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Original Article

Dermatology Section

Bridging the Gap between Clinicoepidemiological and Histopathological Variants of Psoriasis: A Cross-sectional Study

PRATIKSHA KANUBHAI RATHWA[1], HIRAL SHAH[2], SANJAYKUMAR SOMSINGBHAI RATHWA[3], PRIYANKA ROUT[4]

ABSTRACT

Introduction: Psoriasis is a chronic inflammatory immune-mediated skin disease associated with systemic manifestations that affects about 0.5%-2.5% of the population, which varies according to regions. It is a conglomeration of multiple variants that have distinct morphological features. A histopathological study provides the diagnosis of psoriasis in classic form and its variants.

Aim: The present study aimed to analyse the incidence of age, sex, disease duration, and distribution of various psoriasis variants while underscoring the clinical significance of histopathological assessment of epidermal and dermal features.

Materials and Methods: The present cross-sectional study was conducted at Baroda Medical College, Vadodara, Gujarat, India, from January 2024 to December 2024. Hundred newly diagnosed patients of different variants of psoriasis visiting the Dermatology Outpatient Department (OPD) were included in the study, and a detailed clinical history with special reference to gender, duration, site of onset, seasonal exacerbation or remission, triggering factors, past treatment, family history and other systemic disease was taken. Complete head-to-toe cutaneous examination and systemic examination were carried out, and findings were noted. Biopsied specimens were processed in the histopathology section and stained with Hematoxylin and Eosin (H&E) stain, and 10 parameters like parakeratosis, elongated rete ridges, Munro's microabscess, acanthosis, suprapapillary thinning, hypogranulosis, Kogoj abscess, capillary dilatation, dermal infiltrate, and spongiosis were used to assess and classify various types of psoriasis. Collected data were statistically analysed by the Chi-square test and a p-value of <0.05 was considered significant.

Results: Total 100 patients were included among which male preponderance with 60 (60%) cases noted, with the maximum cases in the 31-40 year age group. The predominant histological type was Chronic Plaque Psoriasis (CPP) in 44 (44%) cases, followed by Palmoplantar Psoriasis (PPP) in 32 (32%). Amongst various cutaneous features of psoriasis, erythema was present in 79 (79%) followed by plaques 54 (54%). Auspitz sign and Woronoff ring were noted in 40 (40%) and 20 (20%) cases, respectively. Amongst the epidermal histopathological features of psoriasis, parakeratosis was found in 93 (93%) followed by hyperkeratosis 84 (84%). The dermal feature showed dermal infiltrate in 95 (95%) cases. These findings were statistically significant (p-value <0.0001).

Conclusion: Present study emphasises the role of histopathological study in various clinical variants of psoriasis to see the two aspects simultaneously for effective diagnosis and treatment. The current study concluded that even though most changes occur in the epidermis, there are a few dermal changes which can help in arriving at a diagnosis.

Keywords: Capillary dilatation, Kogoj abscess, Munro's microabscess, Parakeratosis

INTRODUCTION

Psoriasis is a chronic inflammatory, multisystemic, immune-mediated disease characterised by well-defined erythematous plaques and papules with micaceous to silvery white scales predominantly affecting extensors of upper limbs, lower limbs, scalp and lumbosacral area. While it affects about 0.5-2.5% of the population, which varies according to regions [1], the prevalence of psoriasis in the Indian population is found to be 0.44-2.8 per cent, which affects individuals of any age group, gender, ethnicity and socioeconomic status [2,3]. It is considered as a polygenic disease with greater incidence in among first degree and second degree relatives of patients [4]. Psoriasis has a bimodal age of onset with first peak at 20-30 years of age and second peak at 50-60 years of age [5-7]. In genetically predisposed individuals, psoriasis can be triggered by extrinsic (directly interacting with skin) or intrinsic causes. Infections, obesity, psychogenic stress, cold, alcohol use, and smoking are among the most often recognised systemic stressors [8,9].

The classic findings of erythema, thickening and scale are reflections of the histologic findings of elongated dilated capillaries that are close to the skin surface, epidermal acanthosis plus cellular infiltrates, and abnormal keratinisation, respectively. A wet surface with distinctive pinpoint bleeding is observed upon removal of the superficial silvery white (micaceous) scales. This clinical manifestation of dilated and tortuous blood vessels in the dermal papillae along with thinning of the suprapapillary epidermis is known as the Auspitz sign [10]. A pale blanching ring known as Woronoff's ring may occasionally encircle psoriatic lesions in addition to their incredibly distinctive feature of sharp delineation [11].

Manifestation of clinical psoriasis is a rhythmic, repeated pathologic event and not a continuous one depending upon which diverse histopathological findings are seen. Classic psoriasis is often easy to diagnose clinically. However, the histologic examination may occasionally be required to offer a definitive diagnosis in circumstances where the clinical presentation is varied. The histological changes associated with psoriasis are as varied as its clinical presentations. Thus, in cases where diagnosis is ambiguous, the combination of histological features and clinical examination helps dermatologists make the diagnosis. In contrast to psoriasis, research has been done on leprosy, basal cell cancer, and lichen planus to determine their determinants and establish clinic-histopathological concordance. Therefore, while making decisions on the long-term care of a disease, concordance is crucial [12-14]. However, limited research is available on psoriasis with 100 patients or more. Hence, this study was conducted to know clinical and histopathological variants and incidence of age, sex, duration and distribution of psoriasis and to

signify the importance of clinicohistopathological concordance in diagnosis and management of the same.

MATERIALS AND METHODS

The present cross-sectional study was carried out in Department of Dermatology, Venereology and Leprosy at Baroda Medical College, Vadodara, Gujarat, India from January to December 2024. Ethical clearance (IECBHR/88-2024) was obtained from Ethics Committee.

Inclusion criteria: A total of 100 clinically diagnosed patients with different variants of psoriasis, willing to get biopsy and had given the informed consent were included.

Exclusion criteria:

1. Patients not willing to get biopsy.
2. Previously diagnosed psoriatic patients already on topical or systemic treatment

Sample size calculation: Formula for sample size:

n=4PQ/L2

Q=1-P,

L=Allowable error i.e., 3%

where n=Sample size. P=Prevalence (%) i.e., 2 [2]

The initially calculated value was approximately 87.1. To account for a 10% margin, the adjusted sample size became 97. For simplicity, the final sample size was rounded to 100.

Study Procedure

A detailed clinical history with special reference to gender, duration, site of onset, seasonal exacerbation or remission, triggering factors, past treatment, family history and other systemic disease was taken. The clinical diagnosis was based on detailed clinical history and clinical examination. Presence of sharply demarcated and symmetrically distributed erythematous silvery scaly plaques with or without fissuring, studded pustules over the body, with presence or absence of similar type of lesion involving palm, knuckles of hand and soles, scalp was taken clinically as a feature in favor of CPP, PPP and scalp psoriasis respectively [15]. Erythrodermic psoriasis was considered when there was generalised erythema and scaling involving 75-90% body surface area. Clinical features of other variants of psoriasis include erythema and pustules in the case of pustular psoriasis, numerous small, discrete scaly papules in the case of guttate psoriasis [16]. Based on clinical features, the type of psoriasis was classified. Biopsy specimens were processed and stained with Haematoxylin and Eosin stain, and a total of 10 histopathological parameters, like parakeratosis, elongated rete ridges, Munro's micro-abscess, acanthosis, suprapapillary thinning, hypogranulosis, Kogoj abscess, capillary dilatation, dermal infiltrate, and spongiosis, were studied.

STATISTICAL ANALYSIS

Collected data were tabulated in a Microsoft Excel Worksheet 2019 and analysed using Statistical Package for Social Sciences (SPSS) Statistics, version 28.0.1.0. The Chi-square test was applied to assess the statistical significance of categorical variables, with a p-value of <0.05.

RESULTS

In the study, a male preponderance was observed in 60% of cases, with a male-to-female ratio of 1.5:1. The highest incidence occurred in the 31-40 age group (24%), followed by 51-60 years (20%). Half of the patients (50%) had a disease duration of 1-6 years, while 42% had it for less than a year. Out of 100 patients, 64% experienced winter exacerbation, 7% had both summer and winter exacerbations, and 2% showed exacerbations only in summer. Additionally, 27% reported no seasonal exacerbation. A positive family history of psoriasis was noted in 8% of patients, and 33% had co-morbidities, primarily hypertension (54.54%), followed by type II diabetes and a combination of both (21.21% each). Only one patient had sickle cell disease. Scalp was the commonest site to be affected first in 22 (22%) followed by sole 20 (20%), trunk 18 (18%), lower limb 16 (16%), palm 12 (12%), upper limb 10 (10%) and groin 2 (2%) [Table/Fig-1].

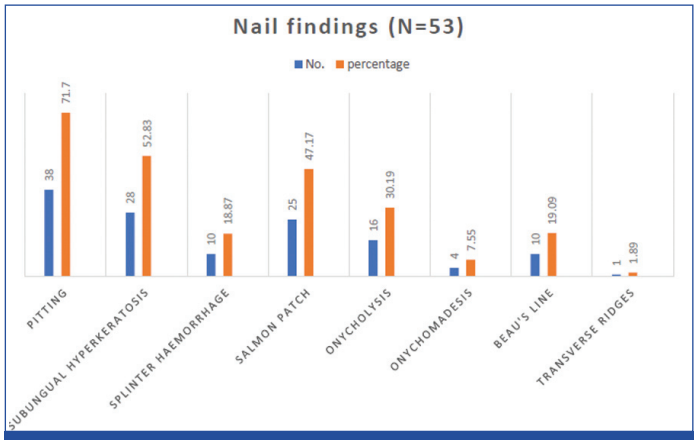
Site of onset	No. of cases (N=100)	Percentage (%)
Scalp	22	22
Trunk	18	18
Upper limb	10	10
Lower limb	16	16
Palm	12	12
Sole	20	20
Groin	2	2

[Table/Fig-1]: Site of onset.

Trunk 51 (51%) was the commonest site involved, followed by the lower limb 50 (50%). Nail involvement was seen in 53 (53%) cases [Table/Fig-2]. Pitting was the most common finding seen in nails 38 (71.70%) followed by subungual hyperkeratosis 28 (52.83%), salmon patch 25 (47.17%) and onycholysis 16 (30.19%) [Table/Fig-3].

Site	Number	Percentage
Face	9	9.0
Lower limb	50	50.0
Upper limb	46	46.0
Trunk	51	51.0
Scalp	48	48.0
Groin	5	5.0
Genitalia	4	4.0
Palm	39	39.0
Sole	48	48.0
Nail	53	53.0

[Table/Fig-2]: Distribution of lesions.



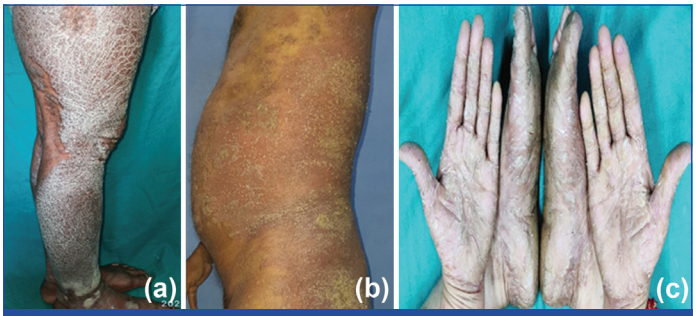
[Table/Fig-3]: Nail findings.

The CPP was the most common variant encountered in 44 (44%) cases followed by PPP 32 (32%), guttate psoriasis 8 (8%), erythrodermic psoriasis 7 (7%), pustular psoriasis 6 (6%) and flexural psoriasis 2 (2%). We got a single case of acrodermatitis continua of hallopeau [Table/Fig-4,5]. b) Pustular psoriasis (black arrow showing erythema, yellow arrow showing multiple pustules); c) PPP (blue arrow showing erythema, green arrow showing hyperkeratotic scaly plaques).

Among various clinical features, erythema was the most common 79 (79%), followed by plaques 54 (54%), silver scales 48 (48%), papules 29 (29%) and pustules 6 (6%). These findings were statistically significant. (Chi-square=141.1, p-value <0.0000001) Auspitz sign was noted in 40 (40%) patients and Woronoff's ring

Type		Number	Percentage
Chronic Plaque Psoriasis (CPP)		44	44.0%
Flexural psoriasis		2	2.0%
Pustular psoriasis	Generalised pustular Psoriasis	4	6.0%
	Palmoplantar pustulosis	1	
	Localised pustular psoriasis	1	
Guttate psoriasis		8	8.0%
Palmoplantar Psoriasis (PPP)		32	32.0%
Acrodermatitis continua of hallopeau		1	1.0%
Erythrodermic psoriasis		7	
Total		100	100

[Table/Fig-4]: Clinical variants of psoriasis.



[Table/Fig-5]: a) Chronic Plaque Psoriasis (CPP) (Red arrow showing Silvery scaly plaque); b) Pustular psoriasis (Black arrow showing Erythema, Yellow arrow showing multiple pustules); c) PPP (Blue arrow showing erythema, Green arrow showing hyperkeratotic scaly plaques).

was seen in (20) 20% patients. A total of 15 (15%) patients showed koebnerisation [Table/Fig-6].

[Table/Fig-6]: Different clinical features of psoriasis.

On histopathological examination, following epidermal parameters were noted: Parakeratosis 93 (93%), hyperkeratosis 84 (84%) from which focal hyperkeratosis in 14 (16.67%) while confluent type in 70 (83.33%), elongated rete ridges 75 (75%), acanthosis 60 (60%), suprapapillary thinning 44 (44%), Munro's microabscess 39 (39%), spongiosis 29 (29%), hypogranulosis 26 (26%) and Kogoj abscess 19 (19%). Among dermal features, dermal infiltrates composed of mononuclear cells were seen in maximum cases 95 (95%), followed by capillary dilatation and tortuosity 53 (53%) [Table/Fig-7]. These findings were statistically significant. (Chi-square=307.1, p-value <0.0000001).

Findings		Number		Percentage
Epidermal changes				
Parakeratosis		93		93.0%
Hyperkeratosis	Focal	14	84	84.0%
	Confluent	70		
Elongated rete ridges		75		75.0%
Munro's microabscess		39		39.0%
Acanthosis		60		60.0%
Suprapapillary thinning		44		44.0%
Hypogranulosis		26		26.0%
Kogoj microabscess		19		19.0%
Spongiosis		29		29.0%
Dermal changes				
Capillary dilatation		53		53.0%
Dermal infiltrate		95		95.0%

[Table/Fig-7]: Different histopathological features found in the present study.

There are variants of psoriasis that have different clinical morphologies that vary in their histopathologic features. Comparison of histopathologic features among various variants is shown in [Table/Fig-8-12].

A total of 94 (94%) patients showed clinicohistopathological concordance in the present study, while the remaining 6 (6%) were found discordant to its clinical types. This concordance finding in the present study was not found statistically significant. (Chi-square=0.2123, p-value=0.9998) [Table/Fig-13].

DISCUSSION

Psoriasis has a chronic, relapsing and remitting disease course, and it is characterised histopathologically by abnormal keratinocyte hyperproliferation leading to thickening of the stratum corneum (Hyperkeratosis) and stratum malpighii (Acanthosis). As a consequence of the course of remissions and exacerbations, the histopathologic features vary with the age of lesions and the site of the lesion. This is also considered a good histopathological explanation of the concept of squirting papillae [17] which is a rhythmic discharge of inflammatory fluid and cellular exudates from dermal papillae into suprapapillary epidermis. Fully developed psoriatic plaques show marked epidermal hyperplasia with characteristic epidermal features. There is marked hyperkeratosis which may be confluent (tiered) or focal along with parakeratosis (nucleated stratum corneum) specifically just above the area of hypogranulosis [18].

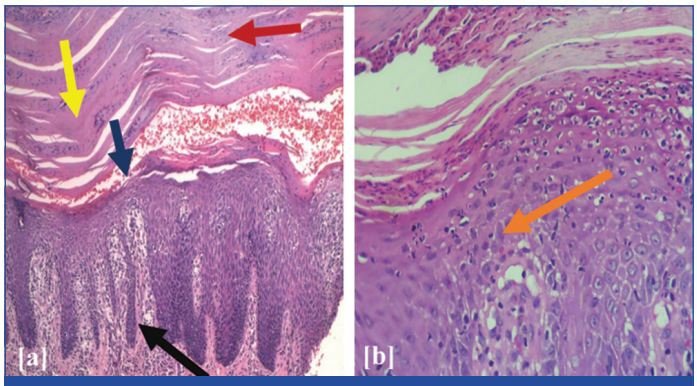
In present study, it was found that psoriasis is more prevalent among males compared to females and male: female ratio was 1.5:1 which was in accordance with the study of Rakhesh SV et al., and Khandpur S et al., Guillet C et al., concluded that psoriasis affects males and females equally [19-21]. But in the Indian population, males seem to be affected quite more often compared to females, as these studies are mostly hospital-based and not population-based.

In the present study, a total of 8 (8%) patients had a positive family history. The maximum number of patients was in the fourth decade of life. This finding is similar to the study of Neimann AL et al., [22]. Among males, the maximum number, 15 (25%), was presented within the age group of 31-40. In females, similarly maximum number of 9 (22.5%) were presented within the age group of 31-40 years. Kimball AB et al., identified bimodal nature of the disease describing two types of psoriasis: 1) Type I (Early onset): occurring at or before the age of 40 years, with positive family history of psoriasis and expression of HLA-cw6 2) Type II (Late onset): occurring after the age of 40 years, with no family history and lack of expression of HLA-cw6 [7]. They also stated that Type I psoriasis has been associated with recurrent and more widespread disease courses [23]. The maximum of Indian studies reported a lower familial incidence of disease. In the present study, also similar finding was seen.

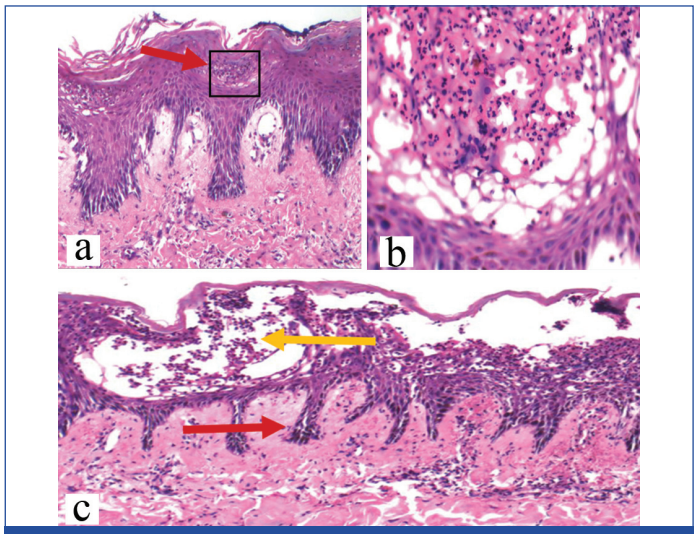
The scalp is one of the commonest areas to be affected by CPP and often the first site to be affected. Scalp lesions may be an early manifestation occurring before the other clinical manifestations of psoriasis [24]. Similarly, in the present study scalp was the most common site (22%) to be involved first, followed by the sole (20%). The most common site to be involved was the trunk in (51%) cases, followed by the lower limb 50 (50%). The Koebner phenomenon, i.e., the elicitation of psoriatic lesions by injury to the skin, suggests that psoriasis is a generalised skin disease that can be triggered locally [25].

Histopathological findings	Clinical types (%)							
	Chronic plaque n=44 (%)	Palmoplantar n=32 (%)	Guttate n=8 (%)	Erythrodermic n=7 (%)	Pustular n=6 (%)	Flexural n=2 (%)	Acrodermatitis continua of Hallopeau n=1 (%)	Total n=100 (%)
Parakeratosis	42 (95.45)	28 (87.5)	7 (87.5)	7 (100)	6 (100)	2 (100)	1 (100)	93
Hyperkeratosis	38 (86.36)	31 (96.88)	5 (62.5)	4 (57.14)	3 (50)	2 (100)	1 (100)	84
Elongated rete ridges	35 (79.5)	23 (71.88)	5 (62.5)	5 (71.43)	4 (66.67)	2 (100)	1 (100)	75
Munro's micro-abscess	17 (38.64)	13 (40.62)	2 (25)	-	5 (83.33)	1 (50)	1 (100)	39
Acanthosis	27 (61.36)	21 (65.62)	4 (50)	4 (57.14)	4 (66.67)	-	-	60
Suprapapillary thinning	24 (54.54)	11 (34.38)	1 (12.5)	4 (57.14)	3 (50)	1 (50)	-	44
Hypogranulosis	12 (27.27)	8 (25)	3 (37.5)	2 (28.57)	1 (16.67)	-	-	26
Kogoj abscess	5 (11.36)	7 (21.88)	1 (12.5)	1 (14.28)	4 (66.67)	-	1 (100)	19
Spongiosis	4 (9.09)	18 (56.25)	5 (62.5)	1 (14.28)	1 (16.67)	-	-	29
Capillary dilatation	21 (47.73)	20 (62.5)	3 (37.5)	4 (57.14)	2 (33.33)	2 (100)	1 (100)	53
Dermal infiltrate	43 (97.73)	32 (100)	7 (87.5)	6 (85.71)	6 (100)	1 (50)	-	95

[Table/Fig-8]: Comparison of histopathological features with different variants.

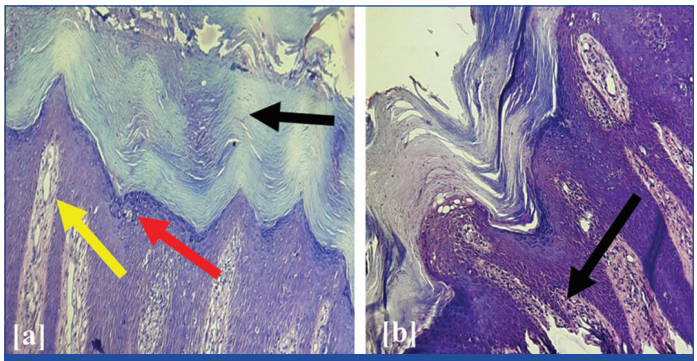


[Table/Fig-9]: a) (Black arrow) Regular elongated rete ridges, (Yellow arrow) Hyperkeratosis, (Red arrow) Parakeratosis, (Blue arrow) Suprapapillary thinning (H&E, x10); b) (Orange arrow) Squirting papilla and Suprapapillary thinning (H&E, x40).

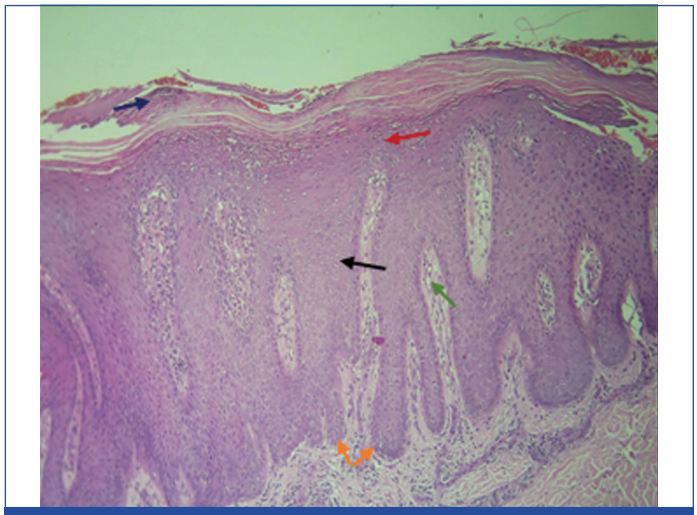


[Table/Fig-10]: a) Neutrophilic collection within stratum spinosum (Kogoj abscess) (H&E, x10); b) Inlet showing the magnified view of the same (H&E, 40x); c) (red arrow) Elongated rete ridges, (yellow arrow) Sub-corneal collection of polymorphs (Munro's micro-abscess) (H&E, x10).

Cold weather generally worsens psoriasis, while hot weather and sunlight are often beneficial. Xerosis and low humidity in winter may explain this exacerbation. Interestingly, 64% of patients in the study experienced worse symptoms in winter [26]. CPP, the most prevalent variant (44%), is characterised by large erythematous plaques with silvery scales, reflecting histological features like epidermal hyperkeratosis and tortuous capillaries. The silvery appearance results from trapped air in lamellar parakeratosis. Removal of scales often leads to pinpoint bleeding, known as the Auspitz sign, found in 40% of patients. However, this sign isn't always specific or sensitive for psoriasis [27,28].



[Table/Fig-11]: a) (Black arrow) Confluent hyperkeratosis, (Yellow arrow) Dilated and tortuous capillaries, (Red arrow) Spongiosis; b) (black arrow) dermal infiltrates (H&E, x10).



[Table/Fig-12]: (Blue arrow) tiered parakeratosis and hyperkeratosis, (red arrow) Suprapapillary thinning, (black arrow) showing marked spongiosis, (green arrow) Dilated and Tortuous blood vessels, (orange arrow) Regularly elongated rete ridges (H&E, x10).

CPP, the most prevalent variant (44%), is characterised by large erythematous plaques with silvery scales, reflecting histological features like epidermal hyperkeratosis and tortuous capillaries. The silvery appearance results from trapped air in lamellar parakeratosis. Removal of scales often leads to pinpoint bleeding, known as the Auspitz sign, found in 40% of patients. However, this sign isn't always specific or sensitive for psoriasis [11,25].

In the present study, Munro's microabscess and Kogoj's pustules are common findings, with parakeratosis (93%) and hyperkeratosis being the main epidermal features observed. A comparison with previous studies showed similar dermal features, with lymphocytic infiltrates being the most common finding (95%) [Table/Fig-14] [29,30].

Clinical diagnosis	Histopathological diagnosis	No. of cases	Total discrepancies	Chi-square=0.2123
Guttate psoriasis	Chronic Plaque Psoriasis (CPP)	2	6	
Chronic Plaque Psoriasis (CPP)	Guttate psoriasis	2		p-0.9998 (i.e.; >0.05) hence not significant
Localised pustular psoriasis	Chronic Plaque Psoriasis (CPP)	1		
Erythrodermic psoriasis	Chronic Plaque Psoriasis (CPP)	1		

[Table/Fig-13]: Clinico-histopathological discrepancies noted in diagnosis.

Histopathological findings	Mehta S et al., [29] (n=58)	Raghuveer C et al., [30] (n=100)	Present study (n=100) (%)
Epidermal features			
Parakeratosis	65.51%	89%	93 (93%)
Hyperkeratosis Focal Confluent	0%	77% 46% 31%	84 (84%) 14 (14%) 70 (70%)
Elongated rete ridges	0%	75%	75 (75%)
Munro's microabscess	0%	58%	39 (39%)
Acanthosis	93.10%	75%	60 (60%)
Suprapapillary thinning	65.51%	0%	44 (44%)
Hypogranulosis	87.93%	51%	26 (26%)
Kogoj abscess	0%	30%	19 (19%)
Spongiosis	31.03%	0%	29 (29%)
Dermal features			
Capillary dilatation	91.37%	90%	53 (53%)
Dermal infiltrate	0%	98%	95 (95%)

[Table/Fig-14]: Comparison of our study with other studies.

These findings highlight that while histopathological examination is considered the gold standard for diagnosing psoriasis, there can be variations in the histopathological results. This variability may create challenges for dermatologists during treatment. Therefore, having a thorough understanding of the different morphological features of various psoriasis variants, along with their epidemiology and histopathological characteristics, is essential for making an accurate diagnosis and guiding timely clinical interventions.

Limitation(s)

The small sample size for each morphological variant of psoriasis in this study highlights the need for further research with a larger number of participants for each variant. This will help support the clinical and histopathological findings and allow for a simultaneous examination of the clinico-histopathological features associated with each variant.

CONCLUSION(S)

Psoriasis presents in multiple forms, each with unique morphological characteristics that can resemble other skin conditions. In this study, the majority of patients exhibited matching clinical and histopathological findings, with only six cases showing discrepancies-though these were statistically insignificant. Despite histopathological examination being the gold standard for diagnosing psoriasis, variations can pose challenges for dermatologists. While epidermal changes are commonly observed in most lesions, certain notable dermal alterations can also contribute to diagnosis. Therefore, establishing a clinicopathological correlation remains crucial.

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PARTICULARS OF CONTRIBUTORS:
1. Assistant Professor, Department of Dermatology, Venereology and Leprosy, Sumandeep Vidyapeeth (Deemed to be University), Vadodara, Gujarat, India.
2. Associate Professor, Department of Dermatology, Venereology and Leprosy, Baroda Medical College, Vadodara, Gujarat, India.
3. Assistant Professor, Department of General Medicine, Sumandeep Vidyapeeth (Deemed to be University), Vadodara, Gujarat, India.
4. Resident, Department of Dermatology, Venereology and Leprosy, Sumandeep Vidyapeeth (Deemed to be University), Vadodara, Gujarat, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Sanjaykumar Somsingbhai Rathwa,
SBKS MI and RC, Sumandeep Vidyapeeth (Deemed to be University),
Vadodara, Gujarat, India.
E-mail: rathwasanjay16@gmail.com

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