)	Test of statistic (Kruskal Wallis)
Lichen Planus	34	8 (23.5)	26 (76.5)	Kruskal Wallis (H)=0.906
Psoriasis	25	6 (24.0)	19 (76.0)	
Parapsoriasis	1	0 (0.0)	1 (100.0)	
Lichen simplex chronicus	1	0 (0.0)	1 (100.0)	*P*=0.924
Lichen nitidus	1	0 (0.0)	1 (100.0)	
Total	62	14 (22.6)	48 (77.4)	

Table 2. Histological findings and associated clinical diagnosis

Histological features	Lichen planus (*n*=26) N (%)	Psoriasis (n=19) N (%)	Lichen nitidus (n=1) N (%)	Lichen simplex chronicus (n=1) N (%)	Parapsoriasis (n=1) N (%)
Acanthosis	23 (88.5)	13 (68.4)	1 (100.0)	1 (100.0)	1 (100.0)
Hyperkeratosis	8 (30.8)	3 (15.8)	0 (0.0)	0 (0.0)	1 (100.0)
Parakeratosis	1 (3.8)	14 (73.7)	0 (0.0)	0 (0.0)	0 (0.0)
Papillomatosis	16 (61.50)	1 (5.3)	1 (100.0)	1 (100.0)	1 (100.0)
Elongated club-shaped Rete ridges	0 (0.0)	16 (84.2)	0 (0.0)	0 (0.0)	0 (0.0)
Saw-tooth appearance	8 (30.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Orthokeratosis	0 (0.0)	1 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)
Hypergranulosis	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Micro abscess of Munro	0 (0.0)	1 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)
Band-like mononuclear cell infiltrate	4 (15.4)	3 (15.8)	0 (0.0)	0 (0.0)	0 (0.0)
Band-like lymphocytic infiltrate	15 (57.7)	15 (78.9)	1 (100.0)	1 (100.0)	0 (0.0)
Pigmentary incontinence	17 (65.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Chronic inflammatory cells	4 (15.4)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)
Mixed inflammatory cells infiltrate	0 (0.0)	1 (5.3)	0 (0.0)	0 (0.0)	1 (100.0)
Dermal blood vessel	0 (0.0)	1 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)
Polymorphic infiltrates	0 (0.0)	3 (15.8)	0 (0.0)	0 (0.0)	0 (0.0)
Eosinophilic infiltrates	0 (0.0)	1 (5.3)	0 (0.0)	0 (0.0)	0 (0.0)

*Figures in parentheses ( ) are Percentages calculated as (N/n*100) where n is the total number histologically confirmed papulosquamous skin with disorder and N frequency of histological features*

Table 3. Comparison of Histopathological findings in Lichen Planus from various studies

Histological features	Younes&Haque et al [5] 2004(n=12)%	Arora et al 2014[7]n=38%	Chavhan et al 2014[8] (n=35)%	Parihar et al 2015[9] (n=145) %	Sushma et al[10] 2016%	Narayankar et al[11] 2018 %	Banguru&Karibasappa 2016[12]N=50%	Barman et al 2018[13](n=24)(%)	Present study 2020(n=26)%
Acanthosis	66.6		66.0	94.0	42.00	83.33	78.0	70.83	88.5
Hyperkeratosis	+	92.0	29.0	-	31.57	91.66	86.0	70.83	30.8
Parakeratosis	-		6.0	-	15.78	8.33		8.33	3.8
Papillomatosis	-	10.5	-	-	-	-		-	61.5
Saw-tooth appearance	-		-	76.0	-	83.33	59.0	-	30.8
Hypergranulosis	83.3	82.0	89.0	96.5	52.63	100.0	86.0	58.33	3.8
Vacuolar degeneration of basal cells	100.0	100.0	83.0	99.0	57.89	100.0	73.0	81.33	-
Max Joseph space	58.3		6.0	29.5	10.52	-		4.16	-
Civatte bodies	-	29.0	6.0	-	-	25.00	10.0	-	-
Epidermal atrophy	-		-	-	-	8.33		-	-
Band-like mononuclear cell infiltrate	-		100.0	-	-			91.6	15.4
Band-like lymphocytic infiltrate	-	100.0	89.0	-	-	100.0	89.0	-	57.7
Pigmentary incontinence	54.1	36.8	49.0	-	-		77.7	-	65.4
Chronic inflammatory cells	-			-	-			-	15.4

Table 4. Comparison of Histopathological findings in Psoriasis from various studies

Histological features	Mehta et al 2009[17] (n=58)%	Chavhan et al 2014 [8] (n=35)%	Pandit et al 2015[18] (n=42)%	Kim et al 2015[19](n=98)%	Raghuveer et al 2015[20](n=100)%	Barman et al 2018[13](n=9)(%)	Present study 2020 n=19%
Acanthosis	93.10	90.0	97.61	-	75.0	88.88	68.4
Hyperkeratosis	-	25.0	23.80	-	79.0	77.77	15.8
Parakeratosis	65.51	75.0	100.00	93.0	77.0	88.88	73.7
Papillomatosis	-	-	-	-	-	-	5.3
Elongated regular shaped Rete ridges	-	-	-	93.0	75.0	-	84.2
Orthokeratosis	-	-	-	-	-	-	5.3
Hypogranulosis	87.93	50.0	92.85		51.0	44.44	-
Supra papillary thinning	65.51	20.0	95.23	90.0	-	66.66	
Micro abscess of Munro	-	75.0	83.33	54.0	58.0	44.44	5.3
Spongiform Pustule	31.3	55.0	95.23	55.0	30.0	-	-
Band-like mononuclear cell infiltrate	-	-	-	-	-	-	15.8
Band-like lymphocytic infiltrate	-	-	-	-	98.0	-	78.9
Mixed inflammatory cells infiltrate	-	90.0	100.0	99.0	-	88.88	5.3
Dilated dermal blood vessel	91.37	-	-	-	98.0	-	5.3
Polymorphs infiltrates	-	-	-	-		-	15.8
Eosinophils	-	-	-	-	8.0	-	5.3
Papillary Edema	-	15.0	-	93.0		33.33	-
Vascular changes	-	10.0	-	97.0		88.88	-

Table 5. Distribution of clinical variants of various types of papulosquamous skin disorders and their histological features

Histopathology features	Linchen Planus						Poriasis						Linchen nitidus	Lichen simplex chronicus	Parapsoriasis
	Hypertrophic	Macular	Linear	Annular	Atrophic	Lichen Planopiliris	Bullous	Follicular	Inverse	Chronic Plaque	Guttate	Scalp			
Acanthosis	17	1	2	1	1	1	0	0	2	10	0	1	1	1	1
Hyperkeratosis	8	0	0	0	0	0	0	0	0	3	0	0	0	0	1
Parakeratosis	0	0	0	0	1	0	0	0	1	12	0	1	0	0	0
Papillomatosis	11	1	2	1	1	0	0	0	1	0	0	0	1	1	1
Elongate club-shaped Rete	0	0	0	0	0	0	0	0	3	12	0	0	0	0	0
Saw-tooth appearance	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orthokeratosis	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Hypergranulosis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micro abscess of munro	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Band-like mononuclear cell	1	1	1	0	1	0	0	0	0	3	0	0	0	0	0
Band-like lymphocy infiltrate	10	1	1	2	1	0	0	0	3	12	0	0	1	1	0
Pigmentary incontinence	11	0	2	2	0	0	1	1	0	0	0	0	0	0	0
Chronc inflammatory cells	2	0	0	1	0	0	1	0	0	0	0	0	0	1	0
Mixed inflammatory cells	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Dermal blood vessel	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Histological features identified in Lichen nitidus were acanthosis, band-like infiltrate and papillomatosis 1 (100.0%) each, whereas in Lichen simplex chronicus were acanthosis, band-like infiltrate, chronic inflammatory cells and papillomatosis 1 (100.0%) each while Histological features in parapsoriasis include acanthosis, hyperkeratosis, mixed inflammatory cells and papillomatosis 1 (100.0%) each [Table 2]. The most common features seen in all the diagnosis of different variants of papulosquamous skin disorder were: acanthosis, papillomatosis and chronic inflammatory cells [Table 2].

The histopathological findings from this study were compared with other studies in Tables 3 and 4 while Figs. 3-4 depict the Pictures and Photo micrograph of a Lichen Planus Patient and chronic plaque psoriasis Patient respectively.

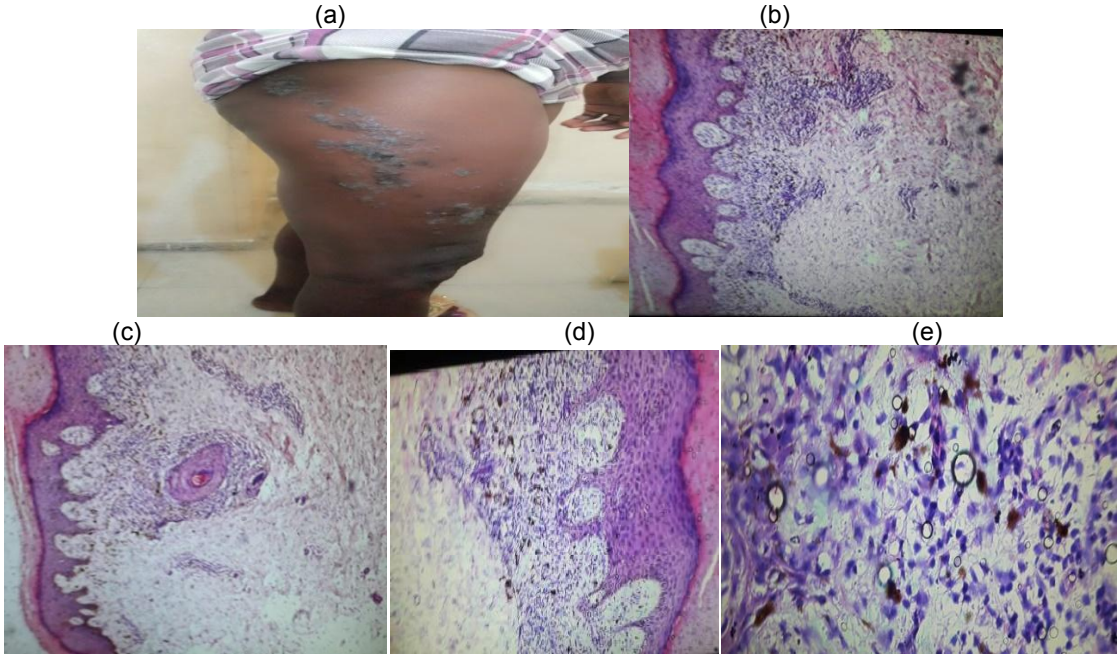

Fig. 3. Pictures and Photo micrograph of a Lichen Planus Patient (a) A 28 year old civil servant/Farmer diagnosed with lichen planus involving the right lower limb; H and E stained photo micrograph:- (b) & (c) are ×10- acanthosis. Hyperkeratosis and saw-tooth appearance; (d): ×20- band of cellular infiltrates;(e): ×40 - inflammatory cells of his histology findings

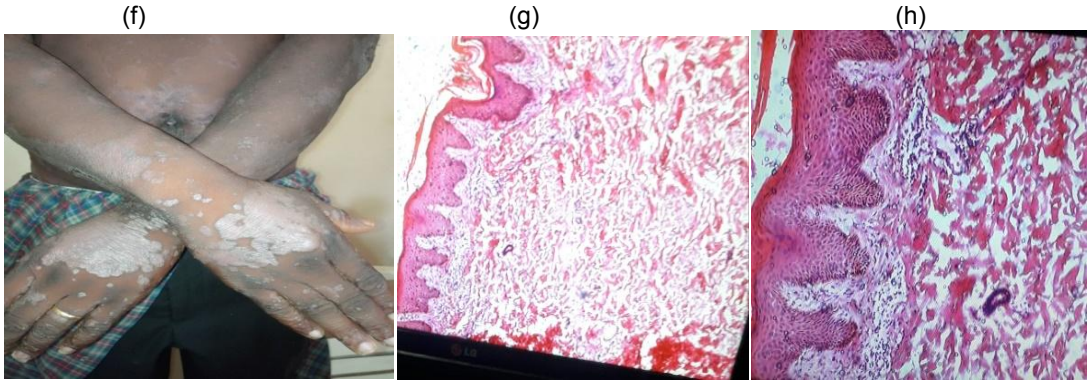

Fig. 4. Pictures and Photo micrograph of a chronic plaque psoriasis Patient (f) A 42 year old teacher diagnosed as chronic plaque Psoriasis; (g) ×10 and (h) ×20 - are H and E stained photo micrograph, all showing acanthosis and elongated rete-ridges

4. DISCUSSION

The outcome of our findings showed that lichen planus was the commonest clinically diagnosed papulosquamous skin disorder, followed by psoriasis; this was similar to the findings of D'Costa et al. [2]. Positive clinicopathological correlation for lichen planus (76.5%) is consistent with those by Reddy et al. [4], Younas et al. [5], D'Costa et al. [2] and Agarwal et al. [6] who observed 86.25%, 76.30%, 97.52% and 58% positive correlation respectively.

Common histopathological findings of lichen planus as seen in the study were comparable with previous findings [5,7,8,9,10,11,12,13]. However, papillomatosis seems more prominent in our study probably due to the high number of hypertrophic lichen planus diagnosed in this study (67.6%). This is supported by Namazi et al. [14] and Arora et al.[7]. Other regular histologic findings such as vacuolar degeneration of the basal cells, civatte bodies and Max Joseph space were conspicuously absent when compared with Youne and Haque et al. [5], Arora et al 7 and Parihar et al. [9]. Our findings of band-like lymphocytic infiltrate (57.7%) was also consistent with previous assertion by Boyd et al [15] that the principal dermal feature in the histology of lichen planus is the band like interface of inflammatory infiltrate which consists of lymphocytes and histiocytes that hug the basal layer.

For psoriasis, the histopathological diagnoses that were at variance with the clinical diagnosis were non-specific chronic dermatitis, psoriasiform dermatitis and two were inconclusive. Sometimes clinical manifestations are misleading in many conditions whereas some cases are clinically suspicious while others are not [16]. Our histopathological findings for psoriasis were compatible with other studies [17,8,18,19,20,13]. However, prominent histologic findings such as hypogranulosis, supra papillary thinning, spongiform pustule and papillary edema which were further observed by Mehta et al. [17], Chavhan et al. [8], Kim et al. [19] and Banman et al. [13] were not documented in our study. Also Renuka et al. [21] had posited that microabscess of Munro and spongiform pustule are early histological features of psoriasis and since most of our patients presented months after onset of lesions, this could explain why we observed only 1 (5.3%) microabscess of Munro and none of spongiform pustule.

In this study, one case of lichen nitidus was diagnosed clinically in a 9 year old male child with fleshy tiny discrete papular non-itchy multiple eruption involving the thigh, knee and abdomen. Histology showed acanthosis, papillomatosis, and band like lymphocytic infiltrate. However, other studies have reported that the hallmark of histological findings in lichen nitidus is a well-confined granulomatous infiltrate of lymphocytes, macrophages, Langerhans giant cells, and multinucleated epithelioidhistiocytes in the papillary dermis bordered by extensions of epidermal ridges. This sharply restricted inflammatory infiltrate generally spans 4 to 5 dermal papillae within the dermis, giving a "ball-in-clutch" configuration [22,23].

Lichen simplex chronicus as seen in this study is a skin disorder characterized by chronic itching and scratching which makes the skin to become lichenified (thick, leathery darkened). It is seen twice in women than in men who are in their 30 – 50 years [24,25]. Our histology findings were acanthosis, papillomatosis, band like lymphocytic infiltrate and chronic inflammatory cells; which is comparable with other studies [24,25,26].

One (3.1%) case of parapsoriasis was seen in a 53 year old man presenting as a red scaly papular plaque lesion with mild pruritus on the trunk and upper limb. Histological features of acanthosis, hyperkeratosis, papillomatosis and mixed inflammatory cells infiltrate were found and this is consistent with previous studies [27,28].

There was discordance in 14 (22.6%) cases between clinical diagnosis and histopathological confirmation. These comprise 8 cases of lichen planus which were opined as chronic non-specific dermatitis, lichenoid dermatitis and inconclusive cases. These could mean that the essential histopathological features in the diagnosis of lichen planus may have been absent. Such was also noticed in 6 cases clinically diagnosed as psoriasis but histologically diagnosed as chronic non-specific dermatitis, psoriasiform dermatitis and inconclusive case. This is similar to studies that have shown that there could be discordance between clinical manifestations and histological studies. [16] The 22.6% discordance between clinical diagnosis and histological diagnosis is of great importance because such category of patients will not have access to appropriate treatment that is required of a tertiary healthcare institution. Study by Inaloez observed that diagnostic rate of

papulosquamous skin disease increased up to 100% in the presence of clinical information and good histological analysis [29]. For a more definite differentiation of various papulosquamous skin disease histopathologically is very crucial for appropriate medical treatment which may vary among diseases that make up papulosquamous skin disorder. This is clearly seen and supported by the present study.

5. CONCLUSION

In order to overcome the attending complexity in diagnosing and initiating appropriate treatment for papulosquamous skin disorder which we commonly see in our clinics; there is need for lucid clinical information and description of lesions to aid the histopathologist in arriving at a definitive diagnosis which is the gold standard. It is also important for the histopathologist to acquaint themselves with the essential histological features of each of this disease entity and be able to differentiate them even when there are overlap since each of these disease items may require different treatment approach.

CONSENT

A witnessed written consent was obtained before biopsy was done.

ETHICAL APPROVAL

Approval was obtained from the Ethics Committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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